which the elemental lesions become larger and redder, and occasionally even edematous.

The papular syphilids, even those which were scarcely noticeable before, stand out and become red and succulent. Likewise, the pigmented syphilids and the malignant precocious syphilis may show marked changes.

The mucous membrane lesions react less frequently than the cutaneous lesions, but the process is similar when it does take place.

The gummata may also show the reaction. When not open, they become swollen and turgid. When ulcerated, they enlarge and emit an abundant serous discharge.

Among the general and visceral symptoms which take place after the first injection, fever is the most common and the most important. It is frequently difficult to say whether the manifestations are those of a Herxheimer reaction or of an intolerance for the drug. As an aid in differentiating the two, Milian mentions the following points:

In the reaction of Herxheimer; (1) the symptoms decrease in intensity with each injection of the same dose or with even larger doses; (2) they diminish *pari passu* with the decrease in the syphilitic manifestations; (3) so long as this reaction continues, the Wassermann reaction remains stationary, or even increases in intensity; (4) the cerebrospinal fluid contains cells which may be augmented in number with each injection.

The reactions of intolerance, however, take practically the opposite course.

1. The general and febrile reaction increases or remains the same with each injection, regardless of the size of the dose.

2. The reaction continues in spite of amelioration, or even the disappearance, of the syphilitic symptoms.

3. The reaction persists, although the Wassermann reaction may decrease in intensity or become negative.

4. The reaction may continue to occur with a completely negative cerebrospinal fluid.

Among the visceral reactions, the most important are those occurring in the liver. In syphilitic diffuse hepatitis, there is an exacerbation of the icterus, which may

progress from a greenish-yellow to a deep greenish-black. This exacerbation is not to be confused with the toxic icterus of intolerance.

The Herxheimer reaction of the central nervous system affects either the meninges or the cranial nerves. The deaths from salvarsan are practically all due to a serous encephalitis, and are not to be explained by the Herxheimer reaction, because most of them have occurred in the absence of syphilis. The symptoms preceding death usually appear about the third day after the injection as a severe headache, followed by convulsions, coma, and death within twenty-four hours.

The reaction of Herxheimer is frequently found of much value in indicating a latent syphilis; and is an indication for further treatment.

The Nitritoid Crisis and the Serous Apoplexy of Salvarsan. Milian[7] believes that the severe reactions sometimes following salvarsan injections are not toxic but mechanical, and due to a vaso-dilatation chiefly of the chorioid plexus, causing nausea, vomiting, and other familiar unpleasant symptoms. If the patient at the time of the injection says he smells ether, it indicates a hypersensitiveness to the drug and a coming crisis. As a prophylaxis an immediate hypodermic injection of adrenalin should be given and repeated if necessary. This he has found to be effective in warding off an attack.

[In the course of an experience with a great many injections, it has been observed that fully 75 per cent. of all patients will describe an odor of ether if asked if they smell anything. The usual supposition of the patient is that the odor is that of the salvarsan. There appears to be no relation existing between the detection of the odor and a subsequent reaction.—Ed.]

GENITO-URINARY SURGERY.

Operative Treatment of Genital Tuberculosis. The term "genito-urinary tuberculosis" should be abandoned, state Cabot and Barney,[1] and we should come to

(7) Bull. Soc. de derm. et de syph., 1914, p. 104.
(1) Jour. Amer. Med. Ass'n., 1913, Vol. 61, p. 2056.

recognize tuberculosis of the urinary tract as primary in the kidney, while tuberculosis of the genital tract in the male is primary in the epididymis.

The bladder and the structures of the bladder neck, including the prostate, are more or less common to both genital and urinary tracts, and the prostate is therefore between two fires and may be infected with tuberculosis as a secondary matter, either in urinary or in genital tuberculosis. It is important, however, to recognize that the infection of the prostate is rarely primary for the genital tract, and as our knowledge of this matter extends they think that primary prostatic tuberculosis will be relegated to the same class of surgical curiosities as is primary tuberculosis of the bladder.

According to Cabot and Barney the clinical pathology of genital tuberculosis is as follows: The disease is primary in the epididymis, occasionally in the testicle, rarely in the prostate. The prostate is involved secondarily early in the disease and ultimately in a vast majority of the cases. The testicle is involved secondarily less often than the prostate, and probably less early. It is of the first importance to recognize the distinction between primary and secondary involvement. The organs primarily involved show very little tendency to shake off the disease, while those in which it is secondary show a far greater power in this direction and will under favorable conditions be successful. On these facts they undertake to support their main thesis, that the operation of election in genital tuberculosis is epididymectomy, including the accessible portion of the vas.

It has become a generally accepted doctrine when dealing with tuberculous processes elsewhere in the body that it is wise to remove, by operation, massive foci and to trust to the tissues the jugulation of the remaining tuberculosis. This principle, applied to the urinary tract, requires nephrectomy, with removal of the accessible portion of the ureter, and it is generally recognized that the secondary processes in the remaining portion of the ureter and in the bladder heal in a majority of cases. Precisely the same principles should be applied to genital tuberculosis. The primary focus, the epididymis, should be dealt with radically. The secondary foci in the testicle may be dealt with locally and the secondary process in the prostate should be left to Nature. To attack the tuberculous prostate is a radical procedure. The complete removal of the process when not under guidance of the eye is practically out of the question.

It has been the authors' experience that the involvement of the testicle was in most cases contiguous to the process in the epididymis. Often only a small focus in one pole is to be found. When this is the case, they have been satisfied to eradicate roughly with the curet and have never seen reason to regret it. It is clear that the testicle offers a very much higher resistance to the process than that offered by the epididymis. Cases will occasionally be seen, however, in which the involvement of the testicle is so considerable that it can not be regarded as a harmless process; in these, though few, orchidectomy must be recommended. After removal of the accessible portion of the vas, patients have returned with scrotum perfectly healed and testicle apparently free from involvement, but with a troublesome mass in the groin or even a sinus, the healing of which required time, patience and tuberculin. Cabot and Barney have, therefore, come to the opinion that the leaving of this portion of the vas complicates convalescence and may at times prove a serious annoyance.

An incision is made over the epididymis about two inches long. If sinuses are present, they should be circumscribed by the incision. This is carried down to, and opens the tunica vaginalis, which in many cases will be found adherent to the testicle and must be separated by dissection. The testicle and epididymis are delivered from the wound. The epididymis is then separated from the testicle by a scissor dissection, as in this way the vessels which lie behind the epididymis are less likely to be destroyed. The separation should be begun at the upper pole and carried downward, the epididymis being separated from within outward. When it is free, the lower inch or two of the vas should be stripped up by blunt dissection from the structures of the cord. A curved clamp is then applied to the vas and the epi-

didymis and the lower inch or two of the vas cut away. The vas is then stripped up by blunt dissection with the fingers so as to free it from the structures of the cord up to the external inguinal ring. Guided by the finger, the clamp on the lower end of the vas is then passed up to the external ring and carefully inserted into the canal, care being taken to avoid pushing it in front to the canal between the fascia and the fat. The clamp is then pushed upward and outward, following the line of the inguinal canal until its tip lies directly beneath the fascia at the level of the internal inguinal ring. The handle of the clamp is then strongly depressed, bringing the point snugly against the skin. An incision not over half an inch in length is then made on the point of the clamp, which is then pushed out through this incision, carrying with it the distal end of the vas. The vas is then picked up, and traction is made so as to pull out the portion lying in the canal, so that the remaining portion dives vertically into the wound and over the brim of the pelvis. The finger is next inserted into the little wound, and the vas is freed as far as the finger can reach, making steady traction during this process. A right-angled clamp is then applied to the vas at the lowest accessible point. It is divided, cauterized with phenol, and dropped back. The wound in the groin is closed with one catgut suture, and the fascia with a silkworm-gut stitch in the skin. The operation is completed by the careful ligation of any bleeding points in the scrotum. Any apparent foci in the testicle are eradicated with a curet. The wound is painted with tincture of iodin and closed with a subcuticular suture of silkworm-gut, leaving a small protective tissue-drain at the lower angle. This drain has been found to shorten convalescence by giving free exit to the serum which necessarily oozes from the raw surface, the amount of which is considerably increased by the application of iodin. The dressing is held in place by the application of an Alexander bandage. The drain can generally be removed in forty-eight hours and the patient may be up and about in two or three days. The after-treatment should include all of the general hygienic measures suitable for patients with

tuberculosis, including the routine use of tuberculin and the routine use of sandalwood oil in cases in which there is involvement of the prostate.

Prognosis of Sarcoma of the Testicle. After reporting a case which had been looked upon for nine months as tuberculosis of the testicle, E. A. Codman and R. F. Sheldon[2] analyze the cases recorded in the literature and make a study of those found in the records of the Massachusetts General Hospital.

Chevassu simplified the classification which had been so mysterious and confusing in the text-books, and practically reduced all tumors of the testicle to two—the "seminoma" and the mixed tumor. Using these clinical classifications, he gives the results of his researches as follows: Number of cases, 100; patients living four years after castration, 19; dead, 81.

That is, 19 per cent. of his patients were cured by castration. Of the nineteen cured, sixteen showed pathologically "epithelioma seminal," but only three were of the "mixed" type. He cites two cases in which additional dissection was done and the abdominal glands, showing metastatic involvement, removed. He therefore demonstrated the practicability of the operation, but sufficient time had not elapsed to prove a complete cure. The greater the variation in tissue, the worse the prognosis.

Ewing reduces the pathologic classification still further, for in the end he shows that all these testicular tumors, sarcomas, adenocarcinomas, teratomas, and all the wordy changes which have been rung on similar terms amount to this: That one and all are derived from the spermatic cells, and like the cells themselves have all possibilities of development short of a complete fetus.

Almost every tissue known in the body has been found in a testicular tumor—even a nearly perfect uterus. Usually, however, the epithelioid elements outgrow all the others, and we have a simple large round-celled tumor, which one pathologist classes as sarcoma because it arises from a mesoblastic organ, and another calls alveolar carcinoma because of its cellular arrangement and

(2) Boston Med. and Surg. Jour., February 19, 1914.

appearances. Practically all testicular tumors contain some of this tissue, though sometimes it is outgrown by the teratomatous elements. When pure, it is the common tumor which we call sarcoma or carcinoma, and Chevassu calls seminoma.

In the records of the Massachusetts General Hospital of the last forty years, Codman and Sheldon found eighty cases, classified chiefly as sarcoma or carcinoma of the testicle. Sixty-three had reports of pathologic examination of the specimens removed at operation. In the cases of those without reports the clinical diagnosis was sarcoma or carcinoma.

Of the eighty cases end-results of sixteen are lacking. It is hardly fair to suppose that all of these men have died. Of the sixty-four known cases, the figures are as follows:

Living and well 13
All operated on.
Dead from other causes 12
10 operated on.
Dead from disease 39
33 operated on.

This gives the mortality from the disease, 61.9 per cent. Excluding those not operated on, in whom the condition of the testicle was manifestly inoperable, or else discovered at autopsy in deaths from entirely different diseases, the mortality is reduced to 58.93 per cent.

This is, of course, a large figure; but it is much smaller than we have been taught to believe. Thus, out of fifty-six patients operated on, thirteen are living (average time after operation, nine years; extremes, two and twenty-eight years), ten have died from something else (average time after operation, ten years; extremes, seven months and twenty-six years). That is, twenty-three, or 41.07 per cent., of those operated on survived the disease. If eight patients unoperated on and twelve operated on when metastases were evident are excluded, we find that 52.27 per cent. were cured. It must be concluded, therefore, that the prognosis of sarcoma of the testicle, while bad, is not, when operated on, so universally bad as text-books would lead us to infer.

Among the sixty-four known cases there is one with the origin of the disease in the epididymis, but among the sixteen the results of which were not traced, there are two of this nature. In these three cases the preliminary diagnosis was tuberculous epididymitis; in two the pathologic report was sarcoma; in the third there is no record of pathologic examination, but macroscopically the specimen was sarcoma. Ewing also has seen cases in which the tumor arose in the epididymis.

In four of the sixty-four known cases the testicle had not descended at birth, thereby confirming Odiome and Simmons in the belief that the undescended testicle is more prone to sarcomatous degeneration than the normally placed organ.

Of the thirty-three patients operated on who died from the disease, twenty-one had no sign of metastasis at operation, yet death occurred in all within three years. Only twelve showed metastasis at operation; in spite of the fact that in two of these additional dissection was done, all were fatal.

The figures confirm those of Chevassu, which show that a patient is safe after the three-year limit.

Nearly every case gave a history of trauma; but the authors do not regard this as important in the etiology.

In two of the cases in the group of "Dead from Other Causes," is found skin ulceration at time of operation. Codman and Sheldon therefore take exception to the statements about the hopelessness of those cases with extension beyond the tunica albuginea. One of these had a pathologic report of sarcoma, but in the other there was no report.

The radical operation, as advised by Watson and Cunningham and Chevassu, has not been done at the Massachusetts General Hospital. Whether had this been attempted some of the twenty-one individuals who died within three years, in spite of no evident metastasis at time of operation, might have lived is, of course, a question.

In twenty-one cases the location of metastases is as follows: In abdomen alone, 13; in abdomen and lung,

1; in neck and liver, 1; in axillae and abdomen, 1; in lungs, 1; in spinal cord, 1.

The great majority, therefore, show abdominal metastasis, and might be helped by a removal of the retroperitoneal glands.

Sterility in the Male. In the event of a childless marriage, it is almost a reflex act on the part of the physician to say nothing of the husband. J. D. Barney[3] considers in a general way the sterile man, and discusses some of the causes of his sterility.

There seem to be no very accurate figures as to the frequency of childless marriages. According to Hühner, 10 per cent. of all unions are sterile; in France the number is put at 20 per cent. There is no general agreement as to the number of times in which the husband is at fault. Hunter quotes numerous writers whose percentages vary from 1 to 80. Lier and Ascher found the fault to lie with the husband in 71 per cent. of the sterile marriages which they investigated. Belfield says: "The investigation of childlessness should begin, not with the curettage of the wife, but with the microscopic examination of the husband's semen."

But the facts show the opposite procedure. From one of our largest public hospitals Barney collected data of 108 women, in whom a diagnosis of sterility is recorded. Some of these women had been married many years. Three had been married more than once.

In thirty-one cases the records do not contain any statement as to advice or treatment either of the wife or of the husband. Of the remaining seventy-four, thirty-seven of the women were advised to undergo operative treatment, while the remaining thirty-seven actually went through this ordeal. In many this advice was given or an operation performed in the presence of a negative pelvic examination. In only five of these 105 women (4.76 per cent.) was the husband first examined!

If these operative procedures had led to the much desired pregnancy, we might feel somewhat justified. But failure is written in large type over the results. Twenty-five of the women operated on were followed for

(3) Boston Med. and Surg. Jour., June 18, 1914.

a year or more. Only two, or 6 per cent., had become pregnant or borne children. An attempt to examine the husbands of the remaining twenty-three cases met with poor success. However, four such husbands were examined. Two were evidently normal in every respect. In the other two the semen contained no spermatozoa, and an examination of their genitalia showed evidence of an old gonorrheal infection. One of these men had been married twice; neither wife had ever become pregnant; the present incumbent had gone through two fairly serious operations, yet the husband's powers of procreation had clearly become obsolete years before.

Bearing in mind the figures already given as to the frequency of the sterile husband, it is fair to assume a similar percentage in the cases here presented.

One might suppose that in hospital practice the pressure of work furnished an excuse for an inexcusable blunder; one might further suppose that this does not apply to our private cases. Unfortunately, it does. Through the courtesy of several gynecologists, Barney has now seen the husbands in forty childless marriages. Twenty were actually sterile. Yet the wives of four (20 per cent.) of these had had more or less severe operations done on them before it occurred to the operator that perhaps, after all, the husband was at fault.

While in women Nature seems to be responsible in many cases for sterility, in man disease plays the chief rôle. In the event of bilateral undescended testicles, Belfield says that no spermatozoa are formed. On the other hand, Simmons and Odiorne, and, more recently, McGlannan, have observed adult spermatozoa and a normal histologic picture in a considerable number of such organs.

In the rare malformations, such as epispadias, certain types of hypospadias, and exstrophy of the bladder, the spermatogenetic function of the testicle may be and generally is unimpaired, but owing to the nature of the defect, coitus is either impossible, or the semen can not be ejaculated into the vagina.

There are several non-venereal diseases, which, if they attack the testicle or epididymis, may produce sterility

in the male. Of these, mumps, especially when occurring after puberty, is the most common, with an incidence of orchitis, generally bilateral, estimated at anywhere from 5 per cent. to nearly 33 per cent. Atrophy of the testes with destruction of the spermatogenetic function follows in a vast majority of these cases.

Approximately 15 per cent. of the adult male population is infected with syphilis. Syphilis (gumma) of the testicle is fortunately not common, and is generally unilateral. Keyes records sixty-seven cases, of which only ten were bilateral. But even if bilateral, the prognosis, after proper antisyphilitic treatment, is said to be good.

The incidence of abscess of the testicle (usually unilateral) in typhoid is only about 2 per cent. The destruction of the organ may be, and usually is, complete.

Tuberculosis of the genital tract, although primary in the epididymis, and even when unilateral, results in azoospermia in about 85 per cent. Experience has shown that, even if early operation removes the diseased epididymis, its fellow becomes involved within a year in more than half the cases.

The abuse of alcohol is also a potent factor. Simmonds estimates that 61 per cent. of all alcoholics are sterile. But in such a condition of narcotism it is reasonable to suppose that concomitant diseases, generally those of venereal origin, are far more productive of the sterility than is alcohol.

Another possible cause of sterility which does not seem to be mentioned elsewhere, is absolute and protracted continence. This statement, made to me by a colleague, is based on the case of a man who was married fifteen years ago. At this time healthy spermatozoa were found in the semen. For reasons best known to themselves, the couple abstained from sexual relations, and there have been no intercurrent diseases. A recent examination of the husband shows azoöspermia.

It also seems to be a fact that the otherwise healthy testes of normal, active and sexually vigorous men may occasionally be entirely unproductive of spermatozoa.

Another source of sterility of considerable importance is repeated and prolonged exposure (especially of the

genitals) to the Roentgen rays. Brown and Osgood investigated this question and found, among other things, that (1) spermatozoa themselves are highly resistant to the *x*-ray; (2) the spermatogenetic cells of the tubules of the testis show degenerative changes; (3) there is no deterioration of sexual activity produced.

Infection by the gonococcus is by all odds the most frequent cause of male sterility. From a numerical standpoint, all other etiologic factors fade into insignificance. The disease is so widespread that statistics collected from various sources place the incidence at from 50 to 75 per cent. of the adult male population. It is also well-established that prostatitis, generally with more or less involvement of the seminal vesicles, occurs in the vast majority of cases.

Embryologic Origin of Mixed Tumors of the Testicle. Two interesting cases are reported by Stokes.[3] In the first there was no sign of metastases except those referred directly to the testicle. The cord was not enlarged to any extent, and the entire tumor seemed to be local. An incision was made extending from the symphysis pubis to the anterior superior spine, and the testicle, the cord, the retroperitoneal fat and the cord around the pubis with all its veins and tributary blood-vessels and lymph nodes, removed. The patient made an uninterrupted recovery and is still living, two and a half years after.

The second case was seen late in its history. With the distended abdomen and the tuberculous family history, the interne in the hospital made a diagnosis of tuberculous peritonitis with the possibility of a tuberculous epididymis. The patient was anesthetized and the abdomen opened, only to find the peritoneal cavity empty and the mass entirely retroperitoneal with liver metastases. The mass was a soft, bloody, gromous-looking material, resembling anchovy sauce. The testicle was removed. In three days the patient died, and at the post-mortem specimens were taken from the lungs, liver, thyroid, glands of the neck and kidneys. On microscopic study of the slides from these sections the diagnosis of mixed tumor of the testicle was made.

(3) Jour. Amer. Med. Ass'n., 1913, Vol. 61, p. 2054.

In the first case, the author found the dominant cells to be epithelial, while in the second, at least in the metastatic growths, the dominant cell was of mesoblastic origin, with many epiblastic cells, as well as mesoblastic in the testicle itself.

The cases were, in Stokes' opinion, both of embryologic origin, as evidenced by the presence of syncytium and the cells of Langhans, the increased amount of muscle and the presence of cartilage, the large embryonal epiblastic cells arranging themselves in an alveolar form, the presence of large round cells, degenerating epiblast and chromogenetic cells.

The origin of the tumor in the first case seemed definitely to be the tubules of the testicle, or, at least, the tubules presented the microscopic appearance of infiltrating the lower layers of the tissue in their proximity. This tumor would, therefore, be readily classified as a carcinoma on superficial examination.

A microscopic study of the second tumor offered no evidence regarding its origin. The last would undoubtedly fall under the theory of Ewing, that these tumors arise in the sex cells of the testicle; the first did not appear to be nearly so indefinite in its origin.

The conclusions of Ewing and the added ideas of Wilson may be quoted, as follows:

1. Pure fibromas and pure leiomyomas of the testes exist, but are extremely rare, as is also adenoma occurring in atrophic undescended testes.
2. Primary lymphosarcoma and pure spindle-celled sarcoma are of uncertain origin.
3. Chrondroma, myxoma, lipoma, rhabdomyoma and carcinoma have not been shown to exist apart from a teratomatous origin.
4. Alveolar large round-celled, perivascular and other forms of so-called sarcoma testis are of epithelial and teratomatous origin.
5. The commonest tumor of the testes is an embryonal carcinoma, alveolar or diffuse, with polyhedral or round cells and often with lymphoid stroma. These tumors are probably one-sided developments of teratomas.
6. Teratoma of the testis arise from sex cells in the neighborhood of the rete, whose normal development into spermatogonia has been suppressed, but whose potencies remain intact and ready to express themselves in the various forms of simple or complex teratomas.

Wilson's application of the theories of Blanca and Bresseto would also further tend to prove the hypothesis of Ewing, that these tumors are of sex-cell origin, and are teratomas.

Epididymotomy. Excellent success and most gratifying results have been obtained at the United States Marine Hospital, Stapleton, N. Y., with Eckels' operation for epididymitis. The technique described by Eckels, except for slight modifications, has been followed.

In the operation, as Knight[4] has performed it, an incision is made in the scrotum about 1½ inches below the lower border of the external ring, and is prolonged far enough to allow free delivery of the testicle with the tunica vaginalis. The organ is then wrapped in sterile cloths moistened in warm saline solution, and a small incision is made in the tunica vaginalis which allows any fluid present to escape. The epididymis is next exposed and that portion which appears inflamed is punctured in several places. This relieves the tension by allowing the restricted fluid to escape. Eckels states that for puncturing the epididymis he uses a blunt probe or grooved director. Knight employs a large blunt-pointed needle, making from ten to twelve punctures, believing that the needle is better adapted for this procedure, especially when operating under local anesthesia. After the tissues have been thoroughly washed with warm sterile saline solution, the testicle is returned to the scrotum. The tunica vaginalis is then approximated and united with a continuous catgut suture. The scrotum is then united with interrupted silkworm-gut sutures. The skin in proximity to the incision is painted with iodin solution to insure asepsis, a sterile dressing is applied, and the scrotum bridged with adhesive tape to give support for the first few days. Eckels also states that, if pus be present, a longitudinal incision should be made in the epididymis, and a few strands of silkworm-

(4) Jour. Amer. Med. Ass'n., January 31, 1914, p. 351.

gut inserted for drainage. In two cases pus was found at operation.

Eckels states that the preparation of the patient is the same as that for a general anesthetic, as local anesthesia is not advisable. Knight has used local anesthesia, however, for this operation in several of the cases, which he reports, with absolute success, hearing no complaints of pain, and noting no symptoms of shock. There may be some pain if orchitis be present, but with careful handling of the testicle, this symptom can be obviated. For local anesthesia, a 1 per cent. solution of novocain with epinephrin is infiltrated along the line of the intended incision. Twenty minutes later the incision is made and the tunica vaginalis is exposed, infiltrated and incised, after which the solution is injected into the epididymis, and anesthesia of the part is complete. The procedure of puncturing and, if necessary, incising, is then absolutely painless. Because of the rapidity with which the operation can be performed, from five to ten minutes being the time required, and the absence of pain and shock, the procedure does not seem to warrant the use of the dangerous general anesthetics.

From a study of Knight's cases, it is seen that the points observed almost entirely agree with the conclusions noted in Eckels' article. The only exception is that Knight is unable to make any deduction as to the probability that there is a smaller percentage of sterility following the disease in those operated on. He agrees with Eckels that the operation should be the procedure of choice in the treatment of epididymitis, and believes that the patients should be operated on as soon as symptoms appear, thereby eliminating the possibility of pus and abscess formation.

His conclusions are that there is immediate abatement of all symptoms for which the patient seeks relief. The tendency to relapse is *nil*. The operative procedure is without danger as regards anesthesia, because the general anesthetics can be eliminated. This operation, as compared with the older methods of treatment, is one of utmost importance, from an economic point of view, not only to the patient, when loss of time from daily labor is

considered, but also to the hospital in its economic administration, by greatly diminishing the number of days of treatment.

Anastomosis of the Vas Deferens. Wheeler[5] has used this method with good results in two cases. The divided ends of the vas are passed over the eye and point of a fine straight needle until they meet. A few points of suture are then inserted, and the needle is pushed out through the wall of the vas at a distance from the anastomotic junction. The line of sutures is wrapped round with neighboring fascia to give additional strength. After salpingectomy the anastomosis of the Fallopian tubes might readily be accomplished by the same device.

Operation for Undescended Testicle. Thompson[6] describes an operation especially designed for the retention of the testicle in the scrotum. The usual incision is made for the exposure of the external opening of the inguinal canal, with two exceptions—it is longer and it is curved. The incision commences just internal to the anterior superior spine, and proceeds in a sinuous manner into the scrotum. It may be divided, for the purposes of description, into three parts of equal length. The first part lies half an inch above, and parallel with, the outer half of Poupart's ligament. The second part is curved, with its convexity directed downwards and outwards. It begins just above the middle of Poupart's ligament and terminates near the pubic spine. The third part curves downward into the scrotum, and is of equal length to each of the two other parts of the incision. Its convexity is directed upward and inward. The external ring is exposed and any hernia found is treated in the usual way. The vas is isolated with its accompanying artery and vein. The cremasteric plexus of blood-vessels and lymphatics is removed between ligatures. A finger is introduced into the cavity of the scrotum and the testicle is brought down and placed in the scrotum, where it is retained by an assistant. The extremities of the middle part of the incision are then united by a curved

(5) Brit. Med. Jour., February 7, 1914.
(6) Lancet, May 30, 1914.

incision, whose convexity is directed upward and inward; and an oval flap of skin and subcutaneous tissues, extending down to the external oblique muscle, is dissected and isolated. This oval flap is then transferred to the scrotal part of the incision, and sutured to both sides of this part, so that its lower apex lies in the lowest part of the scrotal portion of the incision. The rest of the wound is sewn up in the usual way.

By this means the scrotum is appreciably enlarged and, as it were, stiffened by a portion of tissue which contains no "dartos" muscle, and therefore remains uncontracted.

Anastomosing the Ovarian Tube or Vas Deferens. Attempts at repair of the ovarian tube and vas deferens have always been fraught with uncertainty as to whether the lumen of the tube, after simple suturing, would remain patulous or would become obliterated at the site of the suture line. So far obliteration of the lumen at the line of sutures is the usual result. It has seemed desirable that some simple method of repairing these structures that would give reasonably certain results be devised. The following method described by Christian and Sanderson[7] has been used successfully in three cases:

When the ovarian tube or vas deferens has been divided from any cause, the cut ends are picked up, a piece of No. 0 twenty-day catgut is inserted ⅜ inch into each end of the tube, and the ends are brought together with two apposing catgut sutures. The lumen can not become obliterated at the time of healing of the divided ends because the gut is in the canal and will remain there until after repair is complete and Nature has ceased to throw out reparative tissue. The gut, being of absorbable material, is soon completely removed. Gentleness should be exercised in the introduction of the catgut so as not to traumatize the epithelial lining.

Instrument for Direct Application of Radium to Neoplasms of the Bladder. This article is written by W. Ayres,[8] of New York. Application of radium to neoplasms of the bladder have been made either through suprapubic openings or by touch, with the radium con-

(7) Jour. Amer. Med. Ass'n., December 13, 1913.
(8) New York Med. Jour., July 18, 1914.

tainer on the end of an instrument shaped like a sound. The first is not advisable in a case such as a patient with 3 per cent. of sugar in the urine, and both methods are subject to the criticism that one can not be sure that the radium is in direct contact with the tumor. According to the reports of cures or improvements through the use of radium, it has invariably been placed either within the substance of, or directly in contact with the tumor. Even those enthusiastic in its use do not expect any benefit unless such applications are made. Ayres does not wish to express any opinion on the value of the radium, but believes it should be tried in inoperable cases.

The instrument devised by Ayres may be used through the Ayres operating cystoscope, or preferably through the Buerger operating cystoscope. The radium container is held against the tumor under direct observation. This seems better than to deposit a carrier in the bladder and trust to luck that it will remain in proper position for twenty-four to forty-eight hours.

It is considered that 300 mgm. hours are necessary to produce any beneficial effect, and the procedure in the case under treatment is to make application for one hour three times a week. One hour's use of radium in the bladder is more irritating than one hour's cystoscopy without radium. To render the patient as comfortable as possible, 2 ounces of 1 per cent. solution of alypin are injected into the bladder one-half hour before the cystoscope is introduced, and during treatment the bladder is kept comfortably full of a 1 to 400 solution of the same drug.

Cysts of the Prostatic Urethra. Underhill[9] reports two cases of this apparently rare condition.

Case 1. W. M. R., aged 36, unmarried, complained, March 20, 1913, of "impotence." The patient gave no history of syphilis, but he had had a number of attacks of gonorrhea, one of which was complicated by epididymitis of the left testicle. Seven years before he had been massaged for some weeks for prostatitis; since then he had had no urethral disturbance except dribbling

(9) Jour. Amer. Med. Ass'n., January 24, 1914.

after micturition and gluing of the lips of the meatus. His habits, sexual and otherwise, were good.

A few hours before consultation he had attempted intercourse, and failed utterly to induce an erection. He stated that he was in excellent health, but for some months past had been easily exhausted and had felt tired from his waist down. He had not attended to his work with his customary feeling of energy. He had not attempted coitus during the preceding two years, although before that time he had led an unusually active sexual life.

Examination showed the external genitalia to be well-developed and normal. There was no urethral discharge and the urine (three-glass test) was negative, with the exception of a few shreds in the first glass. The whole surface of the prostatic urethra from the margin of the internal vesical sphincter to the beginning of the membranous urethra was found, on endoscopy, covered with cysts from 1 to 2 mm. in diameter, round or somewhat oval, with the long axis corresponding generally to that of the urethra. Two of them just external to the vesical orifice were larger, measured about four mm. in their long diameter, and lay transverse in the wall of the urethra. No normal mucous membrane was visible, even the colliculus being included in the cystic degeneration.

Case 2. An unmarried clerk, aged 26, complained, May 21, 1913, of a gleet for which he had been under treatment by prostatic massage for eight months. He had had an attack of gonorrhea five years ago, but gave no history of syphilis or other venereal diseases. When an examination was made, a transparent mucoid discharge, which microscopically consisted of mucous shreds, epithelium and a few pus cells, but no gonococci, was expressed from the meatus. The urine (three glasses) was negative with the exception in the first glass of a few fine shreds made up of epithelium and pus cells.

The endoscopic examination showed practically the same condition in the prostatic urethra as in Case 1, except that the site of the lesion began within the margin of the internal vesical sphincter, which was smooth and

normal in appearance, and extended 1.5 cm. anterior to this point. The whole circumference of the urethra within this area was the seat of the change. The mucous membrane of the prostatic urethra was hyperemic, bled easily and in places was granular in appearance. The colliculus was apparently normal.

Both the cysts were sessile, white and looked in general like pearls sunk half way in the mucous membrane. They were insensitive to the touch of the probe or swab and did not bleed except when incised; the walls varied in thickness, those of the smaller cysts consisting of a thin membrane which collapsed completely when incised or torn, while the larger cysts were quite resistant to the endoscopic knife and did not collapse entirely when opened. The contents, which were withdrawn with a syringe after incision, appeared to consist of a clear fluid which, microscopically, contained no cellular elements or organisms. This examination, however, was unsatisfactory on account of the presence of red blood corpuscles as a result of the incision, which did not in itself cause enough bleeding to interfere materially with further procedures. No cultures could be taken at the time.

In the first case the condition of the margin of the sphincter was well shown. When the endoscope was pushed into the bladder and slowly withdrawn, in place of the smooth, rounded, bright red circumference of the sphincter internus which normally comes into view and closes on the extremity of the endoscopic tube like an iris diaphragm, a series of grayish-white excrescences was seen, irregular in size, each semicircular at first view, but losing this shape as they came together and were compressed by the contraction of the sphincter. As the tube was withdrawn through the prostatic urethra the cysts continued to come into the field of vision in one thick continuous cluster, which was crowded together in a formless white mass as they disappeared in the apex of the funnel formed by the collapse of the walls of the urethra behind the end of the tube.

The treatment consisted of extreme dilatation with the Kollmann posterior dilator, and incision of the cyst walls. A few dilatations served to destroy the small

thin-walled cysts except a few within the margin of the internal sphincter. These and the larger cysts with thick walls were treated by incision followed by cauterization with the solid silver nitrate stick. Immediate improvement followed. The first patient recovered completely. The second still has a mucoid discharge. The few neurasthenic symptoms he showed have improved.

Although but few of these cases have been reported in the literature, if the endoscope were used oftener conditions such as these described would be found more frequently. Solitary cysts of the prostatic urethra are not uncommon. Many of them are found in the fossae between the colliculus and the lateral walls of the urethra and are probably retention cysts of the prostatic ducts.

The origin of these cysts is as yet not altogether clear. J. Englisch, in seventy necropsies on new-born infants, found, in five cases, cyst-like bodies at the border of the sinus pocularis, which he concluded were retention cysts formed as the result of a malformation or congenital inclusion of glands in this region. They caused obstruction to the passage of urine, but usually ruptured either spontaneously or as the result of catheterization a few days after birth. Springer reported four such cases, three of which were in adults. Michailow described a similar cyst in a patient, aged 28, who was a marked neurasthenic as a result of the frequent micturition, due to the irritation and obstruction, in addition to the pain which had invariably accompanied ejaculation since puberty. Buerger and Oppenheimer found a cyst of the prostatic urethra just within the margin of the internal sphincter at necropsy in a man who had died of peritonitis. All these patients gave a history of one or more preceding attacks of gonorrhea, which were more or less protracted. This seems the only etiologic factor they have in common.

The pathology of this condition is more or less obscure. It is possible that they are retention cysts formed by the occlusion of the ducts of glands in the mucosa brought about by inflammatory changes.

The local symptoms were not distinctive; they were the same as we see in any long-standing chronic urethritis.

The subjective symptoms, if any were present, were those characteristic of the neurasthenia accompanying many of the chronic diseases of the posterior urethra. They were the predominating feature in the first patient. This is often the result when the veru montanum is involved in a pathologic process.

Operation for Shortening the Scrotum. Not infrequently associated with varicocele is a long, lax, pendent scrotum, which in itself needs consideration, and unless dealt with properly these patients will not obtain complete relief from removal of the veins.

The operation most commonly employed is to clamp off and remove the redundant scrotum *en bloc*, the clamp being placed in such direction as is thought best.

The operation which R. L. Rhodes[1] proposes is not to use the clamp, but to make the incision through the skin only, and this can then be readily dissected or stripped from the subcutaneous tissues. The incision may be elliptic, as when only one side of the scrotum is pendent, to shorten this side; or transverse, removing as much of the lower end of the scrotum as is desired; or, following the line of the raphé, extending on either side as widely as is desired. It may be closed in a straight line transversely or parallel with the raphé or in the shape of a cross (+), depending on the amount of skin denuded and the direction most desired to be abbreviated.

The advantages are that it is an open operation, with everything in full view of the operator, and therefore there is no possibility of doing any damage. There is practically no bleeding, only a few oozing points, which can be readily ligated. It can be readily and painlessly done under a local anesthetic. All the tissues beneath the skin are preserved. This is especially desirable as regards the dartos, which because of its elastic and muscle fibers rapidly contracts following the operation, and forms a thicker, firmer and stronger support. There is no post-operative discomfort, and the danger of post-operative hematoma is entirely eliminated, because no large vessels are cut, and such as are cut are readily seen and ligated. The scrotum is not opened, and therefore there is no possibility of carrying infection within.

(1) Jour. Amer. Med. Ass'n., August 8, 1914.