TRANSACTIONS OF THE NEW YORK SURGICAL SOCIETY AND THE PHILADELPHIA ACADEMY OF SURGERY

JOINT MEETING HELD FEBRUARY 11, 1931

DR. EDWIN BEER, President of the New York Surgical Society, in the Chair

OPERATION FOR LARGE VENTRAL HERNIA

DR. CHARLES L. GIBSON presented a man forty-six years of age who, following an operation in 1926 for a perforated duodenal ulcer, devolped a huge incisional hernia. This hernia was repaired June 17, 1930. The operation was very tedious as there was much intra-abdominal work also necessary. The wound was closed by suturing by layers the peritoneum and the sheath of the rectus after opening the mesial edges to approximate the muscles; antero-fascial layers of rectus were approximated after parallel releasing incisions of the fascia two inches to the outer side.

There was prompt convalescence. The condition today is absolutely firm. The man weighs 245 pounds. The case is presented to show that even the most extensive hernia can be treated successfully by this method and that there is no necessity for procedures of doubtful value, such as the transplantation of fascia. The seeming, or theoretical weakness of the wall at the site of the releasing incisions has never been realized in practice. This procedure was described in the ANNALS OF SURGERY for 1920 in which the only case to have a recurrence, and that only partial, was reported. Since then a large number of such operations have been done with absolutely no failures, although no case has ever been refused, no matter how unpromising. The method has also been applied to umbilical hernia and has proved more satisfactory than the usual fascial overlapping operation.

DR. GEORGE M. LAWS said that the principle of the releasing incisions has proven sound and whatever fears surgeons may have had of lateral recurrence have now been dispelled. Intra-abdominal work is not always necessary. There are two kinds of incisional herniæ. One is perhaps not properly called a hernia because it does not have a true peritoneal sac. It starts as a protrusion into the wound and acquires a false sac by condensation of areolar tissue. It may burrow extensively, is prone to cause trouble and requires intra-abdominal operation. In the other kind, with a true sac, one may sometimes reduce the unopened sac *en bloc*, as it were, bring over a layer from the margins of the hernial defect and then proceed with the repair of the fascia. This lessens the time consumed and the danger of complications.

DR. GEORGE P. MULLER said that he had had a number of these cases of ventral hernia both above and below the umbilicus. His method differs from that shown by Doctor Gibson in that after making the incision in the fascia and suturing the median edges together it was often possible to bring the lateral edges together in the median line, thus covering the rectus muscle with fascia. This would prevent the possible bulging that might occur from having no fascia support over the rectus muscle.

IRRADIATION OF PRIMARY OPERABLE CARCINOMA OF BREAST

DR. BURTON J. LEE presented cases of primary operable carcinomas of the breast to illustrate a method of treating these patients by measured tissue doses of irradiation. Until about one year ago the routine procedure in primary operable carcinomas of the breast at the Memorial Hospital was to give a high-voltage cycle over the breast and drainage area as a pre-operative measure. Approximately three weeks after receiving this pre-operative irradiation the patient received radical amputation. When the wound was well healed and the patient in good general condition—which was usually the case in about four weeks after operation—a similar post-operative X-ray cycle was given. When the tumors in these patients were carefully studied grossly and histologically after amputation it was found by Doctor Ewing, in the pathological laboratory, that the cellular degeneration in the tumors was only of a slight degree and that the tissue changes in the environment of the tumors were not of marked degree. Although the use of pre-operative X-ray gives a certain degree of tumor sterilization and change in its environment which is favorable to the ultimate end-result, it was felt that some means of more effective irradiation should be applied in these patients if complete tumor devitalization was to be accomplished.

Therefore, during the past year the primary operable cases to be subjected to radical amputation have received a measured tissue dosage of pre-operative X-ray combined with interstitial radium, by means of the introduction of gold radon seeds or gold radon wires. With the help of the physical laboratory it has been possible to translate the dosage received by the tumor into treatments of skin erythema unit dosages which would have been delivered had the high voltage X-ray alone been employed. Studies in the pathologic laboratory have revealed that complete devitalization of cancer of the breast can be accomplished in the average case by the administration of the equivalent of ten to twelve skin-erythema units. It is obviously impossible, with our present methods of external irradiation, to administer this dose by any external means. This is the reason for the present method of interstitial irradiation which always follows external irradiation. They had taken account of the possible hazard to the patient of the insertion of these radon seeds by means of needle trocars directly into the tumor. Theoretically, one might feel that tumor tissue at the end of such a needle might be introduced into an open lymph or venous channel. Up to the present time, they had seen no instance of diffuse metastasis following this method and they do not believe it occurs, but sufficient time has not elapsed to thoroughly prove or disprove this point. Under this method complete tumor devitalization has been accomplished. Somewhere over one hundred cases have been treated along the lines outlined. At present all primary operable cases entering the Memorial Hospital are divided into one of three groups without selection.

Group A.—High-voltage X-ray cycle plus interstitial radon using a measured dose of ten to twelve skin-erythema doses, and a comparable amount is given into the axilla. Six weeks after the introduction of the radon a radical amputation is performed. In order that they may be convinced of the efficacy or ineffectiveness of this method, no post-operative radiation is being given in this case, which would complicate their conclusions.

Group B.—Radical amputation is being withheld entirely, reliance being placed upon the use of radiation alone by means of the high-voltage X-ray and interstitial radon—measured dosage being the same as in the cases subjected to radical amputation.

Group C.—Surgery only is employed, furnishing a check group for ultimate end-results.

CASE I.—Widow, aged seventy-five, born in Constantinople. For the last four years she has noticed a small lump just below the areola in the right breast. Apparently it has not increased in size. For the past two months there has been some slight sticking pain in this region and for the past three weeks slight redness overlying the skin. Physical examination showed an elderly woman with a tumor 3.5 by 3 by 2 centimetres just above the right nipple in the mesial portion of the breast. The skin over this is adherent and slightly reddened. No definite adenopathy. She was selected for treatment by irradiation alone and was given 1000 per cent., or a skin-erythema dose, delivered to the tumor, and furnished by means of one high-voltage X-ray and the introduction of 25 millicuries of radon seeds into the tumor, furnishing 3325 millicuries. Following external irradiation at the time gold radon seeds were inserted, biopsy was done. Report from the pathological laboratory was as follows: "Carcinoma infiltrating fat and fibrous tissue. Small cells. Insufficient to classify and grade. Marked radiation vascular changes and calcification." Following irradiation marked redness of the skin developed with slight blistering, but this rapidly healed. Last visit to the clinic December 29, 1930. At that time disease appeared inactive.

CASE II.—A woman, widowed, aged forty-six, American. Four days before admission noticed a lump in the right breast. Since that time she has been conscious of slight sticking pain in the same area. There has been some nipple discharge. Physical examination showed a tumor in the right lower quadrant of the right breast measuring 3½ by 3 centimetres. One soft palpable node in the corresponding axilla which was believed not to be significant. Pre-operative irradiation was given using only interstitial radon; 32.37 millicuries of radon were inserted into this tumor on October 25, 1929, and at the same time 18.9 millicuries in the right axilla, furnishing an equivalent of 1300 per cent. of a skin-erythema dose. November 11, 1929, a right radical mastectomy was performed. The wound healed by primary union although about three weeks had elapsed from the time of administering the interstitial radiation. Examination of the specimen showed "a duct carcinoma of the breast with extensive squamous metaplasia, destruction of tumor and productive fibrosis. No tumor was found in the nodes." Her course since then has been uneventful. Her last visit was in January, 1931. At that time there was no evidence of disease. She is shown as a primary operable carcinoma of the breast, treated pre-operatively by using interstitial radiation 1300 per cent. of a skin-erythema dose into the tumor and followed three weeks later by radical amputation. Now one year and four months since beginning of treatment without evidence of disease.

DISCUSSION: DR. JOHN B. CARNETT said there would always be a certain number of patients for whom surgery was impossible, because of poor operative risk, flat refusal to submit to operation, or advanced disease. Treatment of these cases by X-rays alone has been very disappointing as shown by the frequent tendency to local recurrence whenever treatment was interrupted for a few months, and also by practically always finding cancer cells whenever a later simple amputation was done, either because of persistence of a fibrosed mass or because of irradiation necroses. Surface irradiation alone cannot be depended upon to cure these cases and they should routinely receive interstitial irradiation by either radium element or radon.

Keynes, at St. Bartholomew's Hospital in London, has been so impressed by the results of small doses of radium buried in the breast and its lymphatic drainage areas for several days at a time that he now prefers interstitial irradiation to operative removal even in early breast cancer. As he points out, however, implantations are attended with some dangers. He knows of cases in which radium needles have damaged the internal mammary and axillary vessels, and have punctured the heart or pleura—in one case the needle dropped to the bottom of the pleural cavity. He has seen skin implantations at the site of needle punctures. In one case of early breast cancer, known to the speaker, preliminary röntgenograms of the chest and bones were negative before radium implantations but the patient died of widespread dissemination three months later. The result might have been the same in the absence of irradiation but the possibility of the implantation needle having opened a vein for the cancer cells to pass into the general circulation cannot be dismissed. Interstitial irradiation, to be effective, has to be pushed to the limit with resulting necrosis in some cases that calls for limited excisions. These various mishaps affect only a very minor percentage of cases and by no means contraindicate the intelligent use of interstitial irradiation in patients not subjected to operation.

In the past few years, Doctor Carnett said he had become more and more impressed with the frequency with which cancer is disseminated widely through the breast. Cheatle has stressed this point. The speaker sends specimens of many of his breast amputations to Wainwright, at Scranton, and from them he prepares large microscopic slides by Cheatle's technic, giving a bird's-eye view of the breast, pectoral muscles and axillary contents. A study of these slides, and the experience of pathologists with whom the subject has been discussed, indicates that cancer is commonly far more widespread in the breast than is generally believed.

Doctor Carnett declared himself to be an ardent advocate of Handley's theory of lymphatic permeation, but in addition to the lesions that may occur in the breast from that process, he believed other distant breast extensions occur from fairly rapid dissemination of cancer cells along the milk ducts. In view of these considerations effective treatment demands that the interstitial irradiation should include the entire breast. Doctor Lee limits the breast irradiation to the section in which the primary lesion is located and judging from some recent motion pictures of Keynes' technic it is doubtful if the latter's method is adequate to irradiate the entire breast. Cheatle's technic aims at inclusion of every part of the breast. Whatever method is used on the breast itself the lymphatic pathways beyond the breast must receive attention. Doctor Lee has given this in his cases. Further experience is needed to determine the best method for implanting needles in the lymphatic areas. Handley has demonstrated the need for inclusion of the region along the internal mammary vessels homolateral to the breast lesion. External irradiation should precede the introduction of needles or hollow wire and the

use of long needles is safer than seeds to devitalize the cancer cells along the needle tract.

Doctor Carnett said he believes that a combination of radical surgery and irradiation is the treatment of choice in early breast cancer but a debt is due to Doctor Lee and other pioneers for their work on interstitial irradiation in the nonoperable group of breast-cancer cases, and it is possible that further experience with it may give in early operable cases better results than surgery.

Dr. Eugene H. Pool asked Doctor Lee to give the figures showing to what extent surgery with and without radiation has been successful in cancer of the breast. He asked this question in view of the fact that Doctor Lee had stated that surgery was not successful. He wished to know how many cases there were in which radiation alone had shown results. Were the ones Doctor Lee cited as successful exceptional? He thought this information would prove of value in estimating how much promise could be expected by this method.

Doctor Lee, in closing the discussion, replied to Doctor Pool that surgery in carcinoma of the breast in many groups gave 35 per cent. five-year results without evidence of recurrence of the disease. The best that could be offered with this method at the Memorial Hospital of high-voltage X-ray and post-operative irradiation was 39 per cent. The difference between 35 per cent. and 39 per cent. is inconsiderable, but it leads to the feeling that the high-voltage cycle is of some value. As for the irradiation results, there are a number, in a series of cases that have gone five years, who have had palliative removal of the breast, so it would be impossible to separate the figures in those cases. In the group treated by irradiation alone, 31 per cent. have gone five years without evidence of disease.

TREATMENT OF UNDESCENDED TESTICLE

Dr. Franz Torek read a paper with his title, for which see p. 97. The reading of the paper was accompanied with the presentation of patients and of lantern slides.

Dr. Hubley R. Owen stated that the question of undescended testicle resolves itself into three main queries: *Why should one operate? When should one operate? How should one operate?*

Many surgeons are of the opinion that bilateral nondescended testicles are aspermatic, but the case shown by Doctor Torek disproves this theory. Spermatozoa are found in testes that fail to reach the scrotum but usually when found the subject has been young and the presence of the spermatozoa is transient.

He agreed with Bland-Sutton who states a testis is retained because it is imperfect. It has also been shown by Wangensteen that the scrotum is not a mere receptacle for the testes but, by its multitudinous sweat glands, by

the maintenance of an equitable temperature for the testes and by the action of the cremasteric muscle, the function of the testes is enhanced. Therefore, the Torek operation offers the best end-results because by this operation we can have a properly constructed scrotum.

One operates, therefore, in order to restore function to an otherwise aspermatic testis.

Should one operate for fear of malignancy of the undescended testis? Statistics vary greatly concerning the question of the malignancy of the testis in this condition. Bland-Sutton states 75 per cent. of testes retained in the abdomen become malignant. All observers are agreed that the misplaced testicle does predispose to malignancy. It has been suggested that the inguinal testis is more liable to trauma. Coley states that, in his opinion, trauma is the cause of 33 per cent. of cases of malignancy of the testis. An abdominal testis should not be removed for fear of its becoming malignant, but, if an inguinal testis cannot be placed in the scrotum, it should be removed for fear of trauma and possible resulting malignancy. One is frequently asked to place an undescended testicle in the scrotum because of the cosmetic effect.

Physical requirements for certain positions, notably the police and fire departments of larger cities, bar an applicant who has an undescended testicle. This rule, which may be too drastic, was adopted because of the more frequent occurrence of malignancy of the undescended testicle and the greater danger of trauma to the inguinal testis.

When should one operate? The operation should be performed before the age of puberty. The testis remains unchanged from birth until about ten years of age, after which it continues to develop until puberty. It is agreed that the age of choice for the operation of orchiopexy should be before the age of puberty, preferably between the age of from five to twelve. If a child has a large hernia associated with an undescended testicle it may be preferable to operate earlier than five years of age.

How should one operate? Doctor Owen stated he had not personally operated by the Torek method. He termed the operation the Torek method because of the fact that the Keetley technic suggested that the testes be fastened to the fascia of the thigh by sutures through the gubernaculum. This was for the purpose of traction, whereas Torek sutured the testis to the fascia of the thigh without traction. Any operation requiring traction usually terminates unsatisfactorily.

He had employed the technic of Bevan and found that it was unnecessary, excepting in a very small percentage of cases, to cut the spermatic vessels. This point has been recently emphasized by Bevan. Usually, it suffices to cut fascial bands about and around the spermatic vessels and the vas, and by these measures the testis can be placed in the scrotum without traction.

He has used in two cases the method of Ombredanne. The objection to this method is that it places two testes (when the case being operated upon

is unilateral) in one side of the scrotum. To obviate this in one case of unilateral undescended testes, Doctor Owen placed the right (undescended) testis on the left side of the scrotal septum and placed the left testis, although normally descended, to the right of the septum. The objection to the Ombredanne method is, as some have claimed, that the testis may either atrophy or become gangrenous.

Dr. William B. Coley said that at the Hospital for Ruptured and Crippled, where a very large number of operations for undescended testis have been performed, the method usually employed has been that advocated by Doctor Bevan, with the exception that the vessels of the cord were rarely removed. This method has given very good results in the majority of cases. The Torek method was not employed by them until recent years; they have finally come to recognize it as preferable to any other method in certain cases. As to the time when the operation for undescended testis should be performed, there still exists a great difference of opinion. Some years ago it was the practice of some surgeons to operate on the individual at the early age of five or six years, but personally, he believed in most cases the operation should be postponed until the age of ten or twelve years, inasmuch as, in not a few instances the testis descends into the scrotum of its own accord; so that if one waits until the patient has reached this age, he may find it unnecessary to operate. Relative to the danger of malignant disease developing in the undescended testis, he believed this was a danger that had been very much overestimated. In the first sixty-four cases of sarcoma of the testis that he reported (Annals of Surgery, July, 1915), twelve had occurred in the undescended testis. He added that when one considers the very large number of cases of undescended testis that exist and the very small number that undergo sarcomatous degeneration, the danger of malignancy developing may be regarded as very slight. He does not believe that the presence of an undescended testis in an adult, when it is causing no trouble and is not associated with a hernia, is sufficient grounds for rejecting an employee in the industrial world.

Doctor Torek in closing the discussion, said that as regarded the question of the time to operate, he believed it should be done before puberty, but it could be done at any age. He has operated on a patient as young as three and on one as old as thirty-eight years of age. In the very young patients there was always a special reason for operating, such as hernia or recurring pains suggestive of strangulation or torsion of the cord. He agreed with Doctor Coley that, if possible, operation should not be done too early; he had seen a number of testicles come down without interference, even in one case of perineal ectopy.

TAYLOR'S HEMILAMINECTOMY FOR EXPLORATION

Dr. Byron Stookey remarked that if an adequate exposure of the spinal cord, its roots and membranes can be accomplished by removal of one-half

of the laminæ, leaving undisturbed the spines, interspinous ligaments, arches and muscular attachments of the opposite side, the advantages are obvious. For the cervical and lumbar regions the rather free mobility of the vertebral column makes it desirable to expose these regions so as to have all of the mobility and not jeopardize the stability of the vertebræ. While it is true that dislocation of the vertebræ following bilateral laminectomy occurs but rarely, a number have been reported. With the advent of high-speed travel this precaution to maintain stability is all the more indicated. It is an axiom of modern surgery to disturb anatomic and physiologic conditions as little as possible, and for this reason, if for no other, hemilaminectomy offers many advantages over bilateral laminectomy since free exposure of the cervical and lumbosacral regions of the spinal cord can be obtained.

Certainly no one today would think of exposing the brain by biting away bone and leaving a needlessly large cranial defect as was done a few years ago instead of making an osteoplastic flap. Likewise, he thought that the same conservative attitude toward laminectomy in the cervical and lumbar regions will be observed and whenever possible hemilaminectomy will be done in place of bilateral laminectomy.

Hemilaminectomy has its limitations as well as its advantages. Whenever a spinal-cord tumor cannot be readily removed by hemilaminectomy the exposure should be converted into a bilateral laminectomy. This can easily be done and may require the removal of only one or two arches of the opposite side, thus doing a bilateral laminectomy immediately overlying the tumor and not needlessly above or below the tumor.

Hemilaminectomy of either the cervical or lumbar regions is indicated in the following conditions:

(1) Lateral and ventrolateral spinal-cord tumors.

(2) Spinal-cord tumors involving the vertebræ with partial destruction of the vertebræ.

The operation has been used in these conditions in the patients whom he was showing to them that afternoon. In each, the spinal cord was adequately exposed and the pathologic process adequately dealt with. The spines, the arches and the muscular attachments of the opposite side have all been retained.

(3) Unilateral dorsal-root section and unilateral chordotomy.

(4) As an exploratory procedure especially in obscure and baffling spinal-cord diseases when visual proof of the actual conditions is desirable.

Hemilaminectomy is not presented to replace completely bilateral laminectomy but it has a definite and valuable position in neurologic surgery. Criticism of this procedure has almost invariably come from those who have not tried the operation. The time has come to replace hypothetical criticism by that gained from actual experience with the procedure.

Dr. Charles H. Frazier said that as to the propriety of substituting a unilateral for a bilateral laminectomy, obviously the only objection to the con-

ventional laminectomy Doctor Taylor has unearthed is that in a few cases he has found signs of subluxation. Whether there was any resulting disability in these cases has not been disclosed. He himself had never resorted to this procedure. He could readily understand how a unilateral laminectomy might be permissible under certain circumstances, notably a unilateral cordotomy or rhizotomy. In principle he would disapprove of it for all tumor explorations, since in advance of actual exposure one cannot be sure that a larger exposure, even in unilateral tumors, may not be desirable or eventually necessary.

In the performance of a laminectomy, he had stressed the advantage of securing almost perfect hæmostasis before the dura is opened. One's aim is not to have a drop of blood soil the subarachnoid space. Blood carries fibrin and fibrin begets connective tissue and connective tissue adhesions. Imperfect control of bleeding and crude sponging will readily cause adhesions of membrane to cord and the establishment of a complete block.

To be sure that hæmorrhage from all sources is under control, the preliminary bone work should be completed before the dura is incised. To convert a unilateral into a conventional laminectomy after the dura is opened, therefore, has its objections.

The second point upon which he wished to comment was this: Can one not prevent subluxations and any disability in the post-laminectomized patient? He believed one may obtain this protection by the observance of two technical maneuvers: first, the meticulous closure of the wound by careful approximation of every muscle layer, the intervertebral aponeurosis and the fascial layers. This implies with the skin six or seven tiers of silk sutures. Secondly, and of greater importance, is the separation of muscles from spinous processes and laminæ by a sharp chisel. With it these processes are denuded of their periosteum. Thus, provision is made for regeneration of the arches and the restoration of the posterior wall of the spinal canal. This restoration of the canal with accurate musculo-aponeurotic approximation offers substantial protection against subsequent subluxation or any disability in the laminectomized patient.

In evidence of bone regeneration, he submitted the following: first, that in secondary laminectomies, he had found a bony layer which replaced the laminæ, and, secondly, the X-ray picture of the laminectomized patient.

That morning he had submitted a film for inspection to Dr. Henry K. Pancoast, the röntgenologist, a film taken a year after a laminectomy, of the upper cervical vertebræ. Doctor Pancoast could not believe that a complete laminectomy had been done as he saw the shadow of the regenerated arch.

Dr. Thomas A. Shallow remarked that one of the outstanding arguments of Doctor Taylor's against the complete laminectomy and in favor of the hemilaminectomy was the entire absence of dislocation of the spinal column following his procedure.

Hemilaminectomy in the cervical and thoracic region is not a difficult matter and he had used it with a great deal of satisfaction but not until he

had a dislocation at the thoracicolumbar junction following a complete laminectomy of the eleventh, twelfth thoracic and first lumbar vertebræ. He had thought before listening to Doctor Taylor's remarks that dislocation of the spine following complete laminectomy was not something to be feared.

It can be stated that the above-mentioned case coincides with all the faults that he expounds against complete laminectomy.

Doctor Stookey, in closing the discussion, said that whether in hemilaminectomy or bilateral laminectomy, the wound was closed in layers. However carefully done, closure of dorsal-neck musculature cannot prevent ventral displacement of the vertebral bodies, from which both arches and spines with their muscular attachments have been removed. Doctor Frazier's reference to regeneration of the arches after bilateral laminectomy prompted Doctor Stookey to wonder in what percentage of cases in Doctor Frazier's series this had occurred. Regarding blood within the subarachnoid space, this can be as carefully avoided by hemilaminectomy as by bilateral laminectomy. Doctor Stookey regretted that Doctor Frazier had not had occasion to give hemilaminectomy a trial, being sure that he would find additional uses for this procedure. At almost each discussion of hemilaminectomy someone has presented from personal experience another instance of dislocation following bilateral laminectomy. He called attention to Doctor Shallow's remarks concerning a forward dislocation of a lumbar vertebra with instant paraplegia following bilateral laminectomy.

HÆMATOLOGIC STUDIES AS A BASIS FOR DETERMINING THE SURGICAL RISK IN JAUNDICED PATIENTS

Dr. Richard Lewisohn read a paper with the above title for which see page 80. For remarks in discussion by Dr. I. S. Ravdin see page 86.

TREATMENT OF EMPYEMA AND LUNG ABSCESS BY PACKING

Dr. John F. Connors (New York) read a paper with the above title, for which see page 38.

Discussion by Drs. John B. Flick and George D. Stewart. See pages 53, 54.

STUDY OF CASES OF CARCINOMA OF THE STOMACH TREATED AT THE PRESBYTERIAN HOSPITAL OF NEW YORK, 1916-1930

Dr. Fordyce B. St. John (New York) said that from January, 1916, to December 31, 1930, there were 365 cases admitted to the Presbyterian Hospital of New York with a diagnosis of carcinoma of the stomach. Of these, 120, or 32.9 per cent., received no surgical therapy and would therefore not be considered. Resection was carried out in sixty cases, or 16.4 per cent., of all the cases admitted. Palliative gastroenterostomy was performed in seventy-five cases, a simple exploratory celiotomy was done in eighty-five cases, and in the remaining twenty-five cases some emergency procedure such as jejunostomy or gastrostomy was done.

Of the cases in which only a palliative operation or a simple exploration

was carried out, all died within three years of the time of operation. This excludes four cases that have had a celiotomy done in the past year and are still being followed.

Of the sixty cases in whom resection was considered feasible, twenty-two died post-operative, a mortality of 36.6 per cent. This leaves thirty-eight cases to be followed. There were twelve cases alive and well at various post-operative periods. Eight of the thirty-eight cases, or 21 per cent., have been followed for more than five years. It is of interest to note that six of these eight cases have been followed for more than eight years.

Summary.—(1) Of 365 cases, only sixty were operable. (2) Of thirty-eight cases surviving operation, eight, or 21 per cent., are alive and well after a five-year period.

Three of these cases were presented: (1) Woman, G. C., Billroth No. II and partial colectomy, nine years and nine months ago. (Lambert.) (2) Man, (G. C., Moynihan. Nine years and eleven months ago. (Whipple.) (3) Man, L. C., Billroth No. II. Eleven years and seven months ago. (Lambert.)

(1) It is significant in this series that in but 16 per cent. of all cases applying for relief at the clinic, or one in six, was it possible to remove the growth because of the extent of the lesion at the time of admission.

(2) Twenty-one per cent. of all cases surviving radical operation were alive and well after the five-year period.

(3) In two of the three cases alive and well at about ten years, a visible, palpable mass was noted before operation.

(4) The importance of follow-up information is demonstrated by the investigation of the cause of death in a patient followed nine and a half years, who died of hypernephroma of the right kidney with metastases.

Dr. John B. Gibbon (Philadelphia) said that in order to discuss this question properly one should be armed with statistics made up in the same manner as Doctor St. John made his and he was not so prepared. He was willing to admit that the results of the treatment of carcinoma of the stomach in Philadelphia are no better than these, and, indeed, he hoped they were no worse. One advantage of such studies of results such as this is that one is enabled better to prognosticate in certain cases so as to enable one to select a certain type of treatment. There is one unfortunate thing about carcinoma of the stomach and that is that it is the most insidious form of cancer in any part of the body except the colon, but it becomes so much more rapidly inoperable than carcinoma of the colon that it is much more to be dreaded. The speaker was one of those who believe that carcinoma developing on ulcer is comparatively rare compared with carcinoma that starts as carcinoma. Another observation was that the cases that gave good results from resection were the cases that had developed on ulcer; the case with the long history, not the short history. The speaker had one case alive and well fifteen years after resection, but it was a common experience to have these isolated cases

of long-standing cure. What was needed was to find some way to operate on cases of carcinoma with a short history and this still presented difficulties. Another interesting point brought out by Doctor St. John's figures was the high immediate mortality following resection; it is very much higher than in resection for ulcer.

BILATERAL PHRENICECTOMY FOR PERSISTENT HICCOUGH

Dr. Otto C. Pickhardt presented a woman, thirty-three years of age, who was admitted to the Lenox Hill Hospital July 12, 1930, on account of various gastric disturbances and especially of a hiccough which, with various periods of remission, had persisted for five years. At the time of her admission, she had been suffering from the condition for two months. She had enjoyed good health until twelve years before at which time, after a forceps delivery, various pelvic conditions supervened which culminated in a panhysterectomy done in 1925. Since that time she had never been well, having suffered from a combination of infected conditions of the pelvis. The first attack of hiccoughs occurred during the convalescence from the hysterectomy in 1925 since which date attacks have recurred of varying periods of duration. In 1928, following a cystoscopy, she had an attack lasting ten days; in 1929, two attacks, one eighteen days and one twenty-eight days. For the past six months, there have been many attacks lasting for an hour or more. The present attack, which has determined her present hospitalization, began two months before admission and has continued, excepting for occasional intervals of one day, without relief, except when the patient has slept. The attacks are characterized first, by nausea, then vomiting, then gastric distension and then hiccoughs with expulsion of large amounts of gas. The woman has been subjected to a great variety of treatments by various specialists, hospitals and clinics. The treatments tried have included:

(1) Spinal tap in the Bayonne Hospital which stopped the hiccough for several hours.

(2) Gas anæsthesia which caused convulsions at the time and afterwards.

(3) Hypos of atropine and morphine which sometimes made the patient vomit.

(4) Daily colonic irrigations—no relief.

(5) Cystoscopy—the patient "stopped breathing for twenty minutes."

(6) Chloroform anæsthesia; hiccough stopped only while the patient was anæsthetized.

(7) The threat to cut the phrenic nerve made the patient sign a release, and on her return home the hiccough stopped.

(8) Ice bags to the throat, chest and abdomen had no effect.

(9) Pure oxygen breathing had no effect.

(10) Many medications by mouth, none of which were effective for more than a few minutes.

The patient was a well developed, moderately nourished, white woman who was hiccoughing at ten-second intervals. Physical examination was essentially negative; weight, one hundred and one pounds. By the fluoroscope, while hiccoughing, both sides of the diaphragm could be seen to move in a jerky manner with normal excursion.

On July 18, at 3 P.M., 5 cubic centimetres of ½ per cent. novocaine solution were injected into and toward the right phrenic nerve region. The hiccoughing immediately ceased and the patient went into sound sleep; was quiet until the next day at 1 P.M., when the hiccoughing returned.

On July 19, at 2:30 P.M., 4 cubic centimetres of 1 per cent. novocaine solution were injected into and toward the left phrenic nerve region. The patient went into immediate collapse from which she was revived with difficulty two hours later. From this time, until August 6, in spite of all attempts at medical therapy, the hiccoughs continued. Her physical condition became worse, with continued loss of weight. Various procedures were attended by only temporary relief. Finally, bilateral avulsion of the phrenic nerves in one stage was advised, and performed August 7, 1930, under novocaine.

The right phrenic nerve was first avulsed by winding around a clamp until ten centimetres had been pulled out. During this procedure pain in right shoulder and lower chest complained of, but the hiccoughs ceased immediately. An identical procedure was carried out on the left side immediately after. During this procedure patient again experienced pain during the tearing of the nerve, of which 9.5 centimetres were pulled out. A considerable drop in pulse rate, from 136 to 66, occurred, and there was a drop in respiration from 20 to 16. A barely perceptible cyanosis was present but absolutely no dyspnœa or difficulty in breathing.

The post-operative condition was excellent. No respiratory embarrassment. Respirations costal and deep and rate 24. Pulse 96. Respirations and pulse throughout the night following operation remained a little above normal. Lips and fingers show no cyanosis. The wound healed by primary union, without respiratory or cardiac embarrassment. At the end of a week the patient covered her head with bed sheets and made attempts to hiccough. These attempts were successful and she had steady hiccoughs for two periods of ten and three minutes' duration, with a short interval between. These attacks were similar to those prior to the exeresis of the phrenic nerves.

August 19, she was discharged. Vital capacity cannot be measured through blow bottles as patient states that she does not possess strength enough to raise the column of water in the tubes. Still complains of abdominal gas pains in spite of two to three bowel movements daily. No further hiccough attacks. Röntgenogram shows diaphragm at a slightly higher level than pre-operatively and the excursion markedly less. General condition improving daily.

Follow-up Notes: October 19, her general condition was excellent; she had gained fifteen pounds in weight; no more hiccoughs; occasional spasmodic pain in abdomen.

Röntgenogram and fluoroscopy.—The diaphragm at the same height as in previous examinations, with the right side a trifle higher than the left. On ordinary breathing there is barely perceptible moving of either side of the diaphragm. On deep breathing there is a total excursion of less than one-half inch.

February 6, 1931.—Does not feel as well now as a month ago. Slight loss of weight. Same abdominal pressure and gas. Occasional hiccoughing spell lasting from one to ten minutes, characterized by her as of the "silent variety." Thinks she has it because of belching of gas. Bowels continue to move very well.

Physical examination is negative. Litten's phrenic or diaphragmatic shadow is absent. Weight, 108 pounds.

Röntgenograms.—Stomach of so-called "cascade type." Large collection of gas in cardiac end of stomach and also in the splenic flexure region. No organic disease. Stomach empty at six-hour examination.

Chest.—The patient is carefully examined under the fluoroscope. The diaphragmatic excursion, normal and equal on both sides. When the patient coughed or laughed, excursion was maximum and covered practically two

interspaces between the height of inspiration and expiration. On deep breathing there was a distance of one interspace as an average. The costophrenic angles are clear and the diaphragmatic dome is normal in appearance. The findings contrast sharply with the examination following the operative procedure, when the diaphragmatic excursion was a small fraction of the present finding.

Doctor Pickhardt said that he presented this patient to show that: (1) Plentiful and sufficient respiration can be carried on with at least more than partial paralysis of both diaphragms, artificially produced simultaneously. (2) Forced hiccoughing of minor character and short duration can occur under these conditions. (3) To illustrate early and late changes in the position and excursions of the diaphragm. (4) This operation is feasible in nontoxic cases.

DR. GEORGE P. MULLER (Philadelphia) said that he had never performed a bilateral phrenicectomy, by which he meant an exeresis of the nerve, and had not had a case of such long-continued hiccough as the one reported by Doctor Pickhardt.

He had, however, had occasion to practice bilateral interruption at one stage of the phrenic impulse by freezing on five occasions, and, while the singultus was cured, the diaphragm continued to move as seen by the fluoroscope shortly after operation, showing evidence of the transmission of motor impulses below the level of freezing by way of the accessory derivation. In two of these patients hiccough was the reason for the operation and in both, cure was obtained which was lasting for at least six months in one patient, at which time he was not followed further and for two years in the other, at which time he died of cerebral apoplexy. The other three patients were operated upon for that curious condition of tachypnœa, or diaphragmatic tic following encephalitis.

The first case was reported in 1925 by Gamble, Pepper and Muller, himself, and for a period of at least five years, the end of the observation, the patient had remained well.

The second case occurred in a young girl in whom the post-encephalitic manifestations were pronounced. She was relieved by the phrenic nerve freezing and has continued free from diaphragmatic spasm although still suffering from cerebral manifestations of her encephalitis.

The third case was one of mild encephalitis who developed tachypnœa and was temporarily relieved by drinking water. Gradually the water-drinking increased until the time when first seen by the speaker he was taking from thirteen to fifteen quarts of water daily. The phrenic nerves were frozen and after that the patient was unable to develop hyperpnœa although the polydipsia persisted, and it was necessary to put him on an allowance of about 4000 cubic centimetres in the day. He was much improved a number of months later, at which time he was lost from observation.

In 1922, Neuhofer reported the case of a boy eight years old on whom bilateral phrenicectomy had been performed and three years later the diaphragm was still found to be practically immobile. The boy had developed normally,

the thoracic respiration answering all purpose. This case has been quoted and comments have been made that the hypoventilation induced by bilateral phrenic exeresis should so diminish vital capacity as to impair the health of the individual, but in the case reported by Neuhofer, and in this one reported by Pickhardt, the health of the patient seems unimpaired.

Dr. Richard Overholt, working in the laboratory of surgical research of the University of Pennsylvania, has found that in those dogs which recover from bilateral phrenicectomy, the health of the animal seems unimpaired, but he did notice a high instance of post-operative pneumonia in his dogs. He also noted that after the phrenicectomy the diaphragm assumes the position of the normal expiratory phase and that subsequently, perhaps after three months, the diaphragm has retreated so that it occupies a position nearly in the normal relation for that dog.

The observations of a few patients who have died after previous phrenicectomy for tuberculosis of the lung, has shown a complete atrophy of the musculature of the diaphragm. Overholt believes that the lower portion of the diaphragm is due to a replacement of the muscle with fibrous tissue. It lowers the diaphragm for the time being but it may be followed after a time by more complete atrophy and possibly eventration, as shown in the literature. It may be that in this case of Doctor Pickhardt's, a year's observation will show a different condition of the diaphragm.

In reference to the neurotic tendencies of Doctor Pickhardt's patient it is interesting to recall a case in the literature reported by Kappis, in 1924, in which exeresis of the nerves gave no relief. Because the hiccough ceased temporarily after paravertebral injections of procaine, Kappis extirpated the whole left fourth cervical root and the lower and middle left sympathetic ganglion. In spite of this the hiccough returned and he believed that its origin was psychic. Accordingly, the thyroid cartilage was forcibly grasped and compressed and the condition was cured.

PLASTICS FOR BONE CAVITIES

Dr. H. H. M. Lyle presented cases illustrating three different methods of employing soft parts in the plastic closure of large bone cavities. These procedures, though limited in application, are of real value in hastening healing. The cases have remained well ten, eleven, and three years respectively.

The first case represents a primary closure of a bone cavity by pedicle muscle graft; the next is a secondary closure of an osteomyelitic cavity by a muscle pedicle flap with an attached skin button; the third is a secondary closure of an osteomyelitic cavity by Ollier-Thiersch skin grafts applied by means of a stent.

The first patient was one of a giant-cell sarcoma of the external condyle of the femur. The patient, with the X-rays and microscopic slides of the biopsy, was shown before the Society of Clinical Surgery at St. Luke's Hospital, April, 1921. The microscopic examination was: "Sections of soft parts show that they are composed almost exclusively of a dense fibrous stroma in which many fairly regular giant-cells of the epulis type are thickly distributed. The nuclei of these cells are comparatively regular and their morphology is that of one of the more benign types of malignant sarcoma.

The stroma, though very cellular, is composed of nuclei also fairly regular but mitoses are not infrequent. It cannot be considered a benign tumor although it probably has arisen in the myeloid cavity. The older portions of the stroma are less cellular, there is no cartilage, but very early osteoid areas may be found."

At the suggestion of one of the members, a vote was taken on the operative procedure to be followed. Eight members favored a high thigh amputation, thirteen curetting and implantation of radium, four resection of the knee, and one advised that nothing be done. A simple curettage of the bone and surrounding soft parts was done, and a cavity about the size of the fist was the result; this was immediately closed by means of a pedicle

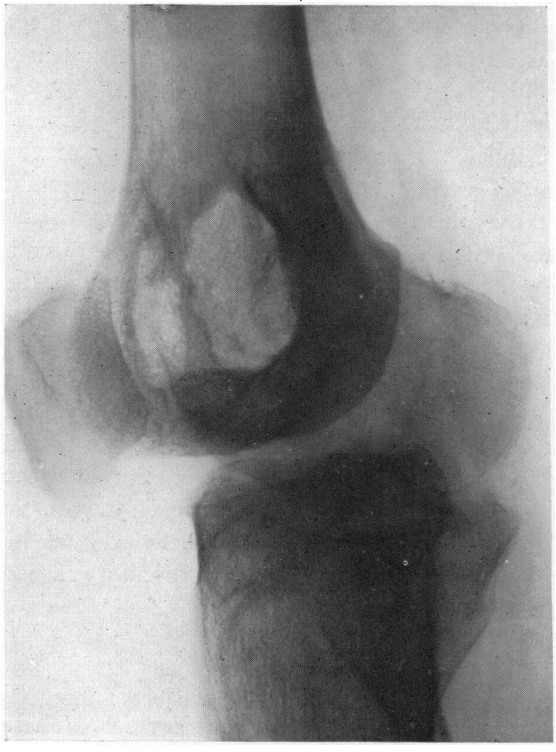

FIG. 1.—X-ray of femur ten years after.

FIG. 6.—Condition of cavity at the present moment.

muscle graft taken from the vastus externus. November 19, 1930, the patient, with his present X-rays, was again shown before the Society of Clinical Surgery at a St. Luke's meeting. He has a perfect functional result. Note in the recent X-rays that although the bone cavity has been materially reduced in size it has not been entirely filled with bone but is in all probability filled with fibrous tissue. (See Fig. 1.)

The second patient had a large osteomyelitic cavity of the head of the right tibia which was closed by a pedicle muscle graft with attached skin button. The history of this patient was: While leading his squad against a machine-gun nest in the Argonne, October 1, 1918, he was wounded by a bullet which passed through the femur and knee-joint, and came out through the head of the tibia. He made the usual round of military hospitals and

on November 2, 1920, was admitted to Doctor Lyle's service at St. Luke's Hospital. He then had a discharging sinus situated on the inner side of the right tibia. The probe passed upward and inward for two and one-half inches. X-ray examination revealed a bony ankylosis of knee. An opaque injection was found to travel through the central portion of the ankylosed area between the tibia and femur.

November 8, 1920, the sinus was excised and the bony cavity thoroughly curetted and the Carrel treatment begun. The cavity was sterilized in twenty-four days.

December 3, 1920, a fat graft taken from the abdominal wall was inserted into the bony cavity and the skin closed over it. This failed and the graft was gradually extruded in the form of oil.

November 12, 1921, the cavity was again curetted and sterilized by the Carrel method. Seventeen days later, the cavity having been rendered sterile, an attached skin-muscle flap was inserted into the cavity and the

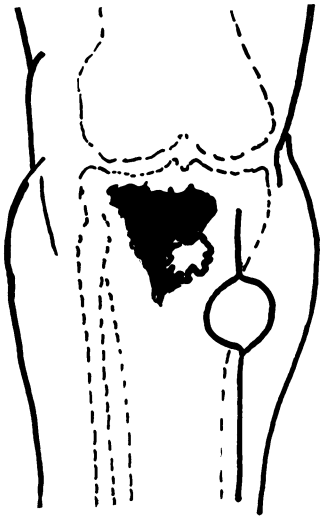

FIG. 2.—Illustrating the technic of closure of pedicle muscle flap with attached skin button (first step).

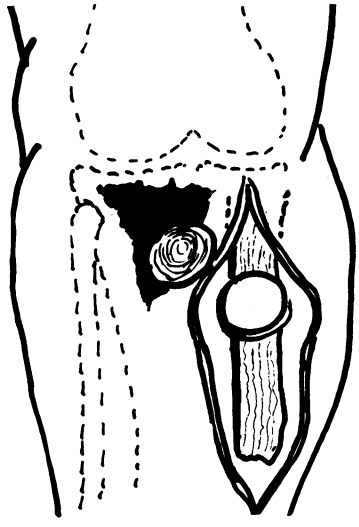

FIG. 3.—Illustrating the technic of closure of pedicle muscle flap with attached skin button (second step).

skin button sutured to the mouth of the cavity. The graft took kindly and the wound healed rapidly.

The following technic was employed (see Figs. 2, 3, 4 and 5): An incision five inches long was made parallel to the internal border of the tibia; the incision started on a level one inch above the sinus and two and one-half inches posterior. At a convenient portion of this incision a button of skin the size of the opening of the sinus was left attached to the muscle, with a flap of muscle tissue sufficient in bulk to fill the cavity, was dissected up, the pedicle being above and posterior to the opening of the cavity. The skin between the cavity and internal border of the tibia was undermined and the muscle flap with the attached skin button was pushed under it into the cavity. The skin button was then sutured to the edges of the sinus and the wound closed without drainage. The present condition of the tibia is seen in Fig. 6.

The third case is that of a patient who fell from a high bridge fracturing his femurs, humerus and right tibia. He came to the hospital for closure

of an osteomyelitic cavity of the right tibia. After seven and one-half months, the wound, despite good surgical treatment, is represented by a granulating trough-like wound 4½ by 1¾ by 1½ inches. The wound was first sterilized by the Carrel method and a stent of dental wax molded to fit the cavity. The stent was wrapped with the skin grafts in such a manner that the epithelial surface was against the stent and the whole placed in the cavity. Eight days later the stent was removed, and 80 per cent. of the cavity was found to be covered by a healthy epithelium. In twenty-seven days the surface of the cavity was completely epithelialized. The cavity is greatly diminished in size.

Doctor Lyle has found these three simple procedures valuable in solving some of the problems of reconstructive work.

DR. B. FRANKLIN BUZBY said that his own experience with the transplant of muscle in these cases had been rather bad; every patient has had considerable post-operative pain. He was sure he had put in muscle and fascia alone without any sensory nerve. In the small cavities one can use bone fragments

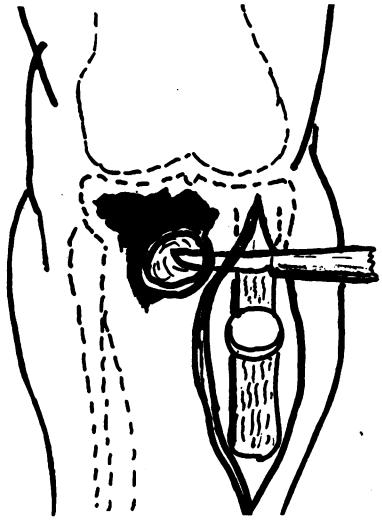

FIG. 4.—Illustrating the technic of closure of pedicle muscle flap with attached skin button (third step).

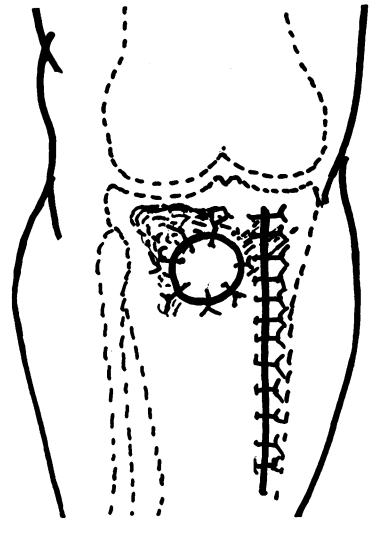

FIG. 5.—Illustrating the technic of closure of pedicle muscle flap with attached skin button (final step).

obtained nearby with rapid subsequent recalcification in the cavity. The type of cavity to be filled in decides the type of graft. In the compound fracture case he believed a long way around was taken to secure the same result that could have been obtained by using the Orr technic in the beginning. Ordinarily, cases of tibial osteomyelitis heal in six months or less with satisfactory skin and with the bone level almost up to where it was before operation. In the bones entirely surrounded by muscle the same procedure is adaptable as well, as the bones will fill out to the proper size if sufficient time elapses and secure packing is kept in place. The speaker had a patient from whom he removed an area in the tibia six inches long and in less than six months the tibia was filled out to where it was before operation. In the femur and the

humerus it is unnecessary to use the graft treatment because they also can be packed snugly. In cases where the bone lesion has healed it is ill-advised to do plastics on cavities for when the skin and periosteum are separated from the bone, frequently the skin will become necrotic and a large area will become gangrenous due to lost blood supply. Filling these bone cavities with inorganic or organic salts of lime is still in the experimental stage but from reports one can feel hopeful of future results.

FILARIAL LYMPHATIC VARIX OF THE BREAST

DR. WILLIAM F. MACFEE (New York) in presenting a patient, remarked that since it was established by Lewis[1] in 1872 that filariæ inhabit the blood-stream of man, there has been an active interest in that parasite and in the group of diseases which come under the head of filariasis. Interest was further stimulated by the finding, made by Bancroft and recorded by Cobbold,[2] of an adult female worm in a suppurating lymphatic varix of the arm. Manson's[3] discovery that the mosquito is intermediate host of the filarial organism gave additional impetus to the study of the disease. A part of this interest, no doubt, has been due to the spectacular appearance of the organism itself and to that of its various manifestations. Attention has furthermore been necessitated by the astounding prevalence of infection in the regions to which it is endemic. These regions embrace practically the whole of the area lying between the Tropic of Cancer and the Tropic of Capricorn and extend around the world.

Lying without that zone, the United States up to 1898 had little cause to be interested in filarial diseases. Our acquisition of tropical territories, however, during the latter part of the last century gave us reason to acquaint ourselves with the diseases found in those regions. Guiteras,[4] Mastin,[5] Henry,[6] Dunn,[7] and others had previously reported cases of chyluria associated with filariæ in which the infection had been contracted within the United States. Opie,[8] in 1901, reported a case of extensive retroperitoneal lymphatic varix in a native of the Dutch West Indies operated upon in this country. From time to time, other more or less isolated cases have been recorded. With the recent influx of American citizens from our tropical islands and the admission of the citizens of other nationalities from the same regions, there has been, however, a great increase in the incidence of filarial diseases in this country.

He then presented a woman who was born in 1895 in British Guiana, where she lived until she was twenty-five years of age. When fourteen years old she had a severe attack of pain in her right thigh and groin associated with swelling, redness, and with abscess formation in the groin. At the same time she had chills and a high temperature. She had frequently repeated attacks of the same character, usually precipitated by dampness or by slight chilling. Each time the swelling of the leg subsided completely.

In 1916, at the age of twenty years, she had an attack affecting the right arm. The arm became swollen and red and three abscesses formed along its inner surface. There was no abscess formation in the axilla. The abscesses of the arm ruptured spontaneously and complete recovery occurred leaving no residual swelling. The right breast was not involved in the inflammatory process.

In 1921 upon the advice of her physician, she moved to the United States. There has been no trouble with the arm or leg since. Soon after her arrival, however, when her second child was ten months old, she noticed for the first

time a lumpy condition in the outer portion of her right breast. These lumps were a little sensitive but gave no real trouble. Two subsequent children were nursed from both breasts. While nursing the first of these the patient had an attack of painful swelling of the right breast which subsided without treatment. Several months later the breast began to have a peculiar shape, and soft areas, apparently containing fluid, were noticed.

In May, 1925, when her last child was fifteen months old, there was a second attack of pain in the breast which caused the patient to seek medical advice. Many diagnoses were made, including cancer, with a recommendation of radical amputation. Following this advice the patient presented herself at the New York Skin and Cancer Hospital for treatment.

Examination.—Both breasts are pendulous. In the right breast, occupying chiefly the outer hemisphere and the areolar region, are large, tortuous, soft, fluctuant areas which more than anything else suggest huge varicose veins. The general course of these tortuous swellings is from the region immediately about the areola and nipple toward the anterior border of the pectoralis major muscle and the axilla. They conform in position and direction to the main

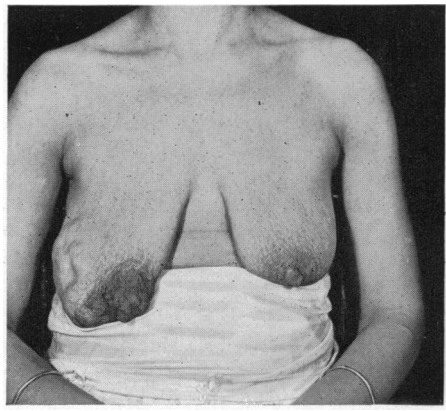

FIG. 7.—Appearance of patient when first examined, showing lymphatic varix of right breast.

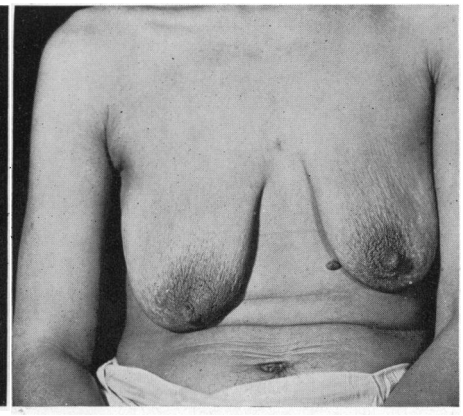

FIG. 8.—Appearance of patient two and a half years after coagulation of lymphatic fluid in varix.

lymphatic trunks of the breast. Along the course of these trunks toward the outer zone of the breast some areas of induration are felt. The induration is not the resistant type associated with malignancy. There are no enlarged lymph-nodes in the right axilla nor above the clavicle. There is one small, rather firm node at the anterior border of the pectoralis major muscle. The right arm shows no swelling and appears normal as compared with the left. Two irregular scars are seen on the medial surface of the right arm, one in the epitrochear region, the other about mid-way between the elbow and the axilla. The left breast and axilla appear to be normal.

The unusual character of the lesion and the history of filarial infection suggested the possibility that a relationship might exist. A needle was inserted in one of the fluctuant areas of the breast and about 10 cubic centimetres of clear straw-colored fluid were withdrawn. A microscopic examination of this fluid revealed a number of active embryonic filariæ. One of the living parasites was found in a fresh blood preparation. The urine did not show parasites nor chylous fluid. The blood Wassermann reaction was negative.

With a tentative diagnosis of filarial lymphatic varix, the question of treat-

ment was considered. The disease did not seem to be affecting the patient's general health and amputation of the breast did not seem warranted. Involvement of the breast, however, was so extensive that surgical removal of the varices was impossible without considerable mutilation. Possessing no specific treatment for the condition, it seemed best not to interfere. The patient was apprised of the situation, but it was suggested that she permit further study of the condition. She consented and as opportunity presented itself, various determinations were made.

Fluid content.—Living embryonic forms of filariæ were regularly found in the fluid. The quantity of fluid which could be aspirated varied from 85 to 100 cubic centimetres. When completely emptied, the varices refilled at the rate of about 70 cubic centimetres in twenty-four hours. The fluid itself varied in color from a very delicate pink to a clear straw color. It always contained a few red blood-cells and leucocytes. Its specific gravity, 1.022, was constant. When placed in a test tube, the fluid coagulated rapidly. When left standing, it tended to re-liquefy, leaving a central, soft, fibrinous clot. Its content of urea nitrogen, uric acid, creatinin, glucose, cholesterol, chlorides, calcium and inorganic phosphates was pretty constant. It corresponded closely to that of the blood taken at the same time (see table). When the varicose channels, containing their usual content of lymph, were injected with 1 cubic

TABLE

Comparative Chemistry of Blood from Arm and Fluid from Varix Taken at the Same Time.

	Blood	Blood from Varix
Urea nitrogen	19. mgms. per 100 cc.	16. mgms. per 100 cc.
Uric acid	3.3 mgms. per 100 cc.	3.6 mgms. per 100 cc.
Creatinin	1. mgms. per 100 cc.	0.8 mgms. per 100 cc.
Glucose	118. mgms. per 100 cc.	110. mgms. per 100 cc.
Cholesterol	210. mgms. per 100 cc.	100. mgms. per 100 cc.
Calcium	12.8 mgms. per 100 cc.	12.4 mgms. per 100 cc.
Inorganic phosphates	3.9 mgms. per 100 cc.	3.8 mgms. per 100 cc.
Chlorides (plasma)	6.75 grams per litre	6.82 grams per litre

centimetre of phenolphthalein, it was excreted in the urine at the rate of 16 per cent. to 23 per cent. in two hours, as compared with 57 per cent. excretion following subcutaneous injection in the arm. When the varicose lymphatic channels were completely emptied and then injected with a like amount of normal saline or 5 per cent. glucose solution, an examination of the fluid aspirated twenty-fours later showed a return to the physical and chemical properties of the original lymph. This was accepted as evidence of free emptying and re-filling of the lymphatic varices, although the phenomenon might be explained by diffusion and osmosis.

Microfilariæ.—Attempts were also made from time to time to find a drug which was lethal to the filariæ but which might be safely injected into the varicose lymphatic spaces. When fluid containing the active organisms was placed under the microscope, novocaine in 0.5 per cent. or stronger solution was found to stop their activity almost immediately. Attempts to revive them afterward with warm, normal salt solution were unsuccessful. This suggests the possibility that the beneficial effects of the local injections of sulpharsphenamine with novocaine described by O'Connor[9] in the treatment of recurrent filarial lymphangiitis may have been due, at least in part, to the novocaine. A few injections of 1 per cent. novocaine were made into the dilated lymph-vessels in this patient's breast without apparent result.

Injection of Lipiodol.—In an attempt to demonstrate the distribution of lymph-vessels in the breast, an injection of lipiodol was made in June, 1928.

The quantity which could be introduced at the time was insufficient to distend the varices, so the attempt was given up.

Two days later, the patient developed severe pain and swelling of the right breast with local and general elevation of temperature and chills. The attack subsided without abscess formation. When an examination was made a few days later, it was found that the fluid in the varices had coagulated. There was subsequently a slow resolution of the process with a return of the breast practically to normal. Recent attempts to microscopically demonstrate filariæ in the blood have been unsuccessful.

X-ray Demonstration of Parasites.—Following publication of the work of O'Connor, Golden and Auchincloss[10] on the revelation of calcified filariæ by X-rays, an attempt was made to demonstrate the dead parasites in this patient. In the right arm were found small oblong shadows believed to represent dead, calcareous filariæ.

Discussion of Treatment.—No effective systemic therapy for filariasis has been discovered. Treatment, therefore, is directed toward the relief of local manifestations. Maitland[11] reported good results from the local removal of adult filariæ when they could be located. O'Connor[12] has likewise reported long remissions of filarial lymphangiitis following the injection of sulpharsphenamine with novocaine directly into areas believed to contain adult worms. It is conceivable that patients who have moved to temperate climates and are, therefore, no longer subject to reinfection may be cured by local destruction of the parent filariæ.

In the case of this patient, disappearance of lymphatic varix followed the injection of lipiodol directly into it. This result may have been due to the lipiodol, or to trauma incident to its injection, or there may have been no causal relationship.

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WILM'S MIXED TUMOR OF THE KIDNEY

DR. WM. CRAWFORD WHITE presented a girl, who was born July 22, 1924, and entered the Roosevelt Hospital February 16, 1925 (almost seven months of age). A tumor in the left upper quadrant of the abdomen was first noticed at the age of six weeks. The tumor had slowly enlarged until eight weeks before the operation when the rate of growth had seemed to increase. The baby had otherwise been healthy. She was well nourished and had steadily gained in weight. There were no urinary symptoms and no hæmaturia. Feb-

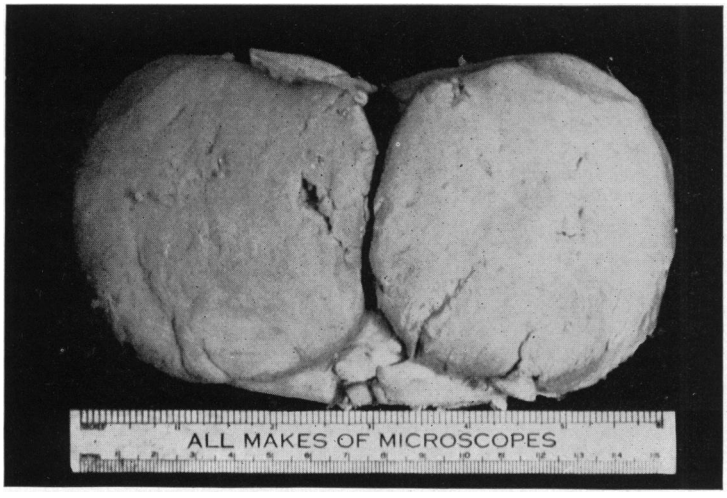

FIG. 9.—Wilm's mixed tumor of kidney.

ruary 17, 1925, the late Dr. Charles H. Peck did a nephrectomy. "Left rectus incision exposing a tumor of the left kidney. A transverse incision through the left rectus and transverse muscles was added to give more room. The retroperitoneum was incised external to the descending colon until the surface of the tumor was exposed. The tumor had a dark purplish kidney color and was smoothly encapsulated. It was shelled out without difficulty and delivered through the wound. The vascular pedicle and the ureter were ligated, and the wound was closed without drainage."

Gross Description.—The specimen consists of the left kidney and tumor. The tumor has replaced nearly all of the normal kidney tissue which is present only as a shell of varying thickness. The tumor and kidney weigh 350 grams and measure 9 by 9 by 7 centimetres. The tumor is firm and elastic on palpation and ovoid in shape. On section it cuts with slight resistance and discloses a gray, granular surface which appears to be very cellular and is divided into fairly large compartments by delicate strands of fibrous tissue. Palpation of the cut surface shows it to be moderately soft and elastic. At one pole is

an area 4 centimetres in diameter which appears entirely similar to the rest of the tumor but is considerably softer. The tumor has extended down into the kidney pelvis and out to the capsule entirely replacing the normal kidney tissue except for two pyramidal areas at the poles. These pyramids of kidney tissue have their bases at the inner surface of the kidney and measure 1 centimeter in width at the base by 3 centimetres in heighth. On the anterior and posterior surfaces of the kidney the tumor may be seen shining through the capsule which is only 0.25 centimetre thick. The tumor is easily separated from the kidney tissue and capsule and while it extends into the pelvis it is not adherent to it.

Microscopic Description.—The sections show the tumor to be very cellular in composition. The cellular elements seem to be of two distinct types, one of connective tissue origin and the other epithelial orgin, with the connective tissue cells predominating. These connective tissue cells are for the most part round in form, contain large deeply staining nuclei and a scant amount of cytoplasm. The nuclei are granular and occasionally show structures resembling mitotic figures although no true mitoses were observed. Many of this type of cell, however, show transitional forms toward the spindle cell. They have no particular arrangement although there are a few fine strands of fibrous tissue running through the section and dividing it up. These connective tissue cells act as a supporting stroma to the epithelial cells. These cells are arranged in definite alveoli bearing some resemblance to the kidney tubules. The cells are larger than tubule cells, have darker and more granular cytoplasm and larger, more deeply staining nuclei. No mitotic fugures were seen. They vary in shape from cuboidal to columnar and appear one to three deep in the alveoli. Although the connective tissue cells are distinctly the more numerous, the proportion of epithelial cells to connective tissue cells varies in different sections. No muscle cells were seen. The kidney tissue appears normal except that it is greatly compressed and separated from the tumor by a layer of dense fibrous tissue which acts as a capsule for the tumor.

At present the young girl is in excellent health. Of nine cases of Wilm's mixed tumor of the kidney in children, in the records of the Roosevelt Hospital, seven died within the first year, one was alive at the end of four years, when trace of her was lost, and the ninth is the patient here presented. These tumors are especially malignant, with a tendency to recur rapidly and metastasize to the liver and the lungs. The reports in the literature are so discouraging that one might well hesitate to operate because of the apparent futility of the operation. On the other hand, such a result as this patient shows justifies the operation and the expectation of an occasional good result.

Dr. Albert E. Bothe (Philadelphia) said that while the so-called Wilm's tumors are usually tumors of childhood, the majority are removed from patients several years older than the one presented. On account of the wide diversity of pathologic findings, this tumor has been tagged by many names. This, of course, is due to the wide variations in the predominating cellular growth. They are called myxomas, myxosarcomas, sarcomas, adenosarcomas, Wilm's tumors, embryomas, teratomas, and mixed tumors.

When the frequency of Wilm's tumors is compared with all tumors of the kidney in childhood, it bears about the same relation as hypernephroma does to all types of kidney tumors found in the adult.

Owing to the embryonal characteristics of the predominating cells in these tumors, it is natural to assume that they should be radio-sensitive. It is further evident that microscopic sections made from radiated and non-radiated Wilm's tumors show striking differences.

FIG. 10.—Low power: tumor and kidney.

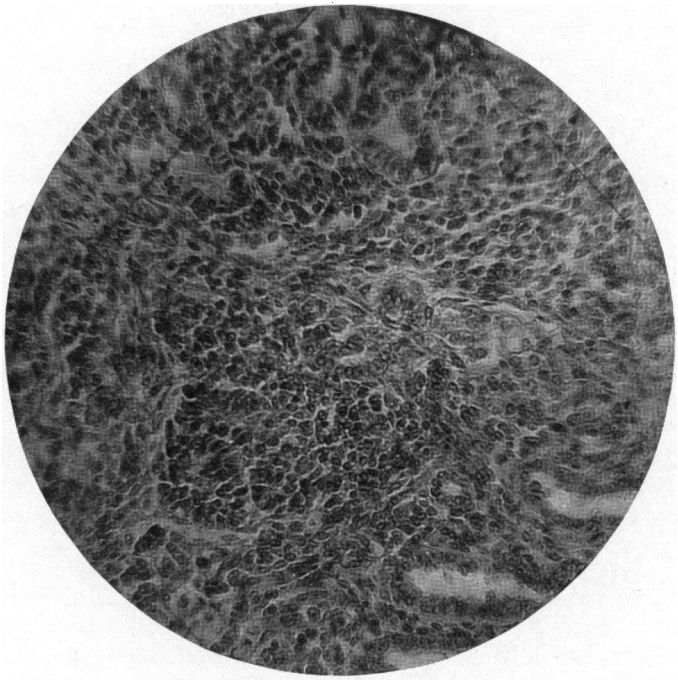

FIG. 11.—High power: tumor.

He had recently seen a girl, eight years of age, who had been operated upon for splenomegaly. When the peritoneum was opened, the mass was found to be attached to the kidney. The abdomen was closed and an extraperitoneal exposure showed a large inoperable tumor. A piece of tissue removed at the time of operation was diagnosed adenocarcinoma of the kidney.

After reviewing the microscopic sections made from tissue removed from this tumor, it was felt that it was representative of a Wilm's tumor and deep X-ray therapy was advised. Since this treatment the tumor has reduced about one-third in size. This reduction in the size of the mass will undoubtedly facilitate subsequent nephrectomy.

He had also studied microscopic sections made from a Wilm's tumor removed after having had a course in deep X-ray therapy. This girl was nine years of age with a tumor mass involving an entire left side of the abdomen. After a course in deep X-ray therapy the mass had reduced about one-half in size. This was followed by transperitoneal nephrectomy by Doctor Randall.

When the sections made from the radiated tumor are compared with the sections made from the nonradiated tumor, the difference is very striking. In the nonradiated tumor there is a predominance of embryonal epithelial cells with very little stroma. The tissue has a very actively growing appearance, while the sections made from the radiated tumor show an extensive fibrous stroma with small islands of embryonal cells embedded in its meshes and considerable evidence of degenerative changes.

It is evident that the findings in the two cases referred to indicate that a preliminary course in deep X-ray therapy should facilitate nephrectomy and reduce the incidence of subsequent extension from manipulation of the tumor mass at the time of nephrectomy.

DR. DAMON PFEIFFER said that many years ago he published a paper on mixed tumor of the kidney which appeared in the last number issued of the Bulletin of the University of Pennsylvania. In assembling the material for this paper he examined the literature on the subject thoroughly and collected many cases, all of which showed that this is a highly malignant condition as a rule, but that now and then a case proves to be benign. Some of the cases are very responsive to treatment so that one need not feel that these tumors are invariably hopeless, and they rate exploration at least.

ACUTE OSTEOMYELITIS OF THE VERTEBRÆ

DR. JOHN E. JENNINGS (New York) in presenting a patient, said that acute septic osteomyelitis of the vertebræ, first described clearly by Lannelougue in 1879 and found by him once in 545 cases, has been well studied by Geisel, Donati, Mathieu, Wilensky and others. It may involve either the arch or the body and may occur in any part of the spine. When it involves the arch, subperiosteal abscesses regularly develop which burrow into the surrounding structures or into the spinal canal. When the bodies are involved, pressure on the cord is apparently not so common, but the pleura, pericardium and peritoneum and dorsolumbar muscles are more often involved.

The prognosis is in any event very grave. Mathieu found a mortality of 46 in 100 cases and says that recovery occurred as a rule in the cases in which

the seat of the lesion was superficial (in the posterior arc). One may consider, as fatal up to this time (1924) the cases in which the lesion was situated in the body of the vertebræ.

In most of the cases reported—now in the neighborhood of 120—the disease has been discovered at postmortem or at operation directed toward the drainage of secondary pus collections. He has not discovered a case reported in which early recognition and prompt operation succeeded in limiting the extension of the disease. His personal case, now presented, was a boy, fifteen years of age, who had been discharged from the hospital after a two-months stay during which he had been operated on for acute osteomyelitis of the left humerus and left ileum. Both these foci had been adequately drained and, while still requiring dressings, were progressing satisfactorily. He had been at home ten days when he was suddenly seized with severe pain in the back and mid-abdomen. His temperature rose to 103°, his pulse to 120 and he returned to the hospital within twenty-four hours. When seen on the morning of his second day his spine was rigid, he complained of agonizing pain on motion; the pain was reflected to the abdomen but the muscles of the abdomen were not rigid nor could tenderness be elicited by palpation either in front or back.

X-ray of the spine was negative. The temperature and pulse remained elevated. The pain increased in severity and the rigidity did not diminish. There were no disturbances of sensation or of voluntary motion. On the morning of the fourth day percussion of the spines of the lower dorsal and lumbar vertebræ elicited tenderness which was most marked on striking the first lumbar spine. X-ray was again negative. November 29, 1927, an incision 8 inches long was made parallel to the spines of the lower dorsal and lumbar vertebræ and an inch and a half to the right exposing and removing the transverse processes of the first and second lumbar and last dorsal vertebræ and the head and neck of the twelfth rib. The lateral surfaces of the body of the first lumbar vertebræ were exposed and thin sanious pus exuded from beneath its periosteum. The bone beneath was dark red, with many small abscesses. The entire vertebral body appeared to be involved. Guided by the finger a sharp gouge was pushed through the soft spongy bone to the centre of the body and a cone of infected bone removed. An iodoform gauze strip was laid in this cavity after inspection of the bodies of the adjacent vertebræ which appeared normal and the wound closed. The recovery was uneventful, temperature and pulse reaching normal in a few days. The drained wound closed by granulation and he left the hospital on the forty-fifth day. A culture taken at the time of operation revealed the presence of staphylococcus aureus, as had previous cultures of the other bone lesions.

Dr. A. Bruce Gill (Philadelphia) said that acute osteomyelitis of the spine is often difficult to diagnose in the early stage of the condition. The disease usually presents the same general symptoms as an acute osteomyelitis elsewhere in the body. Local symptoms are pain in the back, tenderness over the diseased portion of the spine, pain on motion of the spine, limitation of motion, and, in time, development of a kyphosis. Abscess forms and points in the appropriate region. An absolute diagnosis may not be made until X-ray examination shows the characteristic lesion of the body of the vertebra. One cannot expect to find this X-ray evidence of disease until at least three weeks have elapsed after its onset. Doctor Jennings' case is exceptional in that he was able to make an absolute diagnosis by exposing the vertebra at the time of operation and finding evidence of lesion in the bone.