The American Journal of Urology

EDITED BY

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OF BOSTON

Published under the auspices of the American Urological Association, with the collaboration of:

VOLUME II.

OCTOBER, 1905.—DECEMBER, 1906

THE GRAFTON PRESS

PUBLISHERS

70 Fifth Avenue, New York

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Authors of Original Contributions are given in CAPITALS; Authors of articles reviewed are in *Italics.*

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. OCTOBER, 1905. NO. 1

EDITORIAL NOTICE

IN assuming the editorial direction of THE AMERICAN JOURNAL OF UROLOGY, the present editor's policy will have two principal ends in view, namely, to promote the interests of the American Urological Association in every manner possible, and, secondly, to raise the scientific standard of the JOURNAL to the highest point attainable. With this end in view, the co-operation and good-will of the members of the Association is greatly to be desired, and it is to be hoped that they will largely contribute, if only from the standpoint of the reputation of American urology.

The outlook for the JOURNAL is excellent, especially so when it is recalled to mind that it is the only publication in the English language limiting its subject matter strictly to the diseases of the genito-urinary apparatus. From the very fact that it already has a certain circulation abroad, it becomes at once evident that it has not passed by unnoticed.

Gonorrhœa is without doubt a very vast subject, but so much has already been written on the diagnosis and treatment of the acute stage of the disease, and since generally speaking it is at this period rather more in the province of the general practitioner than of the urologist, the editor feels it incumbent upon him to remark that papers pertaining to this subject cannot be accepted unless they are of unusual interest and importance. Let it, however, be understood that this does not apply to the pathology, complications and sequels of this affection which naturally form a most important chapter in genito-urinary surgery.

The pathology, symptomatology, diagnosis and surgical technique of genito-urinary diseases will form the subjects treated in the JOURNAL, at least to a great extent, while the normal anatomy and histology of the various organs entering into the genital and

uropoietic systems will not be neglected. Memoirs on renal and vesical affections from the medical point of view will also find a place in our pages when their importance is such as to be of particular interest to those engaged in this branch of surgery.

In closing, the editor appeals to the members of the Urological Association and to the profession at large for their support.

CONSIDERATIONS ON THE CAUSES RETARDING THE RECOVERY OF GONORRHEAL URETHRITIS

Dr. A. Ravogli, Cincinnati, Ohio.

GONORRHEAL urethritis in a great many cases remains latent and uncured; the patient who does not see any more discharge from the urethra believes himself well and returns to his ordinary life. After a time, however, he complains of a little milky discharge in the morning, or that the lips of the meatus urethrae stick together. He suffers erections at night which prevent him from sleeping, and is often troubled with frequent urination, especially at night time. The patient grows worse until he is compelled to ask for medical attention.

It has been positively demonstrated that the gonococcus is the only cause of the acute contagious urethritis, and that the chronic urethritis following the acute form, is also maintained by the presence of the gonococci. In the latter case the gonococcus remains in the urethral mucosa without producing acute symptoms, but only causing local irritation. Gonococcus is not a pathogenic germ for lower animals, but that it is such for man has been demonstrated by Bumm, Wertheim, Anfuso, Kiefer, Finger, Ghon and Schlangenhaufer by the direct inoculation of the pure culture of the gonococci.

Gonococcus is a micro-organism capable of producing pus and inflammatory process, and this influence may be shown at a distance in a metastatic form, or it is shown by continuity in the adjoining organs, as in epididymitis, prostatitis, cystitis, etc.

According to Grosz and Kraus the gonococcus has an endogen poison and like the bacilli of diphtheria and of tetanus, does not secrete any toxin. The poison of the gonococcus is variable in its

intensity, and in solution if injected under the skin of animals or of man, produces local inflammation and fever. In the urethra of the man and in the camera of the eye of the rabbit it causes the formation of pus.

So far in spite of all the works of Emmerich, Pawlowski, Hueppe, Wood, Grosz and Kraus [2] and others, no process of toxic serum has been found capable of destroying the gonococci by immunization.

Grosz tried to find a specific agglutinin, by injecting cultures of dead gonococci in human serum. It was injected into man and animals, but the serum did not show any agglutinating power. Neither could Jundell find in patients suffering with general gonorrheal infection any agglutinating power in the serum.

It is a well known fact that the gonococcus does not produce immunity in the urethra. After recovery from gonorrheal urethritis, a fresh case can be reinoculated. In the same way a urethra affected with chronic gonorrhea can be reinfected with a fresh case. There remains only a kind of tolerance or rather habit of the urethra to the old gonococci, which cultivated and reinoculated in the same urethra did not produce inflammation, while on another healthy urethra they caused gonorrhea, as proved by Wertheim. This is explained by the increasing and by the weakening of the virulence of the gonococci, as has been found in other bacteria. Indeed, Bocgerath, Milton, Schwartz, Finger and Jadassohn have already pointed out the fact that the infection from a chronic gonorrhea always produces symptoms of subacute or of a chronic form. In reference to this point we must be content with the clinical observations, for the reason that the animals are not susceptible to the attacks of the gonococcus.

In the normal urethra diplococci have been found by Lusgarten and Mannaberg,[3] and they have called them pseudogonococci. Bumm described a diplococcus as micrococcus sub flavus, which he found in the vaginal secretions. Steinschneider and Galewsky found pseudogonococci not only in the normal urethra, but also in the gonorrheal secretions.

These diplococci, however, react positively to the Gram

[1] Handbuch der Urologie I Band, 1904, p. 409, Frisch und Zuckerkandl.

[2] Grosz und Kraus. Bacteriologische Studien über den Gonococcus. Arch. Derm. und Syphil., XLV., p. 329.

[3] Lustgarten und Mannaberg. Arch. f. Derm. und Syph., 1887, p. 905.

method, and are easily cultivated in ordinary agar. Gonococci do not grow on agar or glycerin agar.

We have thought it best to recall the biological properties of the gonococcus, in order that we may more clearly expound our ideas.

When we undertake the treatment of a gonorrheal urethritis, the examination of the secretion has to be made for the diagnosis, and it has to be repeated often in order to ascertain the quantity, the disposition and the location of the gonococci. The gonococci are usually found in the protoplasma of the pus cells in the acute stage, and in the protoplasma of the epithelial cells in the subacute and chronic cases.

Drobny [4] pointed out the fact that the more extracellular gonococci are present, the more severe and complicated will be the course of the urethritis. The complications consisted in lymphangitis of the penis, oedema of the prepuce, swelling of the inguinal glands, prostatitis, epididymitis, orchitis, cystitis, inflammation of the neck of the bladder gonorrheal rheumatism and fever. It seems that in these cases the gonococci with increased virulence produce toxines, which render the leucocytes unable to cope with them, and they do not envelop them any more. The free gonococci enter into the interstices of the tissues of the urethra and spread to the contiguous tissues and organs. Toxines are the cause of the fever.

It is only by the examination of the secretion that we are able to form an idea in reference to the prognosis, and choose appropriate remedies for the treatment. When the secretions are repeatedly examined a great many cases of the so-called pseudo-gonorrhea will disappear, and the relapse will be found in a new autogenous or exogenous gonorrheal infection.

One of the causes which will retard the cure of a gonorrheal urethritis is to be found in the treatment. In many instances young men consider gonorrheal urethritis a disease of little importance, and rather than consult a physician, they rely on the advice of a friend or of a friendly druggist.

In many cases the treatment is nothing more than the administration of balsams, which although they have some soothing effect

[4] Drobny, B. A. Uber die Abhangigkeit der Verlaufs der Urethritis von der localization der Gonococcen. Arch. f. Derm. und Syph., XLVI., p. 32.

on the inflamed mucous membrane, diminishing the purulent discharge, have no bactericidal effect. Valentine [5] proved experimentally that bacteria of different kinds together with gonococci were vegetating on culture media composed of the urine of individuals who for weeks had been taking santal oil. The slight improvement noted in gonorrheal urethritis due to santal oil must be considered as a modification induced on the mucous membrane by the santalate of sodium, which results from the chemical changes in the organism.

The gonococcus when gradually attenuated in its virulence, and when the mucous membrane gets used to its presence, the organic reaction diminishes, and the leucocytes are scanty and the gonococci are free. Many are found in the protoplasma of the epithelial cells. The gonococci gradually find their way into the muciparous glands and in the lacunae Morgagni. The urethra is only irritated, but the purulent secretion has ceased and only a scanty mucous secretion can be found. In this secretion gonococci are at times scanty and at times abundant, mostly in the protoplasma of the epithelial cells at their junction, very rarely in the nucleus. In some cases epithelial accumulations are seen with gonococci showing that they are formed by the epithelial lining of the glands.

There is no doubt to-day after the studies of Neisser, that the treatment of gonorrheal urethritis must be mostly local, and that the irrigation method has given the most satisfactory results, as demonstrated by Goldberg,[6] Valentine [7] and others. With this method, when properly and scientifically applied, we succeeded in obtaining cures of gonorrhea in ninety per cent. of all cases in a remarkably short time. The irrigation treatment as given by Janet and applied by Felicke, Frank, Swinburne, Valentine and many others, must be intelligently applied with a knowledge of the process and of the period of the gonorrheal urethritis.

At first we find of great advantage, the irrigations of the anterior urethra with a mild solution of potassium permanganate,

[5] Valentine, F. C. Der Einfluss des Oleum Santali auf das Bakterien wachsthum in besondere auf die Gonococcus, XXXII., p. 169.

[6] Goldberg. Die Behandlung der Gonorrhea mit Auspülungen von übermangansaurem Kali. Centr. Blatt. f. die Krank. der Harn. und Sex. Org. B VII., Heft. 3 und 4.

[7] Valentine. The Irrigation Treatment of Gonorrhea. New York, 1900.

1 to 5000 in warm water, increasing somewhat its strength with the subsiding of the inflammatory symptoms. Then the irrigation is made with a solution of silver preparation, as protargol, or better picratol, which combines the action of the picric acid and of the silver.

It is not our object to enter into the question of treatment; all that we wish to demonstrate is that the neglect of treatment, or relying on a simple expectant treatment, is the cause of retarding the perfect cure of gonorrheal urethritis. In these cases of unfinished cure of gonorrheal urethritis, the treatment consists in irrigations and instillations. The instillation must be of a solution of a silver salt, or of ichthyol, or picric acid, capable of producing a superficial necrosis of the epithelium of the mucous membrane, so as to obtain a casting off of the epithelium, which comes out with the gonococci contained in the protoplasma of its cells.

Another important factor retarding the treatment of gonorrheal urethritis is the habits of the patient. Indeed, Max von Zeissl [8] has stated that gonorrhea resists all possible injections, as well as the internal employment of the various specifics, if there be not, at the same time, a conscientious regulation of the patient's mode of life and diet, and if the patient does not strictly observe the same. It would be of great benefit for the patient to rest in bed, but as this is in most of the cases impossible, we must forbid all active and strong passive movements. Alcoholics, carbonated beverages, and black coffee must be forbidden, since they favor the desire to urinate and may be the cause of cystitis. The ridiculous and superstitious idea of " drinking away a clap " is really one of the causes of making gonorrhea much more severe, or even chronic. In the same way, the exercise of coitus, which is dangerous for other persons, may cause severe complications of gonorrhea, hemorrhages, and later on prostatitis, epididymitis, etc.

For this reason it is our duty to sketch the rules for the patient with gonorrhoea so he may not himself be the cause of retarding the cure.

Another cause of retarding the cure of gonorrheal urethritis is an early attack of the posterior urethra. In spite of the interesting researches of Max von Zeissl, and although he expressed

[8] Von Zeissl, Max. Gonorrhea of the male urethra. Translated by Bierhoff, A. J. of Urology, 1905, N. 7.

the opinion of the uselessness of the distinction in an anterior and posterior urethritis, yet this division still holds good in our clinical experience. In the largest number of cases of gonorrheal urethritis, we see the process limited to the anterior urethra up to the isthmus, and the patient although suffering with all the symptoms of the acute inflammation, yet he retains his urine for the normal time and does not show complications involving the posterior urethra.

When the gonorrheal process has diminished in intensity in the anterior urethra after the third week, then it spreads to the pars posterior, which is usually considered a complication. The difficulty of reaching the posterior urethra by the ordinary injections with syringes is the cause of the process becoming chronic and of the gonorrhea being prolonged for months and for years in a latent state.

Another difficulty which is found in the treatment of the posterior urethra, although given by an experienced urologist with the irrigation method, is the production of prostatitis and of epididymitis. Indeed, as Colombini [9] has stated, prostatitis, spermato-cystitis and deferentitis are without apparent symptoms and are of frequent occurrence in the course of gonorrhea.

In several instances we have seen the patient a few hours after an injection suffer with unbearable pains in the prostatic region. The patient cannot lie down in bed or stand on his feet. The only desire he feels is to seat himself on the closet, believing that he must defecate. The micturition is quite frequent, the last few drops are accompanied with vesical tenesmus, and at the end of the act the patient does not experience relief.

We have often seen this condition follow an irrigation made with the Janet irrigator, with a warm mild solution of permanganate of potassium. It is a great obstacle to the treatment, because we must stop all injections, abstain from the introduction of all instruments, until the inflammatory process of the prostate has subsided.

In the same way we are handicapped in the treatment of chronic gonorrheal urethritis from a complicating epididymitis. We have seen cases of chronic gonorrheal urethritis where every irrigation and every application of a catheter or of a sound has

[9] Colombini, P. Della frequenza della prostatitee della vesicolite. Giornale Italiano delle malatie ven. e della pelle, 1896, p. 545.

produced epididymitis. In these cases the epididymus of one side is swollen, hard, painful, and this is accompanied with neuralgic pains along the groin. The pain has quite often prevented our patients from standing or walking, so that they were compelled to lie down in bed. These unfortunate complications discourage the patient in continuing treatment and are often the cause of the uncured gonorrheal urethritis.

The presence of an old stricture and also of the formation of a new infiltration on the mucosa, that which we call, wrongly, a wide caliber stricture, is often a cause of difficulty in the cure of gonorrheal urethritis. This condition is oftener observed in the bulbar region of the urethra where the mucous membrane is more closely drawn by the action of the transverse muscles. It begins as a spot, uneven, dull, eroded, congested and covered with fine red granulations, as can be seen by the urethroscope. This condition was demonstrated in the subject by Vajda, Guyon and Bazy, Gosselin and Finger. They have found epithelial thickenings and cicatrices resulting therefrom, some ridged and net-shaped, somewhat elevated, in part formed by epithelium and in part by subepithelial connective tissue. In these cases the subepithelial connective tissue exhibits important changes and is the site of the chronic inflammatory process. It is densely infiltrated with round mononuclear cells, and the infiltration surrounds also the glands and the lacunae which are imbedded in the subepithelial tissues. In these cases, according to Bumm, relapses of acute urethritis are due to the fact that the gonococci from the deeper tissues make their way to the more superficial epithelium. We have found epithelial cells, epithelial scales, all containing numerous gonococci. There remain only slight symptoms of irritation other than inflammation, no leucocytes are present, but the gonococci are contained in the epithelial cells. For any morbific cause the process may undergo an exacerbation. Extravasation of lymph and leucocytes takes place, which fissure the epithelium, and through it the gonococci again penetrate the papillary body, producing a mild suppuration in the form of a relapse. For this reason we do not believe in the pseudo-gonorrhea, because in all our cases we have found the presence of the gonococci. The gonococci, however, are weakened and their virulence has been attenuated by remaining on the same soil, and for this reason at

this period the gonococci inoculated in another person will reproduce gonorrhea in a chronic rather than in an acute form. Gradually the tissues are so accustomed to the presence of the gonococci, that they will remain in the papillary layer, in the follicles without apparent inflammatory symptoms, but their constant irritation will cause a chronic proliferating process on the mucous membrane. In some cases it is possible that the gonococci deep in the tissues are not found in the secretion. It seems that the presence of a stricture, or of an infiltrated place in the urethra is the hiding place of the gonococci and this prolongs the gonorrheal process.

In these cases we cannot finish the treatment of gonorrhoea unless we have dilated the stricture, and locally treated the granulating surface by the application of remedies introduced through the urethroscope.

The last and the most stubborn cause prolonging the gonorrhea is the reinfection. This condition might be called marital gonorrhea and it results from a series of reinfections followed by improvements, which maintain gonorrhea for years. In our experience we have seen chronic gonorrhea in husband and wife for several years. Van Schaick [10] examined sixty-five married women above any suspicion, who complained of suffering with leucorrhea, which was found to be due to the presence of gonococci. In seventeen cases the gonococci were found on the first examination. Among nineteen the gonococci were found in three on the second examination, and in three other cases gonococci were found among the thirty-two remaining. In three cases there were symptoms of an acute gonorrhea.

We have had occasion to treat cases of male patients with a case of latent gonorrhea who have infected their wives at the time of their marriage, and also of married men who have acquired a case of gonorrhea and have infected the wife. The gonorrheal affection has remained in a subacute or in a chronic condition in the woman without causing her marked apparent disturbances. In some cases the gonococci remain in the vaginal cul-de-sac, in most of these cases in the cervix, causing a form of chronic endocervicitis. In these places the gonococci produce a

[10] Van Schaick, G. C. The Frequency of Gonorrhea in Married Women. *New York Med. Journal,* LXVI 18, Oct. 30, 1897. Ref. Arch. Derm. und Syph., XLVI, p. 157.

mild purulent catarrh, which under the microscope shows the cocci. There is no local pain connected with it, but only a mild catarrhal discharge which is easily believed to be a leucorrhea, or even female troubles. The epithelium is affected and is exfoliated in its superficial layers, while in the deep layers it is increased. The gonococci make their way to the subepithelial tissue, causing an infiltration of mononuclear cells, some fusiform cells and a large quantity of polynuclear leucocytes. The blood-cells of the subepithelial layers are somewhat enlarged, are congested and contain many polynuclear leucocytes. There occurs a proliferation of the nuclei of the fibers of the connective tissues, which gives origin to small red granulations which are seen in the patches on the mucous membrane affected by the gonorrheal process. The presence of the granulations maintains a chronic gonorrheal catarrh, which is the cause of infection. In some cases the infection may remain in the urethra, or in the glands at its entrance, glands of Skeene, or in the Bartholini's glands, so that there is left a hidden focus of gonorrheal catarrhal inflammation, which lasts for an indefinite time. In some cases in our practice we have seen the catarrhal process extended to the endometrium in the form of chronic endometritis. The presence of the gonococci in an ascending gonorrhea of the uterus had been demonstrated by Wertheim and Reymond, showed gonococci in the pus contained in the tubes and in one of the ovaries. This shows the persistence of the gonococci in the genitals of the woman without producing acute inflammatory symptoms. The gonococci have been attenuated in their virulence on account of their reproduction on the same ground. If inoculated into a new healthy urethra they will cause an acute clap, but reinoculated on the same urethra, as in the cases which we have called marital gonorrhea, they cause but a recrudescence of the chronic gonorrhea.

In order to be able to finish the treatment of gonorrhea in these cases it is necessary to forbid coitus during the treatment, or to advise the use of the condom. In these cases the condom is of great advantage because it prevents the reinoculation while the treatment is going on.

The coitus without protection will not be allowed unless repeated microscopic examinations have shown the secretions free from gonococci.

TREATMENT OF CHRONIC URETHRITIS IN THE MALE.

By G. S. Peterkin, M.D.

Mr. President and Gentlemen:

WE are all, I use the word advisedly, trying to treat chronic urethritis of gonorrheal origin, judging from the variety of opinions held as to the correct method to be pursued in order to attain the results desired, namely—a cure.

Personally, I believe there are no panaceas for any of the ills that human flesh and mind are heir to. Especially is this true of gonorrhea. Therefore, I shall merely state the rationale of a method of treatment pursued in a number of cases of chronic urethritis of gonorrheal origin, leaving you to judge as to its value. For convenience, all cases will be divided, according to the character of the discharge, into three classes.

First—The morning drop or La Goutte Mulletaire, where the secretion, after stripping the urethra, appears at the meatus in the form of a globule, the color of which may vary according to the microbic infection.

Second—The glued meatus, where the secretion appears at the meatus and agglutinates the borders, often keeping the meatus red from the lacerations caused by the sudden removal of incrustation by the stream of urine.

Third—The shreddy or urinary discharge, where the secretion is so slight in quantity that it collects and remains adherent to the point where it is formed and only appears as shreds on urination.

Naturally, in all such cases, it is assumed that posterior urethritis, prostatitis and vesiculitis as causative factors of the discharge have been excluded and that the presence or absence of gonococci has been noted. At once it is recognized that this clinical classification may be applied to the discharge that occurs in all forms of chronic urethritis, which Obelander has classified, with the aid of the urethroscope, as

First—Chronic urethritis with soft infiltrations.

Second—Chronic urethritis with hard infiltrations; and its various sub-divisions depend upon the degree of density of the new formed tissue and the diminution of the caliber of the urethra. But there is this clinical difference, that after systematic treatment for a sufficient length of time by dilators, sounds, astringent and antiseptic irrigations and injections, cauterization of the diseased area, destruction of the infected glands of Littre and crypts of Morgani with Kohlmann's electric needle, cautery, etc., the discharge still permits a considerable number of such cases to remain in the classification given. In other words, these recognized methods of treatment have failed.

Urethroscopic examination will show that the following condition exists. Instead of the urethritis being as general, it has cleared up except at a few definitely localized areas that are usually situated in the fossa navicularis, one-half inch posterior to this, at the second normal physiologic urethral constriction, or at the peno-scrotal junction.

On examining these areas closely, they present the following appearance: The epithelium has lost its brilliancy,—is opaque and perhaps rough, though the area may show granulation tissue, which is not usually the case. The striations of the urethra at this point are irregular, as is the central figure, the glands of Littre either patulous or cystic or so constricted as not to be plainly visible; likewise the lucunae of Morgani. In fact, it is the same picture as seen at the commencement of treatment, modified by treatment to the extent that the epithelial surfaces have possibly regained somewhat their normal appearance, but never wholly; and if treatment is suspended they immediately relapse into their former pathologic condition.

Pathologic anatomy. The areas under discussion vary from a stage where the cylindrical epithelium has changed into squamous. These squamous cells may consist of one or several layers, the pathologic procecsses being limited to epithelium alone; or, the mucosa or sub-mucosa may be infiltrated with new formed cells that are in various stages of transformation into fibrous tissue, the transformation into fibrous tissue being greatest at the surface of the lesion; at the deeper portion, the cells still retaining their embryotic character.

The recognized method, in fact the only method of promot-

ing absorption of infiltrated tissue in the urethra is by pressure, whether through sounds, dilators, bougies or other instruments. But as stated here, they have been applied and do not produce results in certain areas as they do in others likewise affected. Why is this the case? The explanation, I believe, is simple. The caliber of the urethra is not constant and varies frequently within wide limitations. Its physiologic points of narrowing are, as well known,

First—At the meatus.

Second—At the peno-navicular junction.

Third—About one-half inch back of this.

Fourth—At the peno-scrotal junction.

Therefore, in the depressions at or near the constrictions, as in the fossa navicularis, we find these localized infiltrated areas as described and there they remain, unaffected by the pressure of the sounds and dilators, for the sounds and dilators are uniform in diameter and the normal physiologic points of constriction mentioned prevent these instruments asserting the required amount of pressure at points that are dilatable beyond such normal point of constriction.

A simple method of applying the required amount is as follows; and in my experience has been productive of results. Moreover, in this method I have found an efficient means of curing the discharge that formerly I thought could only be overcome by meatotomy, which I myself do not consider, when universally employed, good genito-urinary surgery. The method, briefly, is as follows:

Patient voids his urine in two or three ignition tubes, in which the character of the discharge, as to shreds, etc., may be noted at each urination. The anterior urethra is then irrigated with a mild 1-6000 or 1-8000 permanganate solution, under hydrostatic pressure, for the purpose of cleansing the urethra. Patient reclines on a table, then a straight silver canula thirteen centimeters or five inches in length, attached to a small Janet-Frank syringe containing the following:

Hermophenyl, gm	.04
Argyrol, gm	2.40
Glycerine, cc	7.50
Mucilage Irish Moss, cc	22.50

a semi-solid fluid, is gently inserted to the sphincter urethrae and then withdrawn, the fluid meanwhile being slowly injected so as to paint the urethral mucous membrane.

A Beniqué sound, largest possible size, is then sterilized by passing through the flame of an alcohol lamp and when cool inserted into the urethra. The penis being grasped with the thumb of the left hand below the urethra and the index and middle fingers above, at the point where the infiltration exists, as localized by the urethroscope, so as to steady the two corpora cavernosa and prevent their slipping on the sound and injuring the urethra when pressure is applied.

If the area of infiltration is on the superior surface of the urethra, the sound is held so that the curve will be toward the head of the patient and the affected area at the center of the curve, thus distending the urethra at this point as much as possible.

With the fingers in the position stated, the urethra is gently massaged, the pressure being gradually increased until it is as much as can be applied by means of the fingers. Apparently, this causes little or no pain. If the infiltration is on the inferior surface, especially as in the fossa navicularis, the sound is turned so that the curvature will point toward the feet. This stretches the urethra in this position and permits of the pressure being applied to the embryotic tissue least affected by this fibrous transformation, as it cannot be by any other means.

After the treatment is completed, a urethral cap is applied so that the patient will not soil his clothing, the medicine injected being allowed to remain. This treatment is repeated every three or four days. If there is much reaction, intermediate irrigation of a mild antiseptic or astringent is given.

The physiologic action of the ingredients of the prescription is as follows: The glycerine softens the squamous epithelium; the argyrol increases diapedesis, also acts as an antiseptic and aids in the penetration of the hérmophenyl, a mercure phenol disulphide of soda, forty to 100 of mercury, whose antiseptic properties are more apt to be efficient as the bacteria present at this stage are usually pyogenic.

Instead of the fluid formula given, the following,

Hermophenyl, gm	.04
Argyrol, gm	2.40
Glycerine, cc	3.75
Mucilage Irish Moss, cc	26.20

that varies only in consistency, may be employed upon the sound as a lubricant, thus dispensing with the syringe, though I myself prefer the latter.

Reciting a number of cases in which this method has been employed would only consume too much time to little advantage. My excuse for offering this paper is that the method advocated is simple, is seldom used, though it does not require any special armamentarium, and may be readily adopted by the general practitioner with advantage.

LAVAGE OF THE RENAL PELVES IN THE TREATMENT OF LITHAEMIA, PYELITIS, AND CERTAIN FORMS OF NEPHRITIS, WITH NOTES OF ILLUSTRATIVE CASES.

By Frank M. Johnson, M.D., Boston, Mass.

CYSTOSCOPY and ureteral catheterization are to-day more nearly than ever before accorded their true position. The former general impression that the procedure is beset with many difficulties is rapidly disappearing as an increasing number of physicians become familiar with its performance. I believe that in the near future no serious operation on the kidney will be undertaken until the condition of each organ as related to the normal and to each other has been fully demonstrated by ureteral catheterization and by microscopic and other findings of the separate urines thus obtained. Owing to the many excellent articles in recent literature, the technic of the procedure is now well known and need not in this paper be considered; my personal preferences regarding its various points have lately appeared elsewhere (*Medical Record,* May 20, 1905.)

Sufficient time has now elapsed since local medication of the

ureter and kidney thus made possible has been employed, to determine if this method of treatment is worthy of acceptance by the profession. Measured by its results, lavage of the kidney must surely be regarded as a justifiable procedure. In saying this I would in no way detract from the praise due those men who have solved many difficult questions regarding diet and internal medication in the conditions under discussion, because in all the cases thus far treated both those factors were of great importance; with them alone, however, much that is desirable is still lacking. To Ayres of New York should be given full credit for being the first to maintain and to demonstrate that in many lesions of that organ, lavage of the kidney with proper medicants gives better and more permanent results than can be obtained by the older methods. Personal experience has proven to my entire satisfaction that Dr. Ayres has presented to the profession a most valuable adjunct to the treatment of renal and ureteral lesions.

All patients suffering from those lesions, who have come under my care, had previously been given internal remedies and been dieted, with but slight benefit; when lavage was added, improvement was soon manifest and in many instances complete cure has been obtained. My most earnest wish is that a keener interest in the subject will be awakened, that a wider knowledge will prevail, and that the men who are devoting their time and energies to this all-important field of work will gain the confidence and moral support of their medical brethren. Zealous though they are, their task will be still lighter when the principles for which they labor are accorded a well-won recognition. My purpose in this paper is briefly to direct attention to certain lesions that are favorably influenced by renal lavage and to indicate the results that are thereby being secured.

First.—*Lithaemia*: Stubborn cases of this imperfectly understood condition often resist the most varied methods of treatment. Remedy after remedy is tried without producing marked improvement in the condition of the patient; change of air and scenery effect but transient gain. Thorough examination generally shows that the kidneys are at least irritated, and may be decidedly inflamed, by the action of the uric acid products they are eliminating. In these cases a few complete washings of the kidneys act as a starting point towards recovery. As a result of this

local treatment, internal medication, diet and other measures begin to act properly and improvement is prompt. All the cases treated by lavage of the kidneys in addition to the ordinary measures usually employed, have been discharged as cured. In a few cases of oxaluria refusing to yield to internal remedies, lavage promptly brought about a return to the normal. I may state here also that in cases of lithaemia, burnt magnesia in one-half to one teaspoonful doses given three times a day in water, has given me better results than are obtained from dilute nitromuriatic acid.

The drug giving the most satisfactory results in kidney lavage is silver nitrate. Solutions, in distilled water, are injected while warm, the strength varying with the individual case. A weak solution, say 1 to 12,000, should be first employed; later this may be gradually increased until 1 to 2000 is reached; mild solutions of protargol, nargol, albargin, and other salts of silver also act well, but in my experience the results obtained from their use are not so lasting as those produced by the nitrate.

Second—*Pyelitis*: This affection is of the greatest importance to all those who practice surgery and medicine, yet in the very early stages it is seldom recognized. Even when found, it apparently receives but little attention. It is claimed for certain preparations, that when given internally, they irrigate the kidney to a degree sufficient to cure inflammation of its pelvis. I have thoroughly tried such remedies in enough cases and for an adequate length of time to prove that usually such claims are not supported by facts. There can be no doubt that by this natural process of irrigation a cure in some cases may be obtained, but even in these, lavage properly performed, yields a much more rapid recovery; because of this, the procedure guards more effectually against further invasion of the process, a point of the utmost importance.

In each case there is a particular cause which must be located and removed. Often there will be found in the pelvis of the kidney, a large or small calculus, removal of which may be followed by spontaneous disappearance of the pyelitis. Again, disturbances of the intestine or stomach, may provoke inflammation of the renal pelvis and attention to the causative elements will secondarily exert a healing influence upon the kidney. But even these cases are more quickly and permanently cured if lavage be

added to other measures. Howard Kelly of Baltimore, has so ably defended lavage of the kidney in pyelitis, covering thoroughly the entire field, that but little can be added to his admirable presentation of this subject; with him I agree most fully. I likewise find either salol or urotropin the best medication to give by the mouth. Silver nitrate solution, 1 to 2000, yields desirable results when injected into the renal pelves. At times when irritation of the pelves and ureters is particularly severe, it is better to employ warm, soothing injections rather than even the milder silver preparations.

I have quite often found as a bar to cystoscopy, tenderness deep in the urethra and about the neck of the bladder. In these cases, warm, soothing oils injected freely about the sensitive areas, accomplish much in relieving the tenderness and promoting resolution. Strictures, in both men and women, play also a highly important part in the derangements found; it is almost needless to add that the first step in such cases is to eradicate the influence of the stricture by complete dilatation. Gonorrheal infection and extension is often a cause of pyelitis; fortunately no other causal element is more readily conquered by frequent lavage.

In the not infrequent cases of pyelitis occurring secondary to cystitis, stronger solutions should be used for the bladder and treatment of that viscus made more often. As the bladder regains tonicity, there is a corresponding improvement in the pyelitis. In one of my cases of ulcerative cystitis of nearly one year's duration, there was an extension of the process into both ureters and pelves. The ureters were so indurated and tender that even a small catheter could not be inserted. Under daily lavage the cystitis improved, but not sufficiently to warrant cystoscopic interference with any surety of gaining better results. Cystotomy was finally performed and resulted in the bladder regaining its normal condition, the ureters and kidneys also markedly improved. Now catheterization of the ureters and consequently lavage of the kidneys can be readily performed.

Third—*Pyelonephritis*: A pyelitis remaining unchecked will end in pyelonephritis. Other etiologic factors cannot be discussed, as there is space only to cite examples of pyelonephritis that have derived great benefit from lavage. Thirty cases have

been thus treated; all were carefully observed and the microscopic findings in the separate urines recorded. To-day the majority of these patients are well and the remainder are greatly improved. In this class of cases the choice of fluids used, their temperature, the frequency of application, and other details must be determined for each patient by the exact conditions found. The general condition of the patient as a result of the necessary manipulation and the improvement, or lack of it, as shown by microscopic examination of the urine, must in each instance be taken into consideration in determining the course of treatment.

Fourth—*Pyonephrosis*: A case of pyonephrosis previously reported as under treatment and improving daily, has now received no application for five months. The affection was confined entirely to the right kidney and evidently as a result of lavage, given at first once and later twice a week, a complete healing has occurred. Chemical examination of the mixed urine reveals neither albumin nor other abnormal constituent. The separate urines give indication of but slight irritation in the renal pelves. The patient did not lose a day's work during treatment. The first time the catheter was introduced and the right kidney injected, colic was produced, but this did not again occur. The patient soon grew accustomed to the introduction of the cystoscope and cocaine was unnecessary in the urethra or bladder. This fact is mentioned simply to show that tolerance to the manipulation is soon established. Nephrectomy at first appeared strongly indicated in this case, but the good results of lavage proved this serious operation not necessary. Internally, tonics, salol or urotropin, and alkaline preparations were freely used. Under treatment, pain that had been so severe for some years as to demand morphine, soon disappeared and that drug was no longer necessary. As irrigating solutions, one-half of one per cent. Protargol was used for the first few months and for the remainder of the time, 1 to 2000 silver nitrate in distilled water. For the bladder, a saturated solution of boracic acid was first employed; later 1 to 5000 silver nitrate. A second case of the same character is now improving under similar treatment.

Fifth—*Ureteritis*: One instructive case of this condition may be briefly cited. The patient was Mrs. P., age forty-six. The most prominent symptom was pain in the right side. This

was diagnosed as ovarian in origin, but abdominal incision and examination showed the ovary to be normal. The patient's physician strongly suspected a diseased ureter and referred her to me for examination. Cystoscopic examination showed an inflamed and irritable bladder. The left ureter was easily explored with an ordinary blunt catheter, but the opening of the right ureter could not be located. Diagnosis of the left kidney lesion, from the urine obtained, was a mild, chronic, catarrhal pyelonephritis. At the second examination, the right ureter was located; as the opening was very minute, a slim, sharp pointed catheter was used, gentle introduction of this causing great pain. Diagnosis of the urine thus obtained was subacute parenchymatous-nephritis and a marked chronic ureteritis. Treatment was instituted and kept up for four and one-half months; the left kidney immediately responded and soon became normal. The following procedure was employed in giving lavage of the right kidney and ureter. After the sharp pointed catheter reached the pelvis of the kidney, it was withdrawn an inch and some of the fluid injected; the catheter was then withdrawn another inch and more fluid injected. This process was repeated until application had been made to the entire length of the ureter. This made possible the injection of an increasing amount of fluid and thoroughly washed, and to a certain extent, dilated the ureter. The insertion of a ureteral bougie greatly facilitated the passage of the catheter. At present there are no miscroscopic signs of disease of kidney or ureter and tenderness and pain have disappeared. The irrigating agents used in this case were protargol, nargol, boracic acid, and finally, 1 to 2000 silver nitrate; all were employed quite warm. The usual tonic internal treatment was also administered.

Sixth—*Chronic Parenchymatous Nephritis*: In this disease the results of lavage naturally depend upon the severity of the process. In some cases the general condition of the patient is so lowered that lavage produces little if any alleviation; in others, destruction of tissue has so far advanced that irrigations are worse than useless. In the largest number of patients presenting themselves, however, improvement following the institution of treatment is surprising, in some instances almost miraculous. For years the profession as well as the laity have virtually held up their hands in the presence of " Bright's " disease, and even now the

announcements of pioneers in the new thought of treating this disease locally are received with credulity. But results, if bearing the stamp of truth, command admiration and respect and should be welcomed by all broadminded persons. The microscope does not lie and clincal pictures of improved physical condition are supported by the statements of patients. The truth about this newer method of treating nephritis may at present seem a trifle unreal, but truth is mighty and when once determined, is lasting. Many observers in all parts of the world, each working in his own particular way, are arriving at essentially the same conclusions; from this it is fair to assume that their deductions possess merit. All these workers cannot be mistaken. All patients cannot be made to think they are better when they are not; they, more keenly than the physician himself, realize the improvement in their condition.

Case after case could be cited in which the diagnosis of subacute or chronic parenchymatous nephritis, supported by clinical deductions and by microscopic findings, could be regarded as a certainty and in which internal medicines have proved of little worth. Now, since irrigation of the kidney has been practiced, the picture in these cases is changed. Casts, disintegrating epithelium, and similar elements have disappeared from the urine, a healing process has supplanted an extending inflammation, and restoration to complete health even is made possible. Such facts cannot be overlooked. If an experienced observer be honest and does careful and skillful work, and like yourselves is conservative in his deductions, full credit should be accorded to what he has done. As for myself, I feel that in my limited sphere, success has attended my efforts in treating chronic parenchymatous nephritis by means of lavage of the kidney; with my teachers, I believe this procedure is not only possible, but when carefully performed will give most excellent results. Simply that it is a new thought should count for nothing. As we are men of science it behooves us to welcome every innovation that savors of practicability and real worth. Not hastily it is true, but after thorough investigation, which in this instance is gladly welcomed by those who advocate the newer treatment. Such investigation should be guided particularly by the hope that herein lies a means of relief for the suffering and afflicted. It is true the element of time may

in this work not give us such strong support as we now hope, but for the present we must believe we are working in the right direction; the indications now are that ere long the proofs will be unassailable.

It should be here stated that in chronic parenchymatous nephritis, as in no other class of cases, is watchful, persevering supervision so imperative. The temperament, the surroundings, the moral atmosphere, the diet, in fact every item in the daily life of the patient, requires the most minute attention. Internal measures, in conjunction with lavage, are of vital importance, though the very best of these measures fall far short of rendering valid the claims often made for them. Local medication of the kidney for nephritis is carried out in essentially the same manner as indicated for the renal lesions previously discussed.

In closing, I wish to add only a brief resume of the points presented for your consideration:

First—Lavage of the kidney is not alone justifiable, but is a procedure whose importance demands recognition from the entire medical profession. Patience, gentleness and experience are necessary attributes in the successful application of this procedure.

Second—Lithaemia is more quickly eradicated when in addition to the usual treatment lavage of the kidney is employed.

Third—Pyelitis is a condition that should be recognized at any stage as a danger signal and promptly treated. If possible the cause should be ascertained and removed. Very mild cases require only rest, and the administration of salol or urotropin; for all others, catheterization and irrigation with boracic acid or silver salt solutions once or twice weekly are indicated.

Fourth—Pyelonephritis may be treated in the same manner with similar agents.

Fifth—Ureteritis will heal under lavage with at first soothing and later mildly stimulating fluids.

Sixth—Chronic parenchymatous nephritis can be alleviated, and in certain phases cured, by proper irrigation combined with appropriate diet and internal medicants; other forms of nephritis also are in a degree amenable to lavage.

43 Tremont Street.

ANÆSTHETIC IMPOTENCE: REPORT OF A CASE

By F. W. Robbins, M. D., Detroit, Mich.

[Read before the Annual Meeting of the American Urological Association, Portland, Ore., July, 1905.]

THE case which I desire to report has been of great interest to me. He has been examined repeatedly by several of my confreres, none of whom has ever seen such a case. We have not succeeded in relieving his condition in any degree.

I first saw Mr. C. W. S., at the request of Dr. T., September 14, 1904, and obtained the following history: Age thirty-six, consulting engineer, having the degrees of A.B., C.E., from one of our largest and best institutions. He gives a very excellent family history. Formerly he was a mountain climber, frequently making thirty to forty miles in a day; also took long bicycle trips. In 1897 did a large part of Continental Europe on bicycle during a period of three and a half months. Only once did he notice any physical defect from this work and that after a ride from Dresden to Paris, when he suffered severely for some time from cramps in calf of leg and thigh, which he thinks were caused by taking iodized sarsaparilla.

He is about five feet nine inches high, weight about 160 pounds, and in every way has the appearance of a perfectly healthy man. He has never contracted any venereal disease, nor had any serious ailment. His history shows this much of a neurotic element: For twenty years he has had frequent attacks of neuralgia especially during the winter season. The fourth nerve of the left side is the part affected and he thinks that this tendency is inherited.

Never has he had any impelling desire of a sexual nature. Never has he had any temptation to masturbation or sexual intercourse. Never has he had any seminal emission, except at night, and these have occurred since puberty at intervals of three or four weeks, and occasionally three or four times in one week. Erections are firm in the morning, also at night. Patient has been married over three years, and not until after marriage did he

appreciate the fact that he was not in every respect as other men. He has a desire for children, and a certain sexual impulse to the extent of being able to have a firm erection whenever he desires; when in contact with his wife she becomes normally passionate, but he has never experienced any pleasurable excitation or ever had an orgasm. He has never attempted sexual intercourse except with his wife. Through his physician, his wife had been instructed in the various arts of sexual excitation which she has practiced on her husband, with no result. His physician has treated him faithfully, circumised him, operated for varicocele and finally tied the dorsal vein. He has not been in any respect improved.

Within six days before consulting me he had had three nocturnal emissions. Testes are now soft and rather smaller than the average. Prostate fairly developed and fluid expressed from the gland contained prostatic granules, but could express no fluid from the seminal vesicles; two weeks later, however, I expressed fluid from the vesicles containing many spermatozoa, the larger number not active. There were no pus cells. The succeeding examinations of expressed and condom fluid contained many more or less active spermatozoa. We could detect no rectal irritation that might reflexly inhibit orgasm. There appears to be no trouble along the nerve tracts. Erections are strong; ejaculation, when asleep, seems to be normal and the character of the seminal discharges shows nothing abnormal as regards the testes or seminal vesicles.

Here certainly is an unusual case of impotence. It has been looked upon as psychic, but this explanation scarcely harmonizes with the fact that never from puberty has he had a normal sexual impulse, never felt any desire or temptation to masturbation and never experienced any frictional excitation. The only basis upon which we have been able to explain this condition, is that of lack of sensitiveness in the nerve terminals of the glans penis and frenum.

Various attempts were employed to render those parts more sensitive, but without effect. Hypnotic suggestion has been considered but not employed. The possibility of there being some defect of the nerve arrangement in the cord has been thought of but to the mind of my consultants and myself the anaesthetic theory appears most reasonable.

THE CHOICE OF TECHNIQUE IN PROSTATECTOMY

By JOHN R. WATHEN, A.B., M.D.

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[Read by title before the Annual Meeting of the American Urological Association, Portland, Ore., July, 1905.]

IT is undoubtedly a fact that there are certain periods in the history of surgical procedures, which are due largely to the fads and fancies of the times.

They are influenced or made possible by the particular preferences shown by a few pioneers in a new field of work.

This was especially true only a few years ago in gynecology when the abdominal and vaginal operators each claimed the superior route, and only after much discussion, have they agreed that there are certain cases suited to each. Nowhere has this been better shown than in the present day arguments for the suprapubic and perineal prostatectomies, and it is the purpose of this paper to attempt to draw some conclusions from the collected reports of others, and the writer's personal experience.

L. S. Pilcher [1] says: "It is of interest to note, in surveying the literature of the subject, that among the many different methods of attacking the prostate which have been proposed by different surgeons, practically equally good results are reported to have been secured by the most diverse methods, by men who had become specially skilled in their application." Nevertheless, we have about reached a time when we should make deductions from the combined clinical and pathological contributions to literature, and begin to formulate views as to the choice of technique to be employed in the removal of the enlarged prostate.

What we need is not to adopt a method which has been successful in the hands of a few especially proficient, but a technique which will be the safest, the easiest, and offer the best results as to permanent cure of the patient.

The enlargement of the prostate, according to Deaver,[2]—

" occurs in two main varieties—one variety, the glandular or adenomatous overgrowth, constituting the majority of cases; while the fibrous enlargement constitutes the minority, and even at times approaches more nearly in type to prostatic atropy, or to sclerosis of the neck of the bladder, or is at least conspicuous by the relatively slight enlargement compared to the magnitude of the symptoms produced."

Based on these generally accepted views as to the pathological anatomy of the prostate, should be our operative methods for its removal.

In those large, soft adenomatous prostates, which rise up into the bladder and are often found to have a pedunculated middle lobe, it is generally conceded that they are easiest removed by the suprapubic route, while the dense fibrous variety, situated low down in the perineum and often associated with them, an inflammatory condition, had better be enucleated from below by the perineal route.

The intermediate type, and the writer believes this to be the most common variety, where we have a medium-sized enlargement of the two lateral lobes, is the prostate which seems to cause the greatest divergence of opinion as to its method of removal. In very doubtful cases where we wish to find the best method of approach, the conclusions of Watson,[3] may be followed to advantage: " That the best way to determine whether any individual case was, or was not suitable for the perineal operation, was to make a digital exploration of the actual conditions present through the posterior urethra, by means of an ordinary external perineal urethrotomy incision, as the first step of the operation." " That at least twice out of three times the gland would be found to be readily removable by the perineal urethral incision just mentioned, and that in the other third of the cases the surgeon would proceed to go on to do a suprapubic operation at once, the perineal urethrotomy exploratory incision not only not interfering with its performance, but, on the contrary, aiding it, and also supplying additional drainage afterwards." While the cystoscope and other methods are recommended for examination of the prostatic enlargement, such procedures do not meet with general approval and are only to be employed in special cases and by those who are very proficient in the use of such instruments. It is the writer's

experience that the less instrumentation before operation, the better for the welfare of the patient.

Having determined the type of prostatic enlargement we have to deal with, and the method of its removal, by the suprapubic or perineal routes, we now are confronted with the question of the best technique to employ.

The suprapubic route, which has been so popular in England, due largely to the excellent work of Freyer, of London, who utilized the methods of McGill and Fuller, certainly has much to recommend it, especially in those types of prostates where a large adenomatous mass with middle lobe involvement projects high up into the bladder. Mr. Freyer[3] is inclined to think that all hypertrophied prostates are best removed by this method and has only found one case out of 110 reported in which he was unable to enucleate the mass. Deaver,[2] in discussing the choice of operation, says: "The suprapubic operation is in certain cases (I think the majority) in every way preferable to that through the perineum," and again he says, "the preferable route for total enucleation of the prostate is the suprapubic."

White,[4] after discussing the suprapubic route, says: "As to the other methods of prostatectomy—the perineal, the 'combined,' etc.—there can be no doubt that they have often given good results in the hands of some surgeons, and are still the methods preferred by a number of able workers in this field." "There are probably cases for which they will always be found specially suitable, but at present it appears to me that past experience does not justify the expectation that the results of prostatectomy by the perineal route will compare favorably with those of the total enucleation above described."

These few quotations from such able advocates of the suprapubic method, show the positive stand they have taken, and it is with interest we read, as I will later quote, equally dogmatic assertions by the champions of the perineal route.

While there has been much dispute of late as to the priority of the suprapubic operation, yet the essential principles are practically the operation as done by Freyer.

Briefly, this consists of the introduction of a catheter into the bladder, and this viscus irrigated with some mild antiseptic solution. An incision is then made just above the pubic bone and

carried down to the bladder which is now opened. With the finger nail or scissors, an opening is made through the bladder mucous membrane over the hypertrophied prostate, and with two fingers in the rectum, or through a perineal incision, the prostate is pushed up from below and the enucleation begun by blunt dissection with the fingers.

Freyer say that the large adenomatous prostates "frequently shake themselves loose" and are very easily removed. It is probable that in the majority of the cases the prostatic urethra is removed with the hypertrophied mass, notwithstanding the assertions of some operators who claim that such is not the case. The cavity from which the mass was removed, now becomes much smaller, due to pressure of the surrounding structures and contraction of its walls. Hot sponges or douches will usually control the hemorrhage, but if alarming, the cavity can be packed with gauze. A rubber drainage tube is next introduced and stitched to the skin and if the incision was large a few stitches are need to partially close the opening.

Some operators favor a drain through the perineum and if a preliminary incision has been made here before the operation above, it will be of advantage in infected cases, allowing through and through irrigation of the bladder.

Deaver[2] says: "It has been pointed out by McGill and Richardson that drainage is really better by the suprapubic wound; for it is a fact that where the bladder is drained both ways simultaneously, almost all the urine escapes by the suprapubic tube, and that when both tubes are removed, the perineal tract closes first." This last statement has not been the writer's experience, and has only occurred when the lower tube was obstructed with pus, etc.

The perineal route which has become so popular of late in this country, and has even been styled the "American operation," has so many various procedures that to properly discuss the method each surgeon's individual technique should be considered. The simplest and most rapid operation is that employed by Goodfellow,[5] who describes it as follows: "The patient on the table, the staff is passed. A change is then made to an exaggerated lithotomy position, the legs held by assistants. A longitudinal median incision, beginning at the scrotoperineal fold, a little over

an inch in length, is made and carried to the urethra. The tissues are then cleared away from the urethra until the membranous part is perceptible; this is perforated with the knife or finger, the bladder entered, the staff withdrawn, the enucleation begun and completed, this taking rarely over ten minutes, generally about six."

Parker Syms has practically the same technique with the exception that he introduces a rubber ball tractor to aid in bringing down the prostate into the perineum for easier enucleation. Hugh Young employs a more elaborate dissection and claims by this method to do a conservative operation, preserving the ejaculatory ducts. He introduces a ground staff and then makes an inverted V incision in the perineum, carried only through the skin and superficial fascia, and then divides the central tendon of the perineum and the rectourethralis muscle which lies beneath, covering the membranous urethra and apex of the prostate. An incision is now made into the membranous urethra just is front of the prostate and the edges caught with forceps. The staff is now withdrawn and the closed tractor introduced. This is then spread open and gentle traction made downwards and upwards so as to bring the prostate with its posterior aspect well in view in the perineal opening.

An incision is now made on either side of the urethra and the lateral hypertrophied lobes enucleated; also a median lobe can be brought out through one of the lateral openings. If a calculus complicates the case, and this is said to occur in nearly one-third of the cases, the urethra is split with scissors along its left lateral wall, from the urethrotomy wound in the membranous urethra up to its vesical orifice, and the stone removed.

Some operators claim to close the urethra with sutures and then suture up the entire wound, expecting union by first intention. In this latter procedure, a self-retaining is introduced through the penis and allowed to remain until union has taken place. The writer prefers a technique which embodies many of the good points of those already described, and which aims at rapidity, safety and simplicity. A staff is introduced with the patient's legs extended, and when the legs are flexed upon the abdomen, a straight median incision is made down to the muscles of the perineum. The writer sees no advantage, but rather a disadvant-

age in elevating the hips with a pillow as usually recommended, for the reason that the hemorrhage accumulated in the cut does not run out as when the hips are lowered, thus obscuring the field of work; also there is much less danger of injuring the rectal wall when lowered, as the operator's fingers are then forced to work in the opposite direction, much aiding in the enucleation of the difficult prostates. Why a transverse incision should ever be used in this operation, the writer is at a loss to know, as the straight median incision affords more space than is needed even for the largest prostate, and at the end of the operation is the only type of an incision which allows of a neat closure and convenient drainage at the most dependent part of the perineum.

The central tendon and other structures are now divided after the method of Young; also the urethra opened in front of the prostate. At this stage the technique differs decidedly from Young's method, and a long probe or director is introduced alongside of the grooved staff, and the latter is gently withdrawn. This probe marks the prostatic urethra and the index finger is next used to dilate the prostatic urethra and explore the bladder, pressure being made from above to aid in bringing down the prostate. At this stage of the operation, it has been the writer's experience to note that when the finger is introduced into the narrow prostatic urethra, that this structure will usually burst laterally and the two lateral lobes will almost fall out or enucleate themselves. When this does not occur and the prostate is of a rather firm consistency, Young's tractor is introduced, and by gentle traction downwards and upwards, the prostate is held firmly while it is partly dissected away from the surrounding structures, especially posteriorly.

This is done by blunt dissection, having an assistant place one finger in the rectum to guide the operator. With the finger nail of my index finger or if needed the scissors, incisions laterally are made and the enucleation rapidly performed.

The two structures which we should be careful not to tear or injure are the neck of the bladder and the rectal wall.

After this rapid enucleation, very hot water should be used to check hemorrhage and large bleeding vessels ligated, but this latter is seldom needed. A very large soft rubber drainage tube (about 40 F. and twelve inches long), with open ends and two

fenestrations close together, is now introduced just past the bladder neck and sutured to the skin a little above the anus. The prostatic cavities from which the lobes were removed, are now packed gently with gauze, avoiding too tight packing upon the rectal wall. This gauze is brought out of the wound just above the rubber tube and the wound sutured with several chromic catgut interrupted sutures embracing as much of the deep muscles as possible.

The after treatment is comparatively simple and consists in irrigating the bladder to remove the blood, and prevent the formation of clots. This should be done on an average, every two or three hours during the first twelve hours, as is indicated by the color of the drainage. The tube should drain into a big-necked bottle placed between the legs, and no other dressings added except a small amount of loose gauze placed around the tube.

The gauze packing in the perineal wound is removed in forty-eight hours and the tube in the next day or two. If the patient is in good condition, he is allowed to sit up very early, depending upon how he stood the operation and his general constitution.

Young claims that by his method alone are we able to preserve the ejaculatory ducts, but the reports of many operators employing a different technique, namely, Goodfellow, show that a considerable number of patients have reported the occurrence of apparently natural ejaculations.

Abell [6] has well expressed the writer's views when he says: "The question of operating so as to avoid injury to the ejaculatory ducts, has been rather widely discussed, but to the writer, their preservation seems to be of little moment; granting the loss, health and comfort are of more value to a man than they at the period of life at which this condition demands operation."

Cabot,[7] after discussing the various methods says: "I am convinced, however, where other conditions are favorable, that perineal prostatectomy is the operation of choice."

Syms [8] concludes: "To my mind there is no question that perineal prostatectomy, performed through a single, simple, median incision is the safest and most scientific method which has yet been evolved."

Watson [1] has certainly summed up the question of choice

when he says: "It will be seen, therefore, that my chief contribution to the subject of operative treatment was the demonstration of the fact that perineal prostatectomy through an ordinary external perineal urethrotomy incision was readily to be accomplished in a large majority of cases, and that it was the operation of choice because of its lower mortality, but not to be adhered to operation; the suprapubic method having a very definite and distinctly advantageous place, which was, however, in a minority of the whole."

The question of mortality has been discussed by almost every writer upon this subject, and while it will always command attention in any operative procedure, the statistics from the limited number of collected cases can hardly be fully accepted as yet, and a wider experience may materially change the figures presented. It is the writer's firm conviction that when these operations become more general, we will find a higher mortality rate even with the improvements in technique. The writer hardly endorses the opinion of Rodman[9] when he says: "The mortality of prostatectomy is almost necessarily greater than many of the operators would have us believe. I have never been able to bring myself to believe that prostatectomy is a simple procedure nor do I believe that the mortality is only two to three per cent."

After the question of mortality, there is no more important one for consideration in the selection of the method of operating on the enlarged prostate, than that of the after results. Among the many sequels of this operation, are those of incontinence, fistulæ, both urinary and rectal, and the loss of ejaculation, the last one having been previously discussed.

Incontinence has followed all the various methods in some degree, but the suprapubic seems to have occasioned fewer cases of this annoying condition. Many times a temporary incontinence occurs and a few months later the patient gradually regains control over his bladder.

According to Ruggles,[1] incontinence is due to injury to the compressor urethræ muscle and not to the neck of the bladder as many have supposed.

Freyer,[10] after discussing the findings in an autopsy of an operated case which died from a complication, says: "It is further demonstrated definitely, that the true sphincter of the

urethra (or bladder) is situated at the membranous portion of the urethra."

The treatment of incontinence has received little attention from the operators, who have believed that it was of little magnitude compared with the previous dangerous condition of retention for which it has been substituted.

Wilson [11] reports the cure of two cases which followed prostatectomy and gives his method as follows: "The treatment of the dribbling consists in bladder irrigation, with the addition of filling the bladder full of the irrigation solution, instructing the patient to voluntarily contract his compressor urethræ muscle." "After doing so, he is told to expell a small portion and again shut off, thus dividing the evacuation of the fluid into from five to six conscious and voluntary efforts." "Instructions are given that when the bladder fills with urine, its evacuation should be divided into five or six portions in like manner." "By this method we gradually bring the cut-off muscle up to its normal tonicity and as a result the incontinence ceases."

Urinary fistulæ are a frequent occurrence after the perineal method, but the majority of the cases close in a few weeks. Curettage of the fistulous tract will usually effect a speedy cure. Rectal fistulæ are much more difficult to cure and are probably produced by too tight packing of the gauze against the rectal wall. Some cases may result from injury or tear and others from the low vitality of the patient, with a slough in the perineal tissues. Often the fistulæ will close when the perineal incision finally heals up, but for those which persist for a greater length of time, it is advisable to do an operation which Young has employed in three cases and in a personal communication (Feb. 1905), to the writer describes as follows:

"Suprapubic cystotomy, insertion of rubber drainage tube in the suprapubic wound. Patient is then put in the dorsal lithotomy position, and by an incision similar to the original prostatectomy incision the fistula is dissected out, the rectum separated from the prostatic urethra, and the two openings closed separately with fine silk, two or three layers each. Patient is then put on a diet of albumen, and the bowels kept closed for about ten days, when they are carefully opened with oil by mouth, preceded by an injection of oil in the rectum."

"The suprapubic drainage is maintained for about three weeks until you are perfectly certain that the rectal and the urethral openings are both firmly closed. By this means I was able to cure these three cases where several previous operations without the use of the suprapubic drainage failed entirely." "The suprapubic drainage is very necessary so as to take away all strains on the urethra from the sutured urethral wound."

In conclusion the writer believes that there are distinct indications for the choice of operations in prostatectomy which should be based upon the anatomical and the pathological conditions present. Good and bad results have followed both the suprapubic and the perineal routes, and those operators who will carefully weigh the advantages and disadvantages of each, and apply that which is best suited to each individual case, will in the future be able to report the largest percentage of complete cures.

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EXPERIENCE WITH THE METHODS OF DETERMINING PHYSIOLOGICAL KIDNEY-FUNCTION FOR OPERATIVE PROCEDURE

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A PERIOD of several years has elapsed since we started our investigations of the value of determining kidney-capacity or kidney-function wherever surgical interference was contemplated. Nevertheless no attempt will be made in this brief paper to draw from our work final conclusions. The literature upon the subject in question, is replete with contradictory statements upon the value of each and all the methods of determining so-called kidney-function, and the spirited discussion at the recent meeting of the German Surgical Society, showed a glaring divergence of opinions (Rovsing and Israel on one side; Kummell, Casper and others on the other). The attitude of American surgeons towards the question of determining kidney-capacity seems to have been a rather expectant one in the past. A few publications only have appeared on this side of the Atlantic, which, as a rule were not from the clinics and laboratories of men who, by virtue of experience drawn from a large material, would be entitled to an opinion. This conservatism though seems justifiable towards methods, the value of which, to say the least, it still *sub judice*. On the other hand though one's attention is naturally drawn towards methods of examination which are liable to throw more light upon dark kidney-lesions and which give an answer to that all-important question: If one kidney is removed, will its sister-organ afterwards functionate sufficiently?

It is a fact that the older methods of diagnosing kidney-lesions, viz.: inspection, palpation, percussion, examination of mixed or bladder-urine, etc., and even radiography recently added to them, were absolutely inadequate in a great many instances. Cystoscopy, inspection of the ureteral openings and especially ureteral catheterization have helped to place the diagnosis of pathological kidney-conditions on a basis of exactness heretofore un-

known. This can only be reached, however, by catheterization of both ureters, a procedure from which, if executed with the required skill and asepsis, we never have seen any harm. In tubercular kidney-lesions especially where the process has descended to the bladder, catheterization of one (the suspected) side with Nitze's occlusive catheter [1] may suffice, through the use of which diagnostic errors (dribbling of urine on the sides of the ureter-catheter into the bladder) are supposed to be avoided. Devices known as urinary segregators may be diagnostically useful in exceptional cases (where ureteral catheterization is impossible) but will never give that safety and accuracy of a diagnosis derived by inspection and the chemical, bacteriological, and microscopical examination of both urine-samples obtained by double ureteral catheterization. In other words: In a suspected unilateral kidney-lesion both ureters are catheterized. Inspection of both urine-samples shows on one (the suspected) side a turbid or bloody urine, while from the other side a clear fluid is obtained, which later upon examination does not contain albumen nor any of those microscopic elements (casts, renal epithelial-cells, etc.), indicative of an advanced anatomical kidney-disease. A nephrectomy on the basis of this evidence will, as a rule, be followed by a favorable result and an experienced observer like Rovsing [2] for instance, holds a similar view in his recent report upon the same subject.

But, unfortunately, we often meet cases where such favorable conditions are not present, but where more or less turbid urine-samples are seen on both sides and where the microscopic examination reveals anatomical defects bi-laterally. Or we meet cases where one kidney is the seat of a pyo or hydronephrosis or tuberculosis, etc.: a nephrectomy on the diseased side appears desirable but is deferred on account of the diseased condition of the other kidney, as recognized by the chemical and microscopic examination of its catheterized urine. Or an acute infection may involve one kidney to such an extent as to make its removal an imperative and life-saving procedure even in the presence of facts pointing to anatomical defects in the other kidney, an instance the following case well illustrates.[3]

Male, fifty years; severe pain in right loin; repeated chills followed by anuria, phosphatic fragments, bladder-urine turbid,

symptoms of general sepsis. Cystoscopy, ureteral catheterization. Right side turbid, purulent urine containing albumen, blood and pus. Left side clearer urine containing less albumen but some pus and a few granular casts.

In such cases particularly, the methods for determining renal capacity or kidney-function as marked out for clinical purposes by Casper and Richter,[4] should be of paramount value as offering additional evidence and giving the operator a feeling of safety for his decision.

A description of these methods seems superfluous in this connection, as you all are familiar with the theories upon which they are based. A few salient points though may be repeated in order to show where our experience forces us to differ from the opinion of authorities who have created the term kidney-function.

Cryoscopy aims to determine molecular concentration of blood and urine, which as A. v. Kornayi teaches, demonstrates the actual work or capacity of the kidneys. In health or under normal conditions molecular concentration of blood is supposed to vary very little ($\Delta = -0.56$ to -0.58). In kidney diseases though the difference between the freezing-point of water and that of blood varies materially, because the kidney-tissue has lost its faculty to rid the blood of its firm molecules. A higher molecular concentration of blood or a lower freezing-point will occur only if both kidneys are materially diseased as one-fourth of the normal kidney-tissue is sufficient to do the whole work. Kümmel, the most enthusiastic representative of this method, determines the Δ of each patient in whom an operation on a kidney is contemplated and refuses to operate if that point rises above -0.60.

We began our work on blood-cryoscopy with Beckmann's cryoscope but were forced to abandon it temporarily on account of great inaccuracies connected with that apparatus. It stands to reason that reliable results upon which such an important decision as the removal of a kidney is to be based, can only be obtained if the determination of freezing-points is made with the utmost care. It should, if time permits, be done two or three times, if possible by different well-trained observers, the thermometer should be repeatedly tested with distilled water and an apparatus of precision should be employed, thus avoiding errors.

We had more satisfactory results when we began to work

with Zikel's so-called Pectoscope, which combines with very simple manipulation, all the advantages of an instrument of precision. We made our examinations like Rumpel, obtaining the blood from an arm-vein and defibrinating in the freezing-tube, where it had been collected directly from the vein.

We were particularly anxious to satisfy ourselves upon that mooted point of Δ in cases with normal kidneys and found it ranging between -0.54 and -0.60. In a case of advanced parenchymatous nephritis with general anasarca, a daily secretion of 180 to 300 cc. of urine, a urea-excretion varying between 5 to 10 grammes and all the microscopic evidences of a grave nephritis we found one time $\Delta = -0.56$ and three days later with the same clinical picture -0.60. A case of acute nephritis gave $\Delta = -0.55$, while a robust young man, suffering from poisoning with illuminating-gas showed $\Delta = -0.61$.

These few examples which coincide with observations reported by Adrain,[5] Rovsing,[6] and others tend to show that Kümmell's standpoint is untenable—at least as far as blood-cryoscopy is concerned. In a recent exhaustive compilation on cryoscopy[7] the Δ in normal kidneys is reported to vary between -0.35 and -0.57. The meaning of smaller values (such as below -0.56) is not yet sufficiently explained, while Koranyi thinks even these indicate abnormal kidney-action.

In all of our cases of suspected unilateral kidney-lesions we have uniformly subjected both urine-samples obtained by ureteral catheterization to cryoscopy, to the phloridzin and urea-tests. According to Casper and Richter a lowering of the urine freezing-point under -1.0 of that of water means an impairment of renal function on that side. They as well as Kümmell, who bases his statements on several hundred cases of surgical kidney, lay the most stress upon the comparative results for diagnostic and prognostic purposes obtained by these methods.

Casper's phloridzin-test is based upon v. Mehring's observation of this drug having the faculty of producing a renal glycosuria, which is dependent upon kidney-activity. If a great deal of kidney-tissue is destroyed or diseased, none or very little sugar is excreted. Casper therefore concludes that, if after phloridzin-injection no sugar is found in the urine obtained from one kidney, the cells of this organ are inactive or destroyed. He looks upon this as the most important test for kidney-function.

Another method to determine the actual excreting work of each kidney is the comparative study of urea-excretion. Rovsing [8] suggests at first to determine the urea of the whole daily urine-quantity as giving an approximate idea of the work of all functuating kidney-tissue. Then urea is determined in both urine-samples obtained by ureteral catheterization and from comparison conclusions can be drawn as to which kidney is actually doing the bulk of the work.

All these three methods we have invariably employed in our material and we give here the results of tests made in a few of our cases as the best illustration of the clinical value of these methods.

A brewer of fifty-five years: Hematuria for one year, lost forty-five pounds, tumor palpable in right loin (Grawitz), examination of catheterized (ureter) urine gave:

	R.	L.
Δ =	-0.5	-1.5
Sugar (phloridzine)	0.25%	1.28%

Kidney removed; quick recovery.

Male, forty years: Attack of severe pain on left side (kidney-stone) complete anuria for twenty-four hours. Urine contains red and pus-cells.

Examination of catheterized (ureter) urine for the three functional tests gave:

	R.	L.
Δ =	-1.31	-1.41
Urea	0.0085	0.008
Sugar (phloridzine)	2.8	2.8

Upon these findings we gave the patient a favorable prognosis and he has since enjoyed good health.

Male, thirty-five years: History of Lues and Tabes, which caused urine-retention necessitating catheterization. Cystitis, pyelitis and pyonephrosis on left side. Examination July 15, 1904:

	R.	L.
Δ =	-1.4	-0.45
Urea	0.017	0.003
Sugar (20 gr. ½% phloridzine)	2.5%	0%

July 22: Left ureter catheterized, large amount of pus with some urine (20m. of ½% phloridzine injected). Tests for sugar made every five minutes. Sugar appeared in urine from right kidney 25 minutes after injection and persisted for 30 minutes. No sugar in urine from left kidney.

	R.	L.
Δ =	-1.58	-0.4
Urea	0.018	0.0015

Left kidney removed. Patient made rapid recovery and is well since operation.

These few illustrative cases, and many more could be cited if time and space permitted, prove that the three tests which we generally employ to determine kidney-function have been valuable aids diagnostically and prognostically in our hands. Wherever we find great differences in cryoscopical urine-points, in sugar excretion and in the amount of urea, we certainly feel justified in concluding that little or no work is done by the diseased kidney and that the other side is responsible for the existing renal function. We lay particular stress though upon the fact that all three tests must coincide and must show good or at least fair points on the remaining side before a nephrectomy is permissible.

With growing experience in this work one learns to recognize the anatomical and functional value of each kidney. Good operative results can even be obtained in cases where both kidneys are found to be anatomically diseased as long as sufficient functionating tissue appears to be left in the remaining kidney, which after removal of the hopelessly diseased organ gradually may improve.

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THE AMERICAN JOURNAL OF UROLOGY

VOL. II. NOVEMBER, 1905. NO. 2

LOCOMOTOR ATAXIA AND THE UROLOGIST.

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WERE it not for the fact that the most trite and commonplace phenomena of clinical medicine and surgery have continued to mystify and elude successive generations of medical men, the pursuit of the practice of the healing art would, long since, have lost its charm.

The vermiform appendix, for example, continues year after year to manifest its morbid capabilities under conditions so multiform, that even the keenest surgical minds are constantly compelled to admit their impotency to unravel the pathologic mysteries of this most useless portion of the human body.

The other component parts of the abdominal contents are nearly, if not quite, equally capable of leading even the most astute operators so far astray in their activities that the results of their operations would be laughable, if they were not of such serious import to their unhappy victims.

Hardly any surgeon is to-day willing to pin his faith to any hard and fast diagnosis when some surgical condition of the abdominal cavity or pelvis is in question. Relying on his ability to invade either region with impunity, he prefers to operate first and make his diagnosis afterwards; and this is all very well if some morbid condition essentially abdominal or pelvic underlies the clinical picture that decides the operation.

Far different is it, on the other hand, when the surgeon, guided merely by the superficies of the case, invades the pelvis or the abdomen in pursuit of morbid conditions whose real seat is quite remote from these regions.

The purpose of this preliminary generalization is to attract

the attention of the general surgeon, and particularly of the specialist in genito-urinary surgery, to the temptations to which they are continually yielding in operating for the bladder and kidney complications of a disease which is as far remote from the province of surgery as anything could well be. The writer refers to that insidious, elusive and protean disease of the sensory side of the nervous system—locomotor ataxia.

The mechanism of normal urination is an elementary phenomenon of physiology. We all know that, in the normal person, the presence of a certain amount of urine in the bladder is the signal to the brain to bring about a desire to void this waste product. We know, furthermore, that this desire is the end result of a reflex action and that this reflex action results primarily from the normal functioning of sensory nerves whose specific duty is to warn the brain when the time has arrived for the latter organ to relax its inhibitory vigilance upon the sphincteric apparatus of the bladder and allow the collected urine to pass.

In locomotor ataxia we are dealing with a disease which involves the sensory nervous system only. Hence it immediately follows that the sensory portion of all reflex mechanism suffers early and severely in this disease.

The veriest tyro in neurologic diagnosis knows that the loss of the patellar and pupillary light reflexes answers the most essential diagnostic requirements in locomotor ataxia and yet nearly everybody, outside of the practised clinician, fails to remember that the sum total of reflex loss is by no means made up of the two portions of the reflex system above mentioned. On the contrary, the vesical reflex plays a most important role in the disease in question and the possibility of its abolition should never for a moment be lost sight of. Furthermore, the fact should always be borne in mind that the first reflex mechanism to be attacked in locomotor ataxia is largely fortuitous and that the primary point of election may lie in the bladder, as logically as anywhere else. Remembering this, the surgeon will save himself from many a regrettable operative interference and his patients from ordeals which they can ill afford to undergo.

Briefly outlined, the sequence of events which lead to superfluous operating in cases of locomotor ataxia is as follows. We will take a typical case. A previously apparently healthy

individual, aged anywhere from twenty years upward, suddenly begins to have considerable spontaneous pain in the bladder, the pain being associated with noticeable interference with the free and complete passage of urine. A surgeon is called, hears the story and without more ado takes the matter of stone into consideration. After a shorter or longer period of time the pain subsides as quickly as it came and a pain-free interval follows. Attack follows attack, however, and the question of operation grows more and more imminent. The painful crises are growing more and more frequent and severe and, in addition, a constant dribbling of the urine has established itself. The next chapter of the clinical history is marked by an operation which uncovers—nothing; and from this point on operation may follow operation, each quite as fruitless and superfluous as the one before.

Meantime the original cause of the pain and dribbling, the locomotor ataxia, continues quite as active as before the primary operation. Indeed it is not at all unlikely that the successive interventions have given a new impetus to the process; and the victim is doubly miserable by reason of the traumatisms which, in spite of his debilitated nervous system, he has been compelled to undergo.

Let it not be thought that vesical calculus is the only erroneous diagnosis that leads to unnecessary surgical interference in the class of cases under consideration. The writer's note book contains more than one history of tabetics who have been cut for stone in the kidney or have had their prostate glands explored in search of a supposed hypertrophy. And, on the surface, none of these operations seems so wild and devoid of indications as the actual facts prove them to be. A great many of the vesical and renal crises of locomotor ataxia bear a close superficial relation to the conditions obtaining in cases of vesical and renal calculi and many others, in the same surface way, practically parallel the clinical features of hypertrophied prostate. A goodly number, on the other hand, are only so remotely similar that a mistaken diagnosis leading to surgical operation is absolutely inexcusable.

How may a surgeon safeguard himself against errors of diagnosis which are apt to lead him into the unnecessary and fruitless operations above mentioned? By remembering that the initial symptom of locomotor ataxia may in any case be urinary

incontinence, and also by bearing constantly in mind that not only in the beginning of the disease but at any time during its progress the patient may undergo vesical and renal crises, so-called, of which the clinical manifestations bear a very strong superficial resemblance to those of renal or vesical calculi. Having these possibilities in mind, the surgeon should approach every supposedly renal, vesical or prostate case with the greatest possible circumspection. If he is able to obtain a history of syphilis his circumspection should be redoubled. If the case is really one of locomotor ataxia, careful questioning will reveal the fact that although the urinary disturbance is the factor which is at the moment of paramount importance in the mind of the patient, it is far from being the only one in a given case. Even in cases where urinary incontinence is the earliest gross evidence of the disease, it will be found that the patient has, for a considerable time prior to this, been the victim of fleeting pains of a neuralgic character; that he has not been quite sure of his footing in going over the stairs or in making his way about in the dark; that he tends to pitch forward over the washbowl when his sight is obscured by a towel or washcloth; that he has occasionally seen double or experienced other visual disturbances, and that he is unaccountably susceptible to atmospheric conditions.

The above necessarily involves a considerable amount of detail work, to which many surgeons—for some unaccountable reason—seem to possess an ineradicable aversion, but the necessity for detail work in surgery is a matter that requires no special argument.

The actual physical exploration presents no insuperable difficulty. It is true that not all cases of locomotor ataxia are absolutely typical, and for diagnostic purposes—even though the diagnostician be an avowed tyro—it is not necessary that they should be. It is enough for all practical purposes that the pupils do not respond to light—while retaining their power of accommodation—and that the knee and Achilles jerks are abolished or obviously diminished. If the surgeon discovers even this much, he has gone far enough to know, if he be wise, that the case in hand is one in which operation will lead to nothing but chagrin on his part and fruitless suffering on the part of his patient.

PYELITIS.

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MODIFICATION of the ureter-cystoscope, making catheterization of ureters easier, has led to a more thorough study of diseases of the renal pelves, and pyelitis is now considered a not uncommon condition. Rayer,[1] the first man to recognize pyelitis as a particular affection, stated that the inflammation might extend to the parenchyma of the kidney. Since his time pyelitis has been more or less thoroughly described, yet in searching through literature one is surprised that many text-books ignore the disease, while others mention it only cursorily.

Of the authors who discourse on pyelitis, a majority describe both catarrhal and purulent varieties, while some speak of purulent only. Michaelis[2] declares purulent pyelitis to be rather rare, but says that catarrhal pyelitis is quite common; that it is considered rare because it occurs as a complication of surgical troubles. The physician who will thoroughly investigate his cases of obscure urinary disturbance, will be startled at the frequent occurrence of pyelitis. Catarrhal pyelitis is far more common than the purulent.

Pyelitis may be caused by an extension of inflammation from the neck of the bladder. Catarrh of the vesical trigone, or purulent cystisis, may extend up the ureters and so to the renal pelves. Especially is this so if there be an obstruction to the flow of urine from the bladder. Pyelitis may be occasioned by extension of inflammation from the kidney. The irritating action of oxalate of calcium and uric acid, if long continued, produces pyelitis as well as nephritis. It is asserted that pyelitis may be caused by infectious fevers, but it is problematical whether inflammation may not, in those cases, originate in the kidney. A primal agent of pyelitis

[1] *Krankheiten der Nieren;* Rayer, Erlangen, 1844.

[2] Zur Lehre der Pyelitis. By Michaelis. (*Wiener medizinische Presse,* 11, 1870, p. 594.)

is declared to be renal calculus, yet it is probable pyelitis may be present before the appearance of calculus and may be a contributing element in its formation. The majority of authors give the long continued ingestion of renal irritants, such as oil of santal and cantharides, as one of the causes of catarrhal pyelitis. Gonococci have been found in pus from inflammation in the renal pelves, but precisely the method of invasion has not been determined. It is claimed by some that the ureteral orifices remain open while the bladder is partly full and that a Janet irrigation may force pus into them. I do not consider this probable. Having repeatedly noticed ureteral orifices in a large number of cases, I have observed the majority to be closed except during the passage of urine into the bladder, the amount of fluid in the bladder not influencing this in the least. Yet in a few patients the ureters are always gaping. A case reported by Lancereaux[3] in 1860, seems to prove the theory of danger in irrigating the bladder. His patient, a young man, experienced severe pains in the region of the kidneys immediately after using a hand injection for the cure of gonorrhea. Necropsy showed a purulent pyelo-ureteritis with perinephritic abscess. The lower part of the ureter, however, was not so acutely inflamed as the upper.

At the present day a cause of pyelitis which must not be overlooked is instrumentation of the ureter. The insertion of an ureteral catheter not absolutely sterile or the passage of a sterile catheter through an infected bladder may cause pyelitis, or may change a catarrhal to a purulent pyelitis.

Tubercular pyelitis is found secondary to tubercular nephritis.

Casper[4] gives as causes of pyelitis: infection from general circulation of the blood—hematogenous; through the urinary tract against the flow of urine—urogénous infection; and finally, micro-organisms which may wander into the kidneys directly from neighboring organs.

PATHOLOGY. (From Morrow's *System of Genito-Urinary Diseases.*)

3 Pyelite, Phebite de la Veine Rénale, Abcès Du Rein Droit, Infection Purulente, Albumine dans l'Urine. By M. Lancereaux. (*Mémoires de la Société de Biologie*, 1860, p. 17.)

4 Lehrbuch der Urologie. (1903). By Leopold Casper.

"The catarrhal form shows a thickened and injected mucosa with rapid formation and desquamation of epithelium, and the process involves by direct propagation the tubules of the pyramids. In the more severe forms there is a fibrinous exudation, that adheres in part to the surface and is carried away as shreds in the urine.

"In the acute purulent form there is a round-celled infiltration of the wall of the pelvis, the mucosa is greatly thickened and irregular, with numerous small extravasations of blood and scattered points of superficial sloughing and ulceration. The kidney substance on section shows small white streakings through the cortex and medulla, and later punctate foci of suppuration or larger abscesses formed by confluence of the small ones. The suppuration appears to begin in the pyramids by the agency of bacilli that have made their way directly into the tubules from the pelvis. The pus that forms on the free surface is either carried away in the urine, or, if the ureter is obstructed by the inflammatory swelling of its own wall or by a fibrinous plug, it collects within the pelvis.

"The chronic purulent form may be the later stage of the acute, or it may be chronic from the beginning. It gradually destroys the parenchyma of the organ, partly by suppuration and partly by the formation of interstitial connective tissue, and as the escape of the contents of the pelvis through the ureter is always opposed and at times entirely prevented, more or less distension of the kidney ensues."

From the foregoing, it must be deduced that the continuance of pyelitis, be it catarrhal or purulent, is a direct menace to the kidney, catarrhal pyeltitis terminating in nonmicrobic nephritis, or Bright's disease, and the microbic form inducing supurative nephritis, or surgical kidney. All writers of general medicine give as the occasional cause of Bright's disease an ascending inflammation from the renal pelves. They also speak of a very large number of nephritis cases in which no assignable cause can be found. It is my opinion that many of the latter have their origin in an unrecognized catarrhal pyelitis.

Symptoms of Catarrhal Pyelitis.—As has been stated, pronounced catarrhal pyelitis almost invariably invades the kidney, so that a description of symptoms is really that pertaining to pyelonephritis. Urination may be disturbed. There may be frequency, micturition becoming obligatory every two hours, or

oftener, and occasionally by night. Some patients complain of frequency while seated, experiencing none or little on standing. The act of urination is usually normal, though certain cases present all symptoms of spasmodic stricture. In mild types there may be no pain referable to the kidney, but in severer ones it is quite a pronounced symptom. Usually, it is referred to the back, in the region of the kidneys; along the course of the ureter and not infrequently in the testicle. A " weak back " is a common symptom. Occasionally the pain is referred to the epigastric region. Besides these indications there is a feeling of malaise corresponding to the amount of nephritis present. In many instances of advanced nephritis, if patients be closely questioned, a prodromal period will be found to have existed lasting from a few months to a few years, in which all the symptoms above described were experienced.

In appearance, the urine is almost identical with that of catarrhal inflammation of the bladder, or prostate. The second specimen has a granular semblance and as it cools, forms a mucus cloud. It is impossible by the naked eye to absolutely determine whether the cloudiness be due to pyelitis, or to other conditions named, but if subjective symptoms be found in addition, a thorough investigation of the renal pelves should be made. Especially important is this if the patient has had appropriate treatment of the prostate and bladder.

Symptoms of Purulent Pyelitis vary according to the intensity of the inflammation. In some cases none exist other than those described for catarrhal pyelitis, excepting that the urine contains large amounts of pus if the ureters be patulous. In acute and subacute inflammation there is always considerable general disturbance; septic fever with chills, loss of flesh and growing weakness. The whole appearance is as of one suffering from septic absorption. Fevers are irregular, running up to 102° or 104° in the afternoon and up to 101° or 102° in the morning. Sometimes they are extremely irregular, reaching their highest at any time of the day. Chills are usually slight, but may be very severe. The more pronounced the general symptoms, the more deeply is the kidney involved.

Course of the Disease.—Catarrhal pyelitis may entirely disappear under appropriate internal treatment, but it usually persists, invading finally the tubules of the kidney. The process of

infringement is ordinarily very slow and several years may elapse before the function of the kidney is disturbed to any great extent. Or the patient, by exposure, may bring on an acute, or subacute attack of nephritis. Mucus constantly secreted by the inflamed pelvis may catch up crystals of uric acid and so originate a calculus. Phosphates, at times, are unquestionably deposited on the inflamed membrane.

Acute purulent pyelitis usually extends swiftly to the kidney, producing suppurative nephritis and sometimes, perinephritic abscess; or the ureter may become plugged by intense inflammation and so cause pyonephrosis with rapid destruction of the kidney. Unless this condition be relieved, death follows quickly. Chronic purulent pyelitis may exist for some time without marked involvement of the kidney, but sooner or later the infection spreads to and slowly destroys it.

Diagnosis.—Dependence must be placed on the microscope for diagnosis of catarrhal pyelitis. If, after the regulation of diet and the administration of urinary antiseptics, pelvic epithelium be found in the urine on repeated examination, a diagnosis of catarrhal pyelitis may be made. The irritating action of oxalate of calcium and uric acid produces desquamation of both pelvic and tubular epithelium and it is sometimes impossible to bring about an entire disappearance of these crystals. In such circumstance, the character of epithelium must be studied and upon discovery of degenerated cells from the deeper layer, a diagnosis of true inflammation may be safely made. In arriving at conclusions, subjective symptoms must also be considered. It is seldom that a patient has pains over the kidney due to lithaemia alone. Pain along the course of the ureter and in the testicle helps to ratify diagnosis. The aches of lumbago must not be ascribed to pyelitis and, on the other hand, annoying pains in the back must not be called lumbago until all possibility of inflammation of the renal pelvis has been excluded. Cloudy urine drawn through the vesical catheter is indicative of cystitis, ureteritis or pyelitis, unless acute or subacute posterior urethritis, prostatitis, or seminal vesiculitis be present.

It is more difficult to make a diagnosis of purulent pyelitis by microscopic findings because the presence of much pus obscures the field, making epithelium difficult to discover. The pelvic cells are

much denormalized, so that only the most expert microscopists are able to determine their origin. Chief reliance is based therefore on clinical observation. If the second specimen of urine contains an amount of pus out of proportion to bladder symptoms present, the case must be regarded as one of possible purulent pyelitis. It is a well known fact that in elderly males considerable cystitis may exist without many bladder symptoms. In younger men, however, this is not the case. The character of the pus must be studied. If it be ropy and possess considerable mucus, in all likelihood it originates in the bladder, but if it be granular and contain little mucus, it probably comes from the renal pelves. Again, if it be ropy, there may be pyelitis in addition to cystitis. In washing out bladders, when the return flow becomes quickly clear, yet swiftly clouds again, pyelitis may be strongly suspected. If the bladder be slow to clear and slow to cloud, pyelitis is probably not present, the pus in all likelihood coming entirely from the bladder.

To still further examine, an observation cystoscope may be inserted in order that the orifices of the ureters be studied. If they are inflamed and everted and if the urinary jet be cloudy, pyelitis or ureteritis may be safely inferred. Fenwick [5] in speaking of renal pyuria says:

"A stream of pus issuing from the ureteral orifice is not quite so readily or so certainly detected as a jet of blood, but it can be diagnosed with care. The glycerine-like stream of health is replaced by a muddy current of a color which varies from a light straw to a dark yellow."

If the ureteral catheter be passed and urine collected diagnosis is absolutely established. If, however, in observing the ureteral orifices, clear urine be seen to issue from one side, that side should not be catheterized. If a severe cystitis be discovered, the ureters should not be catheterized until the cystitis has been brought under control.

Acute and subacute purulent pyelitis may be recognized by general symptoms taken in conjunction with urinary ones. Palpation over the kidney discloses more or less tenderness, and, in cases of pyelonephritis and pyonephrosis, more or less tumifac-

[5] Electric Illumination of the Bladder and Urethra. By E. Harry Fenwick, London, 1889.

tion. The intercurrence of acute pyelitis in the course of cystitis is indicated by an exacerbation of all the symptoms together with fever and chills. Especially is pyelitis to be considered if the exacerbation of symptoms occurs after instrumentation of the bladder.

A urine that is at one time perfectly clear and at another full of pus, usually indicates pyelitis accompanied by obstruction in the ureter, such as calculus, stricture or kinking.

I have selected two cases as illustrative of the two forms of chronic pyelitis:

CASE 1. Mr. B.; minister; age, thirty-five; was referred to me by Dr. Hawkes, of Newark, on April 3, 1905. The patient stated that he had never had a veneral disease of any kind. Eight years ago he first remarked a slight hesitancy on, and dribbling after urination. Six years ago he consulted a physician who told him he had stricture. Sounds were passed, but no improvement followed treatment. At about the same time he noticed considerable pain over the course of the sciatic. This was diagnosticated as neuritis. Shortly after he experienced aches in the back and along the course of the ureter. Beginning about the first of March, he observed considerable pus in his urine, which, however, urotropin removed to quite an extent. His pains and hesitancy continued with more or less severity up to the time he was sent to me. He then complained of a constant desire to urinate, though it was possible for him to hold his water for three or four hours. There was marked hesitancy in starting the stream, ten or fifteen minutes sometimes elapsing before the urine could be induced to flow. The jet was small and frequently twisted. There was moderate pain in the lion, over the course of the ureter, in the testicle and over the suprapubic region. All his symptoms were lessened on lying down and aggravated by walking. Examination discovered the urine to be quite granular in appearance. Urethra normal. Prostate and vesicles normal. Kidneys in position and barely tender. The cystoscope showed his bladder to be congested at the base and over the trigone and the ureteral orifices were seen to be reddened and slightly everted. The ureters being catheterized, were found to be hypersensitive, though there was no obstruction whatever to the passage of the catheter to the renal pelves. Upon removal of the cystoscope,

urine was collected for examination. It was at first seen to be somewhat cloudy, but later blood manifested itself, showing that the ureteral catheters were irritating the ureters. In similar cases I have observed this phenomenon invariably, together with the fact that the longer catheters remain in the ureters, the greater becomes the percentage of blood. On the other hand, when hemorrhage is due to direct traumatism of the ureter, blood will appear with the first urine and later will cease. Dr. Heitzman's report of microscopic findings was chronic pyelitis with mild parenchymatous nephritis.

Mr. B. has received twenty lavages of the renal pelves. As a result, all his symptoms have disappeared. Even the aches in his legs have been somewhat mitigated and are now felt only during heavy weather. There is always, during these periods of pain, a limited amount of uric acid in his urine. Mr. B. has gone to Europe and will resume treatment upon his return. The case is one of catarrhal pyelonephritis probably caused by uric acid. In all likelihood, it began as catarrhal pyelitis eight years ago, at that time escaping detection. When he came to me his urine contained one-fourth of one per cent. albumin and granular casts. Now, it shows the smallest trace of albumin, and casts have entirely disappeared.

Case 2. L. M., salesman; age, twenty-four; was referred to me November 26, 1904, by Dr. Schneider, of New York. He said that his first and only attack of urethritis began in November, 1903. He was pronounced cured in six weeks. On February 10, 1904, he noticed a slight pain at the head of the penis on urination and on inspecting his urine, found it to be very cloudy. He immediately returned to his physician who made a diagnosis of cystitis and treated him by lavage of the bladder and internal use of urinary antiseptics without result until November, when he consulted Dr. Schneider who thereupon sent him to me for examination. On November 26, his only symptoms were slight pain at the meatus on micturition, moderate frequency, a little pain in the suprapubic region and an exceedingly cloudy urine. Urethra, prostate and vesicles were normal. A cystoscope in the bladder showed that organ to be markedly inflamed, especially at the trigone, which was thrown up into folds and knobs of mucus membrane. The right ureter was catheterized with ease, but

owing to irritability of the bladder and marked inflammation about the left ureteral orifice, it was impossible to enter that side on his first visit. Urine from the right side was comparatively clear and on examination showed only slight catarrhal pyelitis. On his second visit I succeeded in entering the left side and obtained through the catheter exceedingly purulent urine. Examination by microscope evidenced ureteropyelitis without involvement of the kidney. He was treated eleven times, at first with silver nitrate, then with protargol and finally with argyrol. His urine cleared absolutely and all symptoms vanished. There has been no return of trouble in six months.

Treatment.—The treatment of pyelitis is both systemic and local. Catarrhal pyelitis should be treated first by rest, diet, internal medication and change of climate. Repose in bed is not necessary, but rest from arduous labor, athletics and close application to business, must be insisted upon. A plain, nutritious diet is essential and in cases of kidney involvement, a very restricted diet should be given as for advanced nephritis. Internal medication consists in the use of salol, urotropin, cystogen, etc., and the ingestion of large quantities of mineral spring waters. Usually inflammation persists and lavage of the renal pelves is indicated to prevent irreparable harm to the kidney.

Chronic purulent pyelitis may sometimes be made to disappear entirely by the use of urinary antiseptics combined with rest in bed. Too much time should not be wasted, however, before resorting to lavage. No operation should be performed until lavage has been tried in an attempt to save the kidney. If urinary analysis prove it to be practically destroyed, lavage of the pelves is useless and the kidney remains must be removed.

Acute and subacute purulent pyelitis should be treated by rest in bed, urinary antiseptics and stupes applied over the kidney. Desnos [6] in discussing a paper by Albarran cites a case " of grave pyelonephrosis; catheterism was followed by an intense chill, the general condition was rapidly aggravated and the patient died the third day." However, it seems a rational treatment to introduce antiseptics in order to clean out pus from the seat of inflammation. If it be decided upon to employ lavage, catheters

[6] Traitement des Pyelonephritis par le Lavage du Bassinet. By M. Albarran of Paris. (Annales des Maladies des Organs Genito-Urinaires, 16, 1898, p. 1283.)

should be passed well up to the kidneys and left in place for days, the pelves being lavaged thoroughly several times every twenty-four hours. By this means the ureter is kept open, allowing free drainage, pus is washed out and an antiseptic brought in direct contact with the inflamed area. If the kidney be the seat of suppurative inflammation lavage is unserviceable.

In 1888, Reginald Harrison [7] reported having washed out the renal pelves by distension of the bladder, causing a back flow along the ureter. In 1894, Howard Kelly [8] described the treatment of pyelitis by means of irrigation through a catheter. Casper [9] did likewise the ensuing year. Since then, Albarran,[6] Desnos,[6] Hamonic.[6] von Illyes [10] and Lang [11] in Europe and Tuckerman,[12] Lewis [13] and Johnson [14] in America, have reported good results from lavage of the renal pelves through the ureteral catheter.

Personally, I have found that catarrhal pyelitis may be entirely cured by lavage when all other means have failed and that the necessity of removing the kidney for purulent pyelitis is sometimes obviated if lavage be given early and thoroughly.

Kelly, Casper and von Illyes recommend strong solutions of silver nitrate, Kelly and Casper using one per cent. and von Illyes as high as two per cent. I rarely use stronger than 1:1000, preferring if this fail, to use the newer silver salts. Catarrhal pyelitis and pyelonephritis respond much better to silver nitrate. Purulent pyelitis should be first washed with boric acid in order to clear out pus, then washed with one of the albuminates of silver freshly prepared. My preference is for argyrol five to twenty-

7 On the Possibility and Utility of Washing out the Pelvis of the Kidney and the Ureters through the Bladder. By Reginald Harrison, F. R. C. S. (*Lancet,* 1888, 1, p. 463.)

8 Gonorrheal Pyelitis and Pyo-ureteritis cured by Irrigation. By Howard Kelly. (*American Journal of Obstetrics,* 1894.)

9 Lehrbuch der Urologie. By Leopold Casper.

10 Du Cathétérisme Thérapeutique des Ureters. By G. von Illyes. (Duetsche Zeitschr. f. Chir., LXXXVI. I, and Semaine Méd., March, 1905.)

11 Lehrbuch der Geschlechtskranheiten. By Rafin.

12 A device for Washing out the Pelvis of the Kidney Through the Ureter. By L. B. Tuckerman. (*Cleveland Med. Gaz.,* 1898, 91, XIV, p. 418.)

13 Ureter-Catheterism: Its Purposes and Practicability. By Bransford Lewis. (*Annals of Surgery,* 1903.)

14 Lavage in the Treatment of Diseases of the Kidneys. By F. M. Johnson.

five per cent. The wash should be copious; requiring from twenty to forty-five minutes.

In conclusion:

First—Pyelitis has not received the attention in medical literature its importance deserves.

Second—To obtain results from the employment of lavage of the renal pelves, a close study of the conditions found is absolutely essential. This will certainly be followed by an increased knowledge of the pathological conditions of the kidney and its pelvis.

Third—Careful examination of urinary cases will show that many who complain of indefinite symptoms are really sufferers from pyelitis. A recognition of their condition and the use of appropriate treatment will invariably relieve.

Fourth—Lavage of the renal pelves is a recognized procedure in the treatment of pyelitis, being indicated in all cases, with the exception of tubercular and calculous pyelitis, when the inflammation is not relieved by diet, internal medication and rest.

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RENAL NEOPLASMS ORIGINATING FROM ABERRANT SUPRARENAL TISSUE GERMS.

By Dr. Friedrich Peuckert.

THE suprarenal capsules were discovered by Eustacchius, who described them in his *Opuscula anatomica,* published at Venice in 1563, while the accessory suprarenal bodies were described by Morgagni in his work entitled *Epistola anatomic,* which appeared at Venice in 1764. Duverney, in his work *De glandula renali Eustachii,* published in 1751, called these accessory suprarenal bodies "renes succenturiati," a term which later on was given to the suprarenal capsules themselves. Duverney found that these accessory suprarenal capsules were composed of a cortex and medullary substance.

The occurrence of smaller accessory, or separate suprarenal bodies on the surface of the principal organ is a well-known and not an infrequent occurrence. Suprarenal bodies are occasionally

found supplied with a very large number of small suprarenal bodies, especially in the newly born (Marchand). More recent researches show that aberrant germs of this organ may be found at some little distance from the suprarenal body. In 1861 Rokitansky demonstrated the presence of accessory suprarenal bodies between the fibres of the plexus solaris and renalis. In 1866 Kuhn published a number of cases recorded in literature of accessory suprarenal bodies, and says: "in the research of the older publications relative to this subject it should be pointed out that, as a rule, only such should be considered as accessory suprarenal bodies where these are to be found in immediate connection with either the suprarenal body itself, its vessels, or lying in close proximity to the suprarenal body and that their structure, after a careful examination from this standpoint, is proven to be identical with that of the suprarenal capsule." Marchand found heterologous parts of the cortical substance of the suprarenal body between the kidney and genital glands and in the ligamentum latum in 5 newly born or young children, a condition which was confirmed by Chiari in adults. Ajutolo has noted the occurrence of an accessory suprarenal body, composed of cortical and medullary substance, in the left spermatic cord of an infant and Schmorl demonstrated the presence of a swelling the size of a pea situated in the right spermatic cord of an adult, which was connected with the spermatic artery and a vein of the pampiniform plexus, whose structure corresponded to that of a suprarenal body. Furthermore, out of 510 autopsies, he found small tumors on the right lobe of the liver 4 times, which upon examination showed the histological structure of the cortex of the suprarenal body. Most frequently, however, aberrant germs of the suprarenal gland are to be found in the kidney. In times past, these were considered as lipoma or adenoma arising from the kidney tissue until Grawitz demonstrated beyond a doubt that they originated from the tissue of the suprarenal body. When lying in the rental cortex they have a special significance, because they not infrequently give rise to benign or malignant neoplasms.

At the present time it is demonstrated that the substance of the suprarenal capsules, or at least their cortex, originates from an accumulation of peritoneal epithelium, as has been shown by Janosik and Spee. A capillary network grows into this epithelial

accumulation in which the parenchymatous cells are placed directly on the capillaries and all other stroma is lacking. In the zona fasciculata, the capillaries follow a straight line converging together from the centre to the periphery, parallel to one another and connected by numerous transversal anastomoses, while in the zona reticularis they form a very fine network in whose dense meshes the parenchyma cells are arranged in small clusters.

The fact that portions of the suprarenal body cortex are not infrequently detached from, and come in connection with, the neighboring organs has been explained by Grawitz as due to an early decrease in growth energy of the suprarenal body and the loose connection and demarcation of the single strands of the suprarenal body combined with the neighboring organs possessing a greater growth vitality. That the cortex of the kidney is a favorite location for aberrant suprarenal gland germs is shown from the fact that in the early period of development of the fetus, the kidney is surrounded by the suprarenal body. By the increasing growth of the former, portions of the suprarenal body which do not undergo the same development and have penetrated the spaces between the fetal lobuli renales, may become dispersed and after the disappearance of the subcapsular or interlobular lobules, they still persist in all the tissue of the suprarenal body lying in a column of Bertini.

Neoplastic hyperplasia has been observed in the suprarenal bodies, especially in the cortex, which have been termed by Virchow, strumae suprarenals. The formation of circumscribed nodes, located both in the cortex and medullary substance, and which are not infrequently multiple, contain cells which in form and arrangement correspond to the cortex cells and have been designated as adenoma. On the other hand, in the medullary substance tumors of the suprarenal body occur, whose structure resembles glioma (Virchow), which also contains elements similar to ganglion cells (Marchand). While the nodules in the suprarenal body generally occur as accidental benign neoplastic formations, a progressive malignant neoplastic formation may also arise from the suprarenal body and which is characterized as an atypical and progressive development of exuberant suprarenal capsule tissue.

These types of growth occurring in the suprarenal body may

also develop from aberrant germs of this organ, but which is more especially frequent when the latter are included in the cortex of the kidney. Nevertheless, one must assume from the frequency of dispersed germs of suprarenal tissue that only very few develop into true neoplasms, because Schmorl found in 92% of his autopsies these existed. Generally speaking, the growth energy of the aberrant germs is no greater than that of the normal tissue from which they are derived (Benecke). The possibility that malignant growths may be produced from the detached germs of suprarenal body tissue was first suggested by Grawitz and further confirmation of this interpretation was given from numerous other authorities, particularly by Ajutolo, Lőwenhardt, Rupprecht, Benecke, Horn and Askanazy. However, a year before the first writings of Grawitz appeared, Marchand had already expressed the opinion that dispersed germs of suprarenal body tissue could give rise to neoplastic formation.

Two instances of tumor formation arising from aberrant germs of suprarenal body tissue developing outside of the kidney have been described by Weiss. In one case the tumor reached the size of an adult head, developing in the left renal region; it had been growing for two years and was operated on by von Eiselberg. The growth lay in close proximity to the kidney, but could be removed by shelling out and consequently was not directly connected with the renal gland. The growth was characteristic, because it had given rise to metastases in the ileopsoas muscle on the same side and, although everywhere only hyperplastic suprarenal, and not metaplastic, tissue had developed, it was malignant in spite of the benign histological makeup of the tissue, which was similar to some thyroid gland growths. The peripheral structure showed rows of the zona fasciculata with clusters of the zona glomerulosa in the center. In the second case a diagnosis of right-sided ovarian sarcoma was made which had extended up to the umbilicus. At the operation, however, which was performed by Prof. Munster of Konigsberg, about two-thirds of the neoplasm became detached when an attempt was made to remove the growth. The removal of the remainder was an impossibility, so the abdominal cavity was packed with gauze and partially closed. The growth was seated between the layers of the broad ligament in front of the uterus and had grown into the right ovary. On

section, other than the hemorrhagic portions, the growth was butter yellow in color on account of fatty metamorphosis of the tumor cells. Microscopically the tumor consisted of a network of capillaries for a stroma, and of tumor cells, which in several places were closely connected with the vessels and were swollen on account of fatty infiltration, while in other parts it had a glassy appearance. What appeared to be gland lumina were apparently only cavities produced by degeneration of the central cells belonging to what were originally compact cell clusters. Many of the cells showed mitosis, a sign of malignancy. It had not as yet given rise to metastases, but the neoplasm had extended to the right ovary and pelvic lymphnodes after the fashion of malignant grows. Lying beside the larger tumor in the broad ligament another small nodule was found, which in structure exactly corresponded with the histologic makeup of the cortex of the suprarenal body.

Before these cases due to Weiss, Chiari had reported a case of neoplastic formation arising from aberrant germs of the suprarenal body, the growth developing between the kidney and the inguinal region. The tumor was characteristic, inasmuch as it grew very rapidly, penetrating into the coecum and mesentary, giving rise to no metastases properly speaking, but to a local recurrence. A case examined by Ribbert of a neoplasm of the pancreas, operated on by Krönlein, should also be mentioned.

In 1883 Grawitz first demonstrated that a series of renal tumors, which until that time had been classified under the head of lipoma, in reality originated from the aberrant germs of the suprarenal capsule and pointed out that true lipoma of the kidney were of extremely rare occurrence. Thus, for instance, Ulrich found out of 34 instances of small yellow tumors and foci in the kidney which he examined and were formerly considered as lipoma, 9 times they were in reality accessory suprarenal bodies, 15 times fatty necrobiosis of the epithelium of the tubuli concorti, the so-called true lipoma, 10 times adenoma of the renal cortex or strumæ supra-renalis accessoriae, the author leaving the diagnosis undecided and in none of them, as will be seen, was a true lipoma found.

These small tumors occurring under the fibrous capsule of the kidney, not infrequently multiple, are generally not of any great

size. Nodules larger than a pea are to be considered as rare, while those attaining the size of a walnut represent the transition to those tumors which are characterized by a progressive growth and which in reality quite rarely occur in comparison to the frequency of the benign growths arising in the suprarenal body of the kidney.

The smaller types of tumors mentioned are, as a rule, pale yellow in color and of soft consistency; in the larger foci, hemorrhages and pigmentation which they have left, are often found. Frequently with the naked eye, always with a microscopic, a fibrous capsule can be recognized, showing the boundary of the renal tissue.

Histologically, most of the tumors arising from the suprarenal body are composed of cortical tissue of the suprarenal body; those forms arising by a pure hyperplastic process of the cells of the medullary substance are apparently rare, as well as those which develop in the cortical substance of the kidney. Virchow says: " that medullary substance does not occur throughout the normal suprarenal body, and therefore, one is very apt to take the intermediate layer itself for medullary substance." The older observations, in which the medullary substance was supposed to have been seen in aberrant germs of the suprarenal body, were in all probability instances of the presence of the cells of the zona pigmentosa. Manasse, however, has described a growth the size of a hen's egg, discovered by chance during an autopsy which was composed almost entirely of the specific elements of the medullary substance of the suprarenal body; clusters of dark brown to light yellow cells were present, separated from each other by thin strands of tissue. The smallest of these resembled normal medullary cells of the suprarenal body. Others were larger, square, or clubshaped, while still others were true giant cells of colossal dimensions presenting the most varied and peculiar shapes. The smaller cells formed tortuous lines or strands as found in the normal suprarenal body, while the larger ones presented themselves in irregular clusters.

The type of normal suprarenal body cells must always be present in tumors which have arisen from the dispersed germs of this organ, in other words, in the meshes of a well developed capillary network, forming the stroma of the tumor; the cells are arranged

in rounded heaps and columns, they being of large size and polygonal in shape. In giving a description of his cases, Askanazy says that " the capillaries above all form the stroma network, in the meshes of which the specific cells are present." Other authorities also have referred to this arrangement of the capillaries and Lubarsch considers his cases as angiosarcoma or perithelioma, a specification which can only be made by the close connection of the tumor cells with the capillaries; the development of these tumors from the adventitious cells of the capillary walls is out of the question, for the simple reason that the tumor cells have been derived from the specific organic cells.

The tumor cells generally contain a large amount of fat like the normal cells of the suprarenal body; complete fatty degeneration may arise, the tumor becomes softened from the formation of cysts in which hemorrhages may occur, so that the contents of the cavities are of a hemorrhagic or pigmented nature. Glycogen obtained from growths arising from the tissue of the suprarenal body has been referred to by Lubarsch.

The hisological structure of tumors arising from the dispersed germs of the suprarenal body is consequently typically different from that of normal kidney tissue; however, it must be pointed out that in the foci of suprarenal tissue, especially those having a progressive development, a gland-like arrangement of the exuberant elements may be detected, while beside the solid columns surrounded by cells, cavities form, which appear all the more gland-like because the cells take on a more cylindrical shape. An analogy of this transformation in the normal suprarenal body is not lacking, as has been shown by Marchand, especially in the loose and hyperplastic exuberances which have developed from the latter. Undoubtedly, just such tumors, which are about to be formed into a tube-like transformation were formerly described as true renal adenoma having an alvelolar structure.

The benign and simply hyperplastic tumors arising from the cells of the suprarenal body are thus made up, whether they develop from the main organ itself or from dispersed germs. It happens, however, that these benign growths which clinically give rise to those symptoms and only occasionally show something on section, give rise to a considerable growth without limits and appear clinically, as well as anatomically, to be milgnant in nature.

These tumors especially, and the cases here to be reported may be included among them, are both of clinical and anatomic interest.

Macroscopically, the malignant tumors of the suprarenal body, which may develop to the size of a child's head, appear in various fashions. This depends principally upon the metamorphosis undergone by the neoplastic tissue. Frequently, extensive necrosis occurs in the older central portions of the tumor. The pale yellow, necrotic foci are seen in great contrast to the fibrous capsule. From blood infiltration and pigment metamorphosis, the surface of section may have a very peculiar appearance. Occasionally softening of the necrotic masses results and from this fact the tumor may assume a cystic character. Calcification of the central portions of the growth has also been met with, as well as progressive peripheral extension.

The structure of these tumors as here described, varies more and more from the typical picture of the suprarenal body. The cells assume indifferent shapes, their pillar-like arrangement becoming indistinct. Transitions from the typical structure of the suprarenal capsule to a completely atypical arrangement is occasionally met with in various portions of the same tumor. These tumors arise from a purely hyperplastic or adenomatous production of the suprarenal body tissue and not directly from the dispersed normal germs themselves. If, in the malignant tumors, tissue resembling that of the suprarenal body is still to be found, it will always resemble the typical stroma of the cortex of this gland; normal suprarenal body tissue is probably never found, this being made evident by clinical observation by the long existence of a small tumor, which, only after a number of years, takes on a rapid growth and malignancy.

As far as the condition of the kidney in which the growth arises, is concerned, it ordinarily gives evidence of more or less extensive interstitial inflammation surrounding it. Frequently, the size of the affected kidney is quite considerably reduced. The functional activity of the renal parenchyma in the neighborhood of the growth is frequently destroyed as a result of atrophy and necrosis. Evidences of foreign growths arising from the renal parenchyma itself have not been observed in these tumors.

In most cases the suprarenal body covering the diseased kidney is intact; in a few instances it was included in the growth on ac-

count of the increase in size of the renal tumor. It occasionally happens, however, that the entire suprarenal capsule remains under the albuginea on the surface of the kidney and always at the upper pole. A neoplastic formation arising from such an obstructed suprarenal body can certainly not be designated as originating from aberrant germs of this organ. In such cases, of course, the suprarenal body on the same side must also be missing from its normal position.

A tissue capsule is characteristic of all tumors, benign as well as malignant, which have developed from the aberrant germs of the suprarenal body. Since the doubtful tumors are, as a rule, situated under the capsule of the kidney, a portion of the capsule belonging to the neoplasm must be formed from that of the kidney. The remainder of the capsule belongs from the very beginning to the neoformation. While in true renal tumors, which are also encapsulated, such as adenoma and fibrosarcoma, the capsule will be found to consist of recent or old granulation and cicatricial tissue, in which remnants of renal tissue, such as the glomeruli and urinary canals, can be demonstrated, as in infarct cicatrices (Lubarsch), the conclusion can consequently be drawn that these bands of tissue are produced by a sort of inflammatory neoformed tissue arising from the renal tissue; in the capsule of these tumors one rarely finds the remains of glomeruli and urinary canals arranged with any regularity and then only when the growths have extensively progressed. It can be readily understood that while the tissue of the kidney in the neighborhood of the neoplasm becomes destroyed and fibrous changes occur, new layers become added to the original capsule which may contain remnants of renal tissue. As Lubarsch says, it can be distinctly proven in many ways that those portions of the capsule, closely bordering on the renal substance have a different origin, because they are usually richer in cells and blood vessels and are almost always infiltrated with the elements of an inflammatory process. On the other hand, in other cases where the capsule is especially thin, renal tissue can nowhere be found. Thick septa of tissue shoot out from the capsule and separate the tumor masses from each other.

The stroma of these growths consists of thin walled capillaries which are often gaping or collapsed, forming dense meshes in

which the tumor cells lie directly on the vessels. No other stroma can be found in most cases. Thus the type of the normal suprarenal body structure again returns here. The real tumor cells are large, in fact larger than in the normal organ, and usually polyedric. Their nucleus is sharply defined, rounded, easily stained and shows from one to two nucleoli, which may also be easily and distinctly stained. This characteristic of the nucleoli is believed to be of great importance by Lubarsch, but, according to Kelley, this peculiarity is present in a large number of tumors having various structures. In the cell bodies are to be found distinct and regular vacuoles resulting from absorbed fat, while in fresh and carefully treated preparations, the fat infiltration of the cells can be distinctly seen in the form of large and small drops. This fatty cell infiltration, which is characteristic of the cortex of the suprarenal body, is an important factor, showing in cases of doubt that the growth originated from the suprarenal body and is a proof against Sudek's opinion, who claims that these growths are true renal adenomata. This peculiarity of taking up fat in large drops, without first producing destruction of the cells, in other words, a fat filtration, never occurs in the epithelium of the urinary canals. The glycogen contents emphasized as diagnostic by Lubarsch, is doubtless of considerable importance, but far less so than fat infiltration of the cells, because very marked glycogen contents are typical, not only in certain types of tumor, such as enchondroma, cancer of the testicle, sarcoma of the bone and so forth, but they may exceptionally occur in types of neoplasms in which it is usually not found (Langhans). This authority has demonstrated the production of glycogen in sarcoma and carcinoma of the kidney, whereas, Lubarsch in 12 renal neoplasms not originating from the suprarenal body tissue, was unable to demonstrate the presence of glycogen. One cannot produce a positive glycogen reaction in normal suprarenal body tissue, but it is frequently met with in tissues which normally show no glycogen reaction and which are not derived from the suprarenal body. Glycogen is found within the parenchymatous cells, as well as in the stroma and blood vessels; in the latter it is free, as well as enclosed in the leucocytes.

Lubarsch called attention to the presence of lecithin in these tumors and Gatti demonstrated it in his case, so that possibly it

may have some diagnostic value. But, since we have no microchemical reaction for its demonstration, and since a more extensive test would necessitate larger portions of the tumor, the demonstration of this substance is lacking to a large extent as to its probable differential diagnostic value.

Furthermore, the tumors show a marked tendency toward cellular degeneration. This tendency occurs to a great extent in benign tumors of the suprarenal body and in itself, does not form a special characteristic of the malignant type. In each of these tumors cellular degeneration exists more or less extensively. A reason for this degeneration is the frequent and profuse hemorrhage which, without exception, occurs in malignant neoplasms of the suprarenal body, while necrosis may arise in a very large portion of the tumor. The cause of these hemorrhages is due to the relationship of the tumor cells to the vessels and will be discussed further on. Remains of old hemorrhages, altered blood coloring matter in the form of fine pigment granules, are often found and which give rise to the reaction of iron. Karyorrhexis is frequently found, according to Lubarsch, as well as myxomatous degeneration and the formation of cavities, the so called cystic transformation, which are filled with a bile-like fluid, the result of mucous softening.

The arrangement of the tumor cells corresponds more or less with that of the suprarenal body, but nevertheless an atypical condition is often found. Even if the structure differs very greatly from the suprarenal body tissue, the origin of the growth is not of necessity to be refuted, because very frequently malignant tumors differ from the mother tissue in various ways, as is found in various forms of carcinoma of the breast, stomach and thyroid gland.

This difference in the histological makeup of hypernephroid tumors has been frequently demonstrated and sometimes alveolar, tubular or even trabecular arrangement has been mentioned. In this evident difference in the morphological or structural peculiarity, lies the cause of the discussion relative to its nature, which will be referred to later on. Usually the cells, especially those in the more recent portions in the outer part of the tumor, lie in two parallel rows without any intercellular substance. In other parts of the growth the cells are arranged in clusters, which are

bordered by capillaries. However, contrary to what is found in benign growths, the spaces between the neighboring capillaries are much larger and irregular. The first row of cells is fairly perpendicular to the capillaries, but the cells in the intermediate spaces are usually placed irregularly. In the islands of tumor tissue, clusters of small round cells are to be observed at certain points. The arrangement of the cells, as mentioned above, is frequently quite atypical and differs from the normal suprarenal tissue. Thus, gland-like formations, as well as cysts, have been described, when in reality one was dealing with suprarenal growths. Occasionally, papillary ingrowing of the epithelium into the lumen of the ducts of these spaces has been demonstrated and not infrequently blood has been found in these glandlike spaces.

It has already been mentioned that frequently the formation of cavities results from central degeneration of the cells, or by a separation occurring between the cells arranged in clusters from the presence of blood. Of greater importance, however, is the presence of real gland tubules and alveoli, and from the diagnostic point of view when these are found the suprarenal nature of the tumor has been doubted and for this reason Sudek considers these growths as renal adenomata. As has already been mentioned, however, such gland formation has been described in the normal suprarenal body and in benign suprarenal tumors, so, therefore, such a condition in malignant neoplasms arising from the aberrant germs of the suprarenal body can in no way appear strange. A condition of numerous glandular formations in renal tumors, which apparently are of suprarenal origin, should always lead one to be circumspect before making a diagnosis.

The relationship of the tumors to the vascular system still remains to be discussed. The neoplasms are interwoven by an extensive ramification of capillaries, in the meshes of which the neoplastic cells lie without the presence of any other stroma of vessel endothelium. Burkhardt found certain conditions of the endothelium of the vessels in his cases which are quite worth mentioning and he says: "in places an enormous endothelial growth was found. Although an overgrowth of epithelium in tumors, especially those of a malignant nature, is nothing unusual in it-

self, nevertheless I have not observed it to such a great extent in any other type of tumor, certainly not in one coming from endothelium. At the same time, the transition of the exuberant epitheloid formation which was assumed to be epithelial, was occasionally so diffuse, the similarity of both kinds of cells was so great, that a differentiation was no longer possible. It is probable that certain authorities who deny the suprarenal origin of these tumors have such histological pictures in mind and take them for endothelioma."

The intimate relationship of the parenchyma cells to the vessels is characteristic of normal suprarenal tissue. Manasse has called attention to a peculiar condition in the normal suprarenal body. This authority often found isolated suprarenal cells in the lumen of the veins, as well as some lying in small clusters in close proximity to each other. "Furthermore, projections of suprarenal tissue were often found to penetrate through the walls of the veins into their lumen and which consisted of suprarenal body cells exclusively. Therefore, I can demonstrate that a very intimate relationship exists between the suprarenal body tissue and the veins and of such a kind that not only an invasion of the cells occurs in the veins, but also projections of parenchyma hang down into the lumen of the vessel." Such close relationship naturally arises between the vessels and the cells of the malignant tumors originating from the suprarenal body tissue, as well as in the benign forms, for which reason the latter may also give rise to metastases with ease. Löwenhardt's case belongs to the latter category, in which a large tumor of the clavicula occurred as a primary growth. Microscopic examination of the tumor after removal showed a similar structure to suprarenal tissue and when the case came to autopsy, a benign tumor having a similar anatomic makeup was found in the kidney, along with many other metastases. Benign tumors then, which are developed from the suprarenal body, may give rise to secondary growths. That it is difficult to distinguish between benign and malignant tumors of the suprarenal body has been made evident by Hansemann and he says: "Every hypernephroma of the kidney is a malignant tumor. Just as carcinoma occurs, which may exist for years without taking on a rapid growth or producing metastases, so also relatively latent periods exist in the life of the hyperne-

phroma. Between a hypernephroma arising in the kidney as an isolated tumor reaching the size of a hazelnut and one which has produced hundreds of metastases, I am unable to find any radical histologic difference. One cannot appreciate the danger of its malignancy by merely examining a single section of the tumor."

The formation of metastases of malignant tumors of the suprarenal body takes place by way of the vascular system and only very infrequently by the lymphatics. Secondary neoplastic productions produced by embolism have been found in the lung, pleura, heart, ribs, spine, diaphragm, peritoneum, mucosa of the stomach, liver, pancreas, kidney, mucous membrane of the bladder and retro-peritoneal lymphatics. Nearly always the veins in close proximity to these growths, especially the renal vein, are found choked up with neoplastic thrombi. This characteristic in the formation of metastases characterizes the malignancy of these tumors quite sufficiently, beside their tendency to rapid growth. It is interesting to note that the metastases often represent the regular type of the structure of the cortex of the suprarenal body, whereas the primary neoplasm shows a different histological structure, a fact which has also been demonstrated in thyroid tumors. For example, Kelly mentions a case of adenosarcoma of the thyroid where the metastases in the kidney had been mistaken for the primary tumor. Tumors of the thyroid gland frequently grow slowly and form metastases frequently in the form of colloid struma clusters and also in the vascular tracts of the bones.

Clairmont reports an interesting case of dissemination of the tumor cells during operation. In 1894 nephrectomy had been done for a malignant growth of the right kidney and during the interference the right pleura was torn to the extent of about seven centimetres, the rent being immediately closed with silk sutures. Examination of the growth after removal showed it to be an adenocarcinoma (this term was then given to malignant tumors arising from the suprarenal body, at the Pathological Institute of Vienna). Nine years later the patient was again admitted, at which time he was suffering from dyspnoea, bloody sputum and considerable loss in weight. The right half of the thorax was retracted and depressed during respiration, and posteriorly, over the right there was dullness and compression

breathing. Puncture withdrew pus containing diplococci. The pulmonary abscess was opened by resection of the ribs. Soon after, the patient died and at autopsy a row of pedunculated reddish and dark blue excrescences were found on the mucous membrane of the right bronchial tube. The lymphnodes situated over the bifurcation were enlarged and adherent to the walls of both main bronchi. On the outer surface yellowish red soft excrescences, the size of a linseed, had developed. Microscopic examination showed that these growths coincided in structure with that in the kidney removed nine years previously and it was only at this time that the diagnosis of malignant hypernephroma was made. Large irregular cells were found with pale cell bodies and nearly regular vacuolar contents, which could be stained with eosin. The cells showed a very distinct nucleus and were arranged in rows.

Clairmont assumes that during the operation the region of the bronchial glands and pleura had become infected with the tumor cells and that these were carried by the lymph stream into the bronchial glands where they remained and developed secondarily.

According to Grawitz, the following arguments are of importance for the diagnosis of these malignant tumors originating from the aberrant germs of the suprarenal body in the kidney: (1) Under the renal capsule dispersed germs of the suprarenal body often occur. (2) The cell formation of the tumors typically differs from the shape of the epithelium of the urinary canals. (3) Fat drops when found in most of the tumor cells, are also frequent in the cortex of the suprarenal body. Fat infiltration of the urinary canals never occurs. (4) The tumors are always encapsulated. (5) The arrangement of the cells and the very scanty stroma, which may be almost absent, is characteristic of the suprarenal body. (6) The glycogen and lecithin contents of the tumors are of lesser importance. (7) The hemorrhages and the resulting retrogressive metamorphoses should also be included among the characteristic signs of malignant growths, and above all, their tendency towards progressive development and the formation of metastases.

The relationship between suprarenal body tumors in the kidney and true renal neoplasms at first sight appears peculiar,

because it seems strange that cell germs not belonging to the organ should so frequently produce neoplastic formations in the kidney. However, as Kelly has said, as inconsistent as this proportion of suprarenal tumors in the kidney may appear, as compared to other renal neoplasms, it is without analogy in the present knowledge of tumor formation, nor does it under the prevailing theories offer any especial difficulty. Experience has shown that complex cells, possessing a very fine differentiation and very great physiological functions, far from the ordinary simple cell life, occur relatively infrequently in organs as the seat of primary neoplastic productions. Ganglioneuroma and hepatic cell adenoma are quite rare as compared to the occurrence of those formations in which the surface epithelium of the skin and mucous membranes is rapidly consumed and again regenerated, which alternatively proliferate and again involving the epithelial lining of the uterus and thymus gland, or the complex cells of the genital organs which are physiologically designed for regeneration. Comparing the highly differentiated and specific functionating cells of the renal epithelium with those of the hepatic parenchyma, we cannot expect to meet with very frequent occurrences of the primary kidney neoplasm and consequently must consider this rarity together with what we know of other parenchyma in general. The suprarenal body, on the other hand, is an organ which in its development and its probable vital functions possesses some similarity with the thyroid gland, more particularly on account of its epithelial origin and the poor development of an excretory canal; the neoplasms, as has already been mentioned, also show a great similarity. Types similar to adenomas and metastases by way of the blood vessels, the multiplicity of the histological structures in the same tumor, the long duration of certain functions, as colloid in one and formation of fat in the other, are common in them. It is remarkable that neoplasms of both these organs seem to have a certain tendency to arise in parts of glands occupying the abdominal cavity. We are reminded of the aberrant germs of thyroid gland strumae in the substernal space, at the base of the tongue, and trachea, in the cellular tissue of the inferior triangle of the neck.

Concerning the position of neoplasms arising from germs of the suprarenal body, especially of the malignant type, in the

oncologic system, much discord has arisen among authorities. The tumorlike hyperplasias situated on the suprarenal bodies themselves were termed strumae suprarenales by Virchow. Grawitz, who demonstrated the real nature of renal neoplasms which were formerly described as lipoma and arising from aberrant germs of the suprarenal body, applied the name of strumae lipomatosae aberratae renis, as did also Virchow. Later on the term adenoma was adopted by many, on account of the supposition that the suprarenal capsule is a true gland, possessing an internal secretion. The malignant tumors arising in the thyroid gland are described as carcinoma and, according to Burkhardt, the malignant tumors of the suprarenal capsule should also be considered as such, the benign types being adenoma. "In every gland carcinoma three forms may be observed—the destructive adenoma, carcinoma simplex and medullary carcinoma. Generally, in carcinoma of the suprarenal gland these three types of structure are more or less intermingled and it follows from this peculiarity that many variations and atypical conditions occur in the structure of these growths." On the other hand, Borst says: "According to the morphological definition, the suprarenal capsule in a normal condition cannot be termed a gland in the strictest sense of the word, nor can we attribute the character of the neoplasms arising from this structure as glandular productions of an adenomatous character. The structure of the tumors only shows here and there, and that exceptionally, histologic pictures recalling tubular or alveolar gland spaces, according to the statement of many. Then again, the history of the development of the suprarenal body is by no means definitely known. It has been recently upheld that this organ is derived from the kidney or the coecum. Taken for granted that the epithelial origin of the suprarenal body is unquestionable, the fact still remains that the characters of a true gland are not evident in the makeup of a normal and perfectly developed suprarenal capsule. The structure of this organ rather resembles the so-called vascular glands, more especially the so-called glandulae carotica, whose mesodermic, or rather mesenchymal, origin is probably unquestionable. The resemblance of the normal structure of these two organs is also made evident by the neoplasms to which they give rise."

In spite of the decidedly epithelial character of the tumor cells, malignant growths of the suprarenal body have generally been called sarcoma (Grawitz, Benecke), partly because a definite demarcation between the stroma and parenchyma does not exist, while the framework of tissue not only surrounds the filled-up alveoli and other cell spaces in the parenchyma, but also penetrates between them; also from the fact that such growths, particularly in the older portions, give rise to a histologic makeup very similar to sarcoma, while the more recently developed portions give the impression of an epithelial growth. From a purely morphological standpoint these tumors should be termed sarcoma on account of the very distinct penetration of the stroma and parenchyma (Graupner). This authority asserts, on the other hand, that the solid lines of cells in the cortex of the suprarenal body and in the aberrant germs, come from organs in which transmission from solid cell rows to tubular formations occur, and vice versa they arise in various stages of embryonal development only infrequently. Those tumors arising from these germs retain the nature of the mother cell and they also give evidences which would seem to indicate the commencement of the development of gland spaces. If it is shown that the suprarenal body and its aberrant germs arise from true epithelium, it is pointed out by Graupner that then tumors of the suprarenal body may represent epithelial formations and consequently the malignant types may be placed under the head of carcinoma.

The morphological characteristic of suprarenal tumors, especially the intimate connection of the tumor cells with the vessels, caused Hildebrand and de Paoli and Driessen to consider them as endothelioma. While their predecessors claimed that they originated from a proliferation of the endothelium of the lymph spaces, they attributed them to an overgrowth of the perithelium of the blood vessels and the endothelium of the lymph spaces, a periendothelium.

The conception of the renal tumors in question being adenomatous, arising from an overgrowth of the epithelium, cast off from the urinary tubules, as Sudek and others claim, has been disproven by Lubarsch, Askanazy, Ulrich, Manasse, Gratti and others, so that their error was at length proven.

Birsch-Hirschfeld suggested that adrenal tumors should receive an indifferent name until their origin and place in the oncological system was made perfectly clear, and suggested hypernephroma as a proper term. Marchand objected to this expression because the final syllable " oma " is not annexed, as is usually done, to the tissue element relative to the tumor, but to the entire organ from which the growth arises.

Borst also recommends selecting an unprejudiced name for all growths arising from the adrenal gland and its aberrant germs. He, therefore, suggests speaking in general of typical and atypical hyperplastic benign and malignant tumors of the suprarenal type, a suggestion which certainly deserves notice, although the demonstration of the epithelial character of these tumors should have more weight.

The clinical importance of renal neoplasms originating from aberrant germs of the suprerenal gland is very considerable, because the diagnosis has not yet been made before operation. It is only at the operation, and, then only by careful examination of the removed tissues, that the origin of the growth has been made clear. However, as has been shown by numerous articles on the history of the subject, in doubtful cases the diagnosis can be made with much probability and radical operation can be applied accordingly. One can hardly be certain clinically of the difference between benign and malignant growths of the kidney of the suprarenal type, because, on the one hand, most benign growths of this type run a course without giving rise to any clinical symptoms, while, on the other, from the pathologic standpoint, the benign neoplasms prove to be malignant.

These neoplasms are by no means rare as compared with other renal growths and since Grawitz has demonstrated their nature, it has been proven beyond a doubt that many of those instances reported as sarcoma or carcinoma of the kidney, belong to tumor formations developing from the suprarenal tissue and it was found that they occurred more frequently than primary renal sarcoma or carcinoma.

As to the age at which these tumors develop it has been noted that only in two cases due to Rupprecht (child two and one-half years of age), and Linser's case (male child five years and nine months old), have they been found under the age of thirty. In

Linser's case the diagnosis was certain, while in Rupprecht's case there was a rapidly growing retroperitoneal tumor which was removed by operation. Child died a few years later with large metastases of the lung. Histologic examination showed an encapsulated growth the size of a child's head, composed of large pale cells having a tube-like arrangement. Prof. Neelsen made a diagnosis of suprarenal tissue tumor and called the growth an adenoma suprarenale. Most cases, however, have been met with between the thirty-seventh and sixty-fourth years of life. They appear more prevalent in the male sex, although this may be merely a coincidence.

Even after the tumors have given rise to clinical symptoms they may persist for some time, as much as from two to six years, before causing death. Usually, however, after existing for a short time, they tend to grow rapidly and give rise to metastases. Askinazy's case is unique; the patient, fifty-four years of age, had discovered the tumor in the left kidney when he was a child. Later on the tumor is supposed to have disappeared and was only again noticed one year before the operation.

The existence of a suprarenal growth, often for many years, giving rise to only a slight amount of pain, makes it more probable that in the beginning simple hyperplasias develop from the aberrant germs of the suprarenal capsule. If these grow exuberantly they resemble typical struma of the suprarenal body. As such, they may attain quite a considerable size, as is usually the case, before they give clinical evidence of a malignant growth and even symptoms of disease.

The symptoms pointing to this affection are usually trifling and are frequently far out of proportion to the real seriousness of the condition. The tumor makes its presence known by very slight dragging pains, often radiating towards the bladder, or by a constant feeling of weight in the renal region, until finally a tumor can be palpated or hemorrhages occur. The general condition remains unchanged, while a bronzing of the skin rarely arises.

A unique case is recorded by Linser in a boy five years and nine months of age, where a tumor in the left kidney was discovered, the child having a markedly giant growth. On section the tumor was found to be malignant and of suprarenal origin.

The suprarenal body on the same side could not be found, while that over the other kidney was normal. Linser assumes that the suprarenal capsule had an influence on the general body growth and questions whether the aberrant germs of the suprarenal body had not given up their specific regulating functions, on account of the premature separation from the mother tissue.

Some authorities have raised the question of malignant degeneration, and de Paoli, for example, found a movable kidney, Braatz a movable kidney, and Busse a movable kidney in his tenth case. Grohé, in his seventh case, found the same condition, the movable kidney having been present for twenty-seven years.

Gatti considers that traumatism was the etiological factor of the tumor in his case. Eight years before the operation the patient fell on her back and right side; six years later evidences of a malignant tumor of the right kidney became apparent.

Whether these conditions have any causative relation to the malignant degeneration, or whether they should be regarded as simple coincidences, still remains undecided and then again, records of such cases are still too few. In the three cases that I here report, the cause of the malignant degeneration could not be made evident.

Symptoms resulting from the primary renal tumor may be entirely wanting, while those due to the metastases may be prominent. Among such instances may be mentioned Löwenhardt's case, already referred to, in which a tumor of the clavicle was removed and proved histologically to be a metastasis from a suprarenal tumor and at autopsy the primary growth was found. Grohé has reported the case of a patient, otherwise in apparently perfect health, who developed a tumor of the tuber frontale following a traumatism and for which he came to the clinic. By careful examination a very large tumor was discovered in the right renal region and after the growth had been removed, evidences of metastases of a malignant suprarenal growth of the kidney was found. In this case no symptoms had preceded which gave any clue as to the presence of a renal tumor, which was only found by chance during a careful examination.

The initial appearances then, due to an overgrowth of aberrant germs of the suprarenal body are in most cases so

slight and indefinite that the patient attributes little importance to them, while the symptoms are usually attributed to rheumatism.

As soon as these growths commence to develop malignantly, hemorrhage from the kidney takes place in eighty per cent. of all cases and this occurrence is what decides the patient to consult a physician. This hematuria is intermittent; frequently it arises suddenly and unexpectedly, while in other cases it results from a slight strain, as, for example, in one of our cases, where it followed difficulty in the passage of the stools, while in another it arose after palpation of the renal region. A slight dragging pain may be complained of, there is difficulty in micturition and pure blood, or blood mixed with urine, is voided; especially after cessation of the hemorrhage, vermiform blood clots are passed in the urine. Pale, colorless clots are especially characteristic, as well as those which are passed in perfectly clear urine, because they are certain to have originated in the ureter. A direct cause for the hemorrhage is not usually discovered and in most cases it apparently takes place spontaneously. In the first case which I shall report hematuria always occurred after palpation of the diseased kidney. The frequent occurrence of renal hemorrhage is easily explained by the anatomical structure of the tumors and it is to be noted that pathologically benign suprarenal tumors of the kidney may also give rise to hematuria. Grohé has given warning not to consider every renal hemorrhage as due to a renal neoplasm and he says: "It is erroneous to immediately think of a renal tumor whenever a patient presents a one-sided hematuria. Special contributions on kidney growths naturally show that hematuria is an important symptom, but, if special articles pertaining to renal diseases are carefully perused, it will at once be seen that hematuria is frequently considered as an unimportant symptom as it at once becomes evident in König's recent work, which appeared in the fifty-fifth volume of the *Deutsche Zeitschrift fur Chirurgie.*"

He also calls attention to instances of hematuria which have been met with in apparently healthy kidneys, aside from the fact that the source of the hematuria is to be found in deeper urinary passages, or on the other hand, the origin of the blood may remain a matter of doubt, at least for a certain time.

In large suprarenal tumors of the kidney, palpation will reveal them, and enormous growths have been described, but it is just in the smaller ones which are commencing malignant degeneration, and where so much depends upon an early diagnosis, that palpation is of no use. In the first two cases here reported, in spite of the fact that the tumors had attained the size of a hen's egg, and extended over the upper surface of the kidney, nothing could be made out by palpation and Küster has pointed out that palpation is rendered more difficult for the reason that usually the middle of the kidney is the seat of the tumor, because in 194 instances which have been carefully recorded the growth arose in the middle of the kidney in eighty, from the lower pole in sixty, and the upper pole in fifty-four. Consequently, on account of the hidden position of the smaller tumors, not much diagnostic knowledge can be obtained from palpation of the kidney.

As to the frequency of the various symptoms, Grohé found that out of seven cases, in five slight pain had been present over a period varying from six months to two years, in two there was no pain, in six a palpable growth had been present for from two months to three years and in one no tumor could be felt, in six hemorrhages had been present for six weeks to two years, and in one no hemorrhage had ever occurred.

The differential diagnosis is difficult and in spite of carefully considering each symptom, a diagnosis of malignant renal growth is often all that can be made, and still from the standpoint of treatment it is of the greatest importance to ascertain as nearly as possible the nature of the growth before operation. Carcinoma is the nearest tumor to the suprarenal type, clinically speaking. Nevertheless, the rare primary cylindrical cell carcinoma and the rarer instances of flat epithelial cancer arising from the epithelium of the renal pelvis, run a clinically different course from the more ordinary renal growths of the suprarenal tissue type.

As far as the difference in frequency between carcinoma and suprarenal tumors of the kidney is concerned it may be said that Grohé found, out of eleven renal neoplasms, seven times tumors of the suprarenal tissue type, one diffuse infiltrating growth and two carcinomas of the renal pelvis. Primary renal

sarcoma is still more rare, excepting the malignant renal growths met with in early childhood.

There is no difference as regards the age at which renal carcinoma occurs and those tumors originating from disseminated suprarenal germs, as both develop almost exclusively after the age of thirty.

There is one important point to be noted and that is that renal carcinoma, even more than sarcoma, gives rise to hematuria much less frequently than suprarenal growths. In them hematuria is only observed in about fifty per cent. of cases, and particularly in adenosarcoma it may often be lacking, whereas in malignant suprarenal growths it is found in about eighty per cent. of all cases.

(*To be concluded.*)

A CASE OF VESICO-INTESTINAL FISTULA.

From the Surical Clinic of Prof. Dr. von Bramann, Halle, Germany.

By Dr. Johann Mittag, Wittenberg, Germany.

THIS case has been deemed worthy of publication, because so far as I have been able to ascertain no exactly similar case has as yet been published, and as voluntary assistant to the Surgical Clinic of Halle, the case was under my direct observation.

The patient, a male 38 years of age, gave the following history. His mother had died of pulmonary tuberculosis, his father living and well. Other than the ordinary diseases of childhood the patient stated that he had always been well until 1896, during which year he was treated for cystitis, remaining in the hospital for three weeks. He left considerably improved, although not cured.

The right testicle had been swollen since the Summer of 1901 and it finally ruptured spontaneously, giving issue to a certain amount of yellowish green pus, the process resulting in a fistula. The left testicle has only become involved within the last few days according to the patient's story, because he had only noticed the swelling very recently.

It would appear that the urine had been cloudy and contained

flakes immediately after being voided for considerable time past. The patient has also noted upon frequent occasions the exit from the urethra of several small greenish-yellow drops of pus, also mixed with blood. For the past two years the stools have been frequently thin and fluid, but for the two weeks previous to entering the hospital he has suffered considerably from diarrhoea. According to the statement of the patient's physician anuria has been present for fourteen days.

Now, since such conditions are usually dependent upon an obstruction of the ureters the patient was prepared for cystoscopic examination. It was stated that the bladder was first irrigated, but when the catheter was introduced only several ccm. of a slimy chocolate colored matter was voided and which appeared to have a fecal character. The bladder contents had an extremely disagreeable odor, was only slightly fluid and in no respect did it remind one of urine. Since, however, the histological examination could not be immediately undertaken and also for the reason that such masses may be voided in advanced purulent processes of the kidney and bladder, particularly in instances of necrosis of the vesical wall, it was decided to still further irrigate the bladder.

It was very soon observed, however, that, although several litres of a borax solution were introduced, the patient did not experience the slightest discomfort in the bladder and by percussion the organ did not give any evidence of distension. On the other hand, the patient very soon gave evidences that the fluid reached the rectum because he passed several litres of liquid containing only a few particles of the contents of the rectum. Although this condition of affairs made things quite clear without any further signs that an abnormal communication existed between the bladder and some portion of the intestine and that again, even if one could locate this communication at about 1 metre above the ileo-coecal valve, on account of the amount of fluid which could be introduced and retained, it was thought nevertheless advisable to clear up all doubt that this liquid and diarrhoeal contents passed by the rectum, represented the stool. Consequently, for this purpose, some methylene blue was added to the irrigating fluid and after it had been introduced into the bladder, it was not long before the patient complained of a desire to empty the bowel and the blue

stained borax solution was expelled per rectum. Thus, the diagnosis of a vesico-intestinal fistula was demonstrated.

Since the patient had been in the medical clinic some years before, at which time he presented a liquid collection in the abdominal cavity and since also before the occurrence of the vesico-intestinal fistula he had suffered from diarrhoea, one could make with quite a degree of certainty the diagnosis of a tuberculous peritonitis and for this very reason it might be presupposed that the process which had given rise to the communication between the intestine and the bladder was of a tuberculous nature. If all this data had not been sufficient for a diagnosis, the existing tuberculosis of both testicles along with a right-sided tuberculosis of the vas deferens and seminal vesicle would have been sufficient to have settled the question.

The patient's general condition was such that any interference of long duration, such as resection of the bowel and closing the opening in the bladder, could not for a moment be considered. Consequently, the only treatment to be resorted to was to improve his strength and general condition in order, if possible, to place him in such circumstances that he might be operated upon later on.

In spite of a permanent catheter, almost all the urine passed through the intestine and was voided per rectum, from which fact it was surmised that the communication between the gut and the bladder must be large; and then again this liquefaction of the loose tuberculous stools caused them to become so thin that the patient was constantly annoyed by frequent desires to empty his rectum of its watery contents, a fact which disposed of any thought of interference by way of the rectum. Now, since the nourishment requisite to retain life could only be given with difficulty and in small quantities to such a greatly weakened patient, it was decided to give the nutrient enema through the catheter introduced into the bladder. By this means, not only the large intestine, but also the greater portion of the ileum could be used. Naturally, the enemas were composed of non-irritating substances, such as milk, unsalted flour and milk soups, with cane sugar, etc. In spite of all this the physical strength of the patient declined progressively and he finally succumbed without operation.

The most important facts of the autopsy will only be men-

tioned. The pelvis was removed along with the penis, testes and spermatic cords, as well as the ureters and kidneys. The preparation showed that the left kidney was somewhat hyperemic and had undergone a compensatory hypertrophy to a slight degree and that the pelvis of the kidney was normal. The right kidney, on the contrary, had to a certain extent an embryonal aspect, the separate renculi could be still differentiated one from another and although diminished in its entire size, it was completely filled up by caseous and partly hardened tuberculous masses down to its fibrous capsule. As was also clinically assumed, both testicles were completely disorganized by caseous tuberculous masses, while the diagnosis of tuberculosis of the vas deferens and right seminal vesicle was verified by autopsy.

Upon the serosa of the small intestine, especially of the ileum, about 1,000 miliary tubercles were scattered. The mucous membrane of the bladder could hardly be recognized as such on account of the hard, fibrous degeneration which had taken place, along with extensive epithelial defects. There was no sign of an internal sphincter, which had become completely transformed by ulcerative tuberculous processes. On the posterior wall of the bladder, just above the floor of the organ, an ulceration the size of a pea was discovered with its long axis running crosswise, while at about 1 centimetre above this, directly towards the promontory, was seen a depression about the size of a walnut which represented the communication between the intestine and the posterior bladder wall. On the posterior aspect of this depression were found three perforations about the size of a pea and through these a sound could be introduced into the obstructed intestine.

EDITORIAL.

THE PERSISTENCY OF PAIN FOLLOWING NEPHROPEXY.

IN the early part of last year, Lucas-Championnière published a clinical lecture on movable kidney, in which he reported forty-three operations followed by success. The pains stopped and the neurasthenic symptoms gave way little by little.

It must, however, be admitted that there are cases in which the expected improvement does not come about, and unsuccessful cases are found under two different circumstances, namely, when there has been a diagnostic error, that is to say, when painful phenomena are due to some disease in another organ and which have been attributed to a movable kidney; and secondly, when the kidney, after operation, has broken away from its attachments and becomes fixed in a defective position, as Taylor has recently pointed out.

An error in diagnosis is certainly frequent. Take, for example, a patient who presents both biliary colic and a movable kidney. The mistake is made by attributing the pain to the kidney, which in reality is due to biliary lithiasis. Under such circumstances it is quite natural that fixation of the kidney produces no improvement, for the simple reason that the pain is due to the process in the other organ. The same observation may be made relative to lesions of the appendix, the tubes or the ovary. One should not compromise the kidney where in reality the trouble is due to an inflammatory condition of the latter organs and for this reason, before resorting to an operation on the kidney, one should be positive as to his diagnosis.

Generally speaking, a movable kidney, giving rise to pain, will itself be found sensitive on pressure and one should be extremely reserved should a movable kidney be painless when palpated. Under these circumstances it is better practice to look for the cause of the pain elsewhere.

After operation on the kidney, the pain may persist for the simple reason that the organ has broken away from its attachments ,and in order to avoid this unfortunate result, the technique advocated by Lucas-Championnière may be followed. Carefully free the renal parenchyma and pass catgut sutures directly through it. Three groups of double sutures, sometimes even five or ten, should then be brought out through the muscles and aponeurosis and tied up as high as possible. Taylor reports the case of a woman who continued to suffer after operation; the pain soon became paroxysmal, recurring for from three to five days every month and necessitating rest in bed. The kidney was exposed a second time and was found to have become twisted and fixed low down. The organ was sutured to the last rib which put an end to the pain. In another case the pain continued after operation and a second intervention was necessary. The kidney was found fixed low down and was adherent over its entire posterior surface so that decortication became necessary. Fixation in a normal position resulted in a cure.

ABSTRACT DEPARTMENT

IN CHARGE OF

FREDERICK BIERHOFF, M.D.,

OF NEW YORK

"Thiosinamin, an Aid in the Treatment of Urethral Stricture."—REMEK. (*Centralbl. f. Erkr. d. Harn. u. Sexual Org.,* April, 1905.)

Remek employed this drug in a series of twenty cases of narrow, medium, and wide-calibred urethal strictures.

One gramme of a fifteen per cent. alcoholic solution of the drug was injected between the skin and muscles of the back, as a rule twice a week. He warns against the danger of cutaneous necrosis, as a result of intra-cutaneous injections. To avoid pain, in the injections, they employed a few centigrammes of a one per cent. cocaine solution.

The best results were obtained in medium-calibred strictures.

"A Case of Large, Congenital Vesical Diverticulum."—MEYER. (*Centralbl. f. d. Krankh. d. Harn. u. Sex. Org.,* June, 1905.)

Meyer reports the case of a male of forty-three, who had suffered from repeated attacks of cystitis over a period of twenty-five years. For two years preceding the examination, the patient had been forced to use the catheter regularly. The cystoscope revealed a large diverticulum on the right side, or a double bladder.

"On the Physical Therapy of the Urinary and Sexual Apparatus."—Laskowski (*Centralbl. f. d. Krankh. d. Harn. u. Sex. Org.,* June, 1905.)

Laskowski recommends vibration-massage in the treatment of old prostatitis with induration, prostatic neuroses, relaxation of the gland, and impotence. He further describes a modification of his prostatic percussor.

"The Treatment of Gonorrhoeal Epididymitis and Prostatitis With Mud Baths and Mud Poultices."—Schmucke. (*Centralbl. f. d. Krankh. d Harn. u. Geschl. Org.,* June, 1905.)

S. recommends these measures, which he has employed in the above variety of cases. He employs the baths at 40° C., for twenty-five minutes, on two successive days, each bath being followed by a hot pelvic bath for two hours. The treatment covers a period of several weeks. That is, in recent cases.

"Hypernephroma Renis." Kuzmik. (*Beitr. z. klin. Chir.,* February, 1905.)

Kuzmik reviews the histology, etc., of these tumors, and reports three cases. He states that hematuria is the first reliable symptom of hypernephroma. The urine is evenly discolored, and long, thin blood-coagula, showing constrictions, are not only suspicious, but, according to experience, a certain sign of this condition. The hematuria is usually preceded by a dull pain, referred by the patient to the affected side. The tumor usually causes the patient no discomfort, as long as it does not, through its large size, cause pressure, or traction symptoms. The growth of the tumor is irregular. All of K's patients had passed the fiftieth year; two were males, one a female. One male and the female recovered from the operation, the latter dying sixteen months later, of a nephritis. The therapeutic indications are extirpation of the diseased kidney, if the other kidney is healthy and capable of performing its functions properly. His preference is for the lumbar incision. The contra-indications to an operation are severe organic disease of other organs, and the presence of metastases.

"Radical Cure of Urethral Strictures by Means of the Electrolytic Needle." Selhorst. (*Dermatolog. Centralbl.,* February, 1905.)

The author describes his method of procedure as follows: The stricture is first dilated (by means of bougies, or internal urethrotomy), to 23 French, before the electrolytic treatment is begun. The urethra is then thoroughly irrigated with a solution of oxycyanate of mercury. The urethroscopic tube is passed through the entire stricture and then withdrawn until the stricture presents in the lumen of the tube. The insulated electrolytic needle, which ends in a sharp platinum point of 1½ to 2 cm. in length, is connected with the negative pole of the battery, and inserted ½ to 1 cm. deep into the strictural tissue. The current is completed by a wet sponge electrode, placed upon the thigh, and connected with the positive pole of the battery. Four to six milliamperes of current are used for about three minutes, after which the operation is repeated at another part of the stricture. Four to six treatments comprise a sitting, and these sittings are repeated at first twice a week, later weekly. Each sitting is followed by an irrigation of the oxycyanate solution. During the course of treatment, bougies are passed once a week, and followed by an irrigation of 1-4000 solution of nitrate of silver, to promote resorption, and to preserve the lumen of the urethra. The author claims that his results are excellent.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. DECEMBER, 1905. NO. 3

SOME NOTES UPON THE TREATMENT OF TUMOURS OF THE BLADDER.

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TO more than refer to the important and far-reaching results of the introduction of cystoscopy in the diagnosis and treatment of affections of the urinary tract would be an act of supererogation. That cystoscopy inaugurated a new era in this department of surgery is universally recognised by surgeons, and it is unnecessary to discuss the important part it has had in advancing our knowledge of tumours of the bladder. In this paper I do not propose to allude in any detail to the symptomatology of bladder tumours. It will suffice for my purpose to say that we now know (1) that tumours of the bladder are of much more common occurrence than was formerly supposed; and (2) that by cystoscopy their presence can be detected at a much earlier period than was previously possible.

In the treatment of tumours of the bladder, at least two problems have still to be solved. First, When is operation with a view to eradicate the disease justifiable? and second, In cases where complete removal of the disease is obviously impossible, at what period should we have recourse to a palliative operation? It is necessary to exclude from consideration in this connection the removal of the bladder in the effort to eradicate the disease and to limit the subject of removal of the tumour from the bladder. As a corollary to these, the question arises: What is the remote result of operative interference?

The greater number of malign as compared with benign growths has been insisted upon by Albarran, Clado and others, and in the series of cases which has been under my observation

this has been amply borne out. This makes the prognosis in bladder tumours grave, but they do not differ from tumours of other organs or viscera in remaining intrinsic for a considerable period, and it is recognised that they cause death not so much by extension of the disease to lymphatic glands or other organs as indirectly by producing renal insufficiency of by undermining the patient's health through sepsis, associated as it is, with pain, frequency of micturition and haemorrhage. It is because of this that palliative procedures are frequently so beneficial in those tumours which are so extensive when first seen that their removal is impossible. The life of the patient in such cases may be prolonged for months or even years.

If cystotomy be not used, the only means by which the site, attachment and approximate nature of a tumour can be determined is by cystoscopy, but unfortunately it is not possible in all cases to carry out a perfectly satisfactory examination, and not infrequently we are left in doubt both as regards the attachment and the extent of the tumour. This is in particular the case when the tumour is large or in those cases where there are multiple growths. Although the nature of the attachment cannot in all cases be determined, even approximately, yet so long as infiltration of the bladder wall has not occurred operation may be justifiable. In what cases are we justified in delaying operation? I think, first, in those which have extended from the prostate; and second, in those which are infiltrating epitheliomata.

The following cases illustrate each of these types:—1. Mr. R. aet. 58, was first seen by me in October, 1897. A healthy man, he had noticed, for the first time, three months before that without any cause and unassociated with any other symptom his urine was mixed with blood. The bleeding lasted 3 days and then wholly disappeared to recur however in 10 days. There were no clots, and the blood was bright red at the end of micturition: examination of the deposit revealed round nucleated cells and squamous cells, and his medical attendant suspected a tumour to be the cause of the bleeding. When I saw the patient the urine was quite clear. The prostate was not unduly large or hard and was regular in outline. Cystoscopy revealed an irregular mass, smooth on the surface attached to the prostate and extending on to the floor of the bladder.

In the belief that the tumour originated in the prostate and secondarily invaded the vesical wall, immediate operation was not advised.

After progress: Occasionally during the next four years bleeding occurred, but continued to be unassociated with other symptoms (thus differing from prostatic tumours). In January 1902—4½ years from the date of the first bleeding—there was profuse haemorrhage and great frequency of micturition. His general health had not suffered and he had not lost weight. The prostate showed nothing definite, was not unduly enlarged; neither irregular nor hard. On bi-manual examination the floor of the bladder felt thickened and was much indurated. Rest in bed and medicinal treatment did not improve his condition, and on March 1902 suprapubic cystotomy was performed. An extensive tumour growing from the prostate and surrounding the urethral orifice was found. It was sessile and obviously irremovable. October, 1902. The patient has been very well up to now, but frequency of micturition has been considerable. Bleeding is not great. A tumour the size of a tangerine orange projects from the wound, and the patient is beginning to lose ground. December 1902, he died. No autopsy was permitted.

Mr. S. aet. 65. In December 1901 began to pass blood with the urine, but had no other symptoms. The bleeding continued for one month. It varied in quantity but the urine was only occasionally clear during that period. Then retention occurred and catheterisation was required on one or two occasions. For four months the bleeding was intermittent and no other symptoms developed, but four months later, when I saw him, there was great frequency of micturition and he was obviously going down hill. He had very broken nights and suffered considerable pain. The urine was alkaline and contained pus and blood. On cystoscopic examination a crateriform ulcerated surface invading the left lateral wall of the bladder was observed. Suprapubic cystotomy was performed after the patient had been told that removal was in all likelihood impossible, but that relief would be given to the pain and discomfort. The tumour was found to be just as suspected from cystoscopy. Much relief to the symptoms was got, and the patient improved greatly during some weeks, but he died four months later.

In each of these cases an operation was performed to relieve symptoms and with the view that the suprapubic wound would be permanent. In the former, operation was delayed for four years during which time the patient was able to perform his ordinary work as an engineer. I believe the tumour from the first was not removable, and the absence of any need for catherisation and thus the avoidance of a septic cystitis enabled him to live in comfort. Operation at an earlier date would probably have done no good and would perhaps have been followed by sepsis and the production of pain and frequency of micturition,—conditions which would have caused a fatal result at an earlier period. The operation performed later when he was rapidly becoming weaker from pain and want of sleep together with absorption of toxines, gave much relief.

In the latter patient at the period when I saw him (eight months from the first bleeding, four months from the date when sepsis supervened) operation was necessitated by just those symptoms which in the former case came on very late in the disease.

Several similar cases have been under my care and it has been my invariable practice to advise delay in operation so long as the patients were able to live in comparative comfort and were not losing strength.

It is otherwise in those cases in which successful removal of the disease by operation is probable, as for instance in patients who have single tumours papillomatous in type whether they be sessile or pedunculated. Such tumours are usually implanted and do not infiltrate the muscle wall of the bladder. They may be villous papillomata or more solid growths with small villi on their surface. The former are papillomata with little stroma and with cells showing evidence of rapid proliferation, and are in my experience those most commonly met with in patients whose first symptom is haematuria of a profuse character. The latter do not bleed so freely but the intermittence of the bleeding is generally less—shorter periods of no bleeding being the rule. Indeed, the bleeding is often so continuous that the patient becomes alarmed and insists on treatment. Both of these forms are favourable for operative interference. My experience has been that while infiltrating carcinomata are much more frequently seen in patients over fifty years of age than at an earlier period in life, villous

papillomata occur in old persons as well as in those of early or middle life. In three instances of well marked pedunculated villous papillomata the patients were all over sixty years. The more solid sessile tumours and the markedly villous growths have been in the series of cases under my care almost equal in number in patients under fifty. The most common age for their occurrence is between thirty and forty.

Mr. I., aet. 35, first noticed blood in the urine in 1898. There was no cause for it and no other symptoms. The bleeding was intermittent and the blood came chiefly at the end of micturition and was then bright red in colour. No instrument was passed. Cystoscopy in November 1899 revealed a sessile tumour with stunted villi situate on the right lateral aspect of the bladder above the ureter. OPERATION: Suprapubic cystotomy was performed a day or two later. The growth was about the size of a walnut and was as seen by cystoscopy. It did not infiltrate the muscle wall, and I was able to clip it away along with the mucous membrane of the bladder and some muscle fibres. Since that date to the present time there has not been a symptom. Micros: papilloma.

Other patients with tumours similar in character have presented similar symptoms, have been treated by the same method, and have for varying periods up to this date remained well; but others, on the contrary, have had recurrence and a second operation has been needed. Two of these have many features of interest and their histories may be related.

Mr. D., 10th February, 1903. Patient aet. 33. Hæmaturia causeless, with no other symptom than bleeding. Cystoscopy showed multiple tumours, villous papillomata with long processes situated all around the anterior aspect of bladder wall sessile but not infiltrating. (From the age of patient I thought it possible that the tumours might be less malign than usual.) Further, that he would be able to undergo an operation of considerable length even though accompanied with much loss of blood. I advised suprapubic cystotomy. This was carried out a few days later. The tumours were large villous papillomata but implanted, not infiltrating. An endeavour was made to remove them as thoroughly as possible. There was much bleeding at the operation, but it was readily arrested by washing out with

hot water. The patient made an excellent recovery and returned home a month after operation. For nine months there was no return of bleeding, but at the end of that time there was occasional bleeding and he suffered from pain and frequency of micturition. From my knowledge of the case I advised no operative interference. The symptoms gradually got worse until twenty months after operation the frequency was so great that he got practically no sleep. There was a good deal of pain. The urine contained pus and blood and was strongly ammoniacal. He was obviously quickly losing strength and I advised suprapubic cystotomy, and performed the operation in February 1905. The bladder wall was very rigid and much thickened and over almost two-thirds of it sessile tuberculated growths were present, obviously quite impossible to remove. He made an excellent recovery. The urine became quite clear, bleeding entirely ceased, and frequency of micturition was wholly obviated by the suprapubic drainage. The condition was such that a permanent fistulous opening was indicated and this was provided for. Leakage was prevented by a special apparatus. Now, eight months since the operation, he continues well. No recurrence of bleeding or pain. He has gained weight markedly and is able to attend partially to business.

Mr., J. B., aet. 65, had for four years before he came under my care intermittent bleeding. It was suspected that the cause was a renal calculus in the right kidney, and eighteen months ago the right kidney was cut down upon, but no stone found. The bleeding continued and many clots were passed—from time to time the bladder was washed out, but without any benefit. There had been some frequency of micturition, but on the whole his one symptom was intermittent haematuria. The prostate was not unduly large. I suspected tumour of the bladder and by cystoscopy was able to see a villous growth not very large, growing from close to the urethral orifice, and extending on to the anterior aspect of the bladder wall. It was sessile and a smaller one was attached quite close to it. On bi-manual examination some thickening corresponding to the site of the tumour was detected. From the appearance I thought excision was quite possible, and I accordingly advised operation. Operation, October, 1903: Tumours found as supposed, but rather more extensive, especially

the second growth. As far as possible removed. Excellent recovery. Haematuria recurred in 9 months. Cystoscopy again used and now tumours seem to be more extensive and more intimately related to the bladder wall (micros: first tumour made up of delicate papillary processes of corium covered by several layers of more or less rounded epithelial cells). I thought so extensive that operation precluded. I advised delay in operation, and pointed out that later a palliative suprapubic cystotomy might be done. Three months later, when the frequency of pain and bleeding had so increased that his general health was suffering, I opened the bladder and found most extensive disease. Unfortunately the patient died in 48 hours from post-operative hematemesis.

The tumours in each of these were multiple and typical (naked eye and microscopically) villous papillomata. They were implanted and did not infiltrate the muscle coat, and yet in both patients recurrence or rather recrudescence and extension of the original grows occurred. The first patient, who is comparatively young is notwithstanding the recrudescence of the disease and the presence of a suprapubic fistula, at the present time not only comfortable but able to do his work. The tumours are in effect simple and if excision of the bladder were justifiable in the sense of the risk to life not being too great the disease could even yet be eradicated. It is analogous to a simple cerebral tumour situate in such a position that to operate means almost certain death. The other patient at the time of the second operation was found to have a very extensive tumour which seemed not only to have grown with great rapidity, but to have definitely begun to infiltrate the bladder wall. In this case X-ray treatment was used for a time and I believe it may have increased the rapidity of the growth of the tumour.

In these cases we may further note the actual duration of the disease. Three years in the former and four years in the latter from the time of the first bleeding. A most important question arises in such cases: Does partial removal hasten the growth? I do not think so. In the majority of cases all bleeding ceased after opening the bladder, and when the opening closed bleeding did not recur for months from the date of the operation. In one

patient eighteen months elapsed before bleeding recurred and the tumour at the second operation was much more fibrous and correspondingly less vascular than the original growth. He lived four years after the first operation.

NAEVOID TUMOURS of the bladder. Two such cases have been under my care: (1) Miss C., and (2) Mrs. W.

In both the bleeding had been extraordinarily profuse, and in both the history of haematuria was a long one. Shortly, the histories were as follows:—

Miss C., aet. 42, seen in February 1896. Five years ago without cause haematuria with clots. Retention on one occasion and catheterisation required. Bleeding intermittent. CYSTOSCOPY: Tumour size of walnut posterior to but close to the trigone. Has a thick pedicle and has phosphates over the main mass. Dilated the urethra and curetted.

In March 1898, recurrence. Suprapubic cystotomy. Tumour implanted sessile and covered with phosphates. Tumour removed and patient quite well in 1905.

Mrs. W., aet. 65, Haematuria for 12 years. No cause. Much treatment without benefit. Great anaemia. CYSTOSCOPY, January 1900. Very soft villous growth slightly raised above surface. Very localised and implanted. OPERATION. Tumour scraped away through suprapubic wound. This tumour was so soft and so little raised above the surface of the bladder it was not possible to feel it with the finger after the bladder was opened. It was just the form of tumour almost certain to be overlooked when touch was trusted to in investigating a bladder and illustrated the greater value of cystoscopy as a diagnostic agent in some cases as compared with cystotomy.

This patient remained well for three years after operation and then bleeding recurred. Cystoscopic examination showed recurrence in the form of a small extremely vascular area. Operative interference was recommended, but unfortunately the patient had a hemiplegia a month or two later and I considered operation inadvisable. She is alive at this date and haematuria, which is present, is the only urinary symptom.

The remote result of operative interference naturally varies

according to the nature of the tumour, but even in those tumours which are pathologically benign, e.g. villous papillomata, the risk of further tumour growth is considerable, however thoroughly they may seem to be excised. The patients who have been under my care have been chiefly in private practice and I have been able to trace their progress. In only three instances has a patient lived more than four years, apart from two in whom the tumour consisted almost entirely of fibrous tissue. This experience is due, I believe, to the late stage at which operation has been performed—months, and in many cases years, having been allowed to pass after the first bleeding before the operation was undertaken. Fortunately during the last three years patients have come under my care much earlier in the disease: the tumours have been smaller and the outlook after operation in these patients is much brighter.

Where the tumour has been an ulcerative epithelioma sepsis has been invariably present and in these patients death has occurred in less than six months from the date of the palliative operation. These are from the first infiltrating tumours and unless a portion of the whole thickness of the bladder wall be excised with the growth I believe operation must be necessarily futile from the curative standpoint. Unfortunately in the majority of cases of this nature excision of the part of the bladder wall invaded would be so dangerous to life as to be unjustifiable.

Conclusions. The conclusions I have arrived at from personal experience of tumours of the bladder are:—

1. In all cases of haematuria examine the bladder cystoscopically as early as possible. Symtomless haematuria is, in the majority of cases, the first symptom of vesical tumour, and early diagnosis may mean the removal of the disease at a favourable stage in its growth.

2. Pedunculated tumours are not more favourable for treatment than sessile implanted tumours of a similar nature.

3. Removal of the tumour in a certain proportion of cases can be complete, and recurrence does not take place.

4. Even if recurrence does occur the disease is delayed in its progress. The patient for a time is relieved from distressing symptoms and life is not only prolonged, but it is prolonged in greater comfort.

5. Operation should be delayed, in cases unfavourable for cure, until the symptoms are so severe that the patient's life is rendered very unpleasant and his health suffering.

6. Suprapubic drainage causes the haemorrhage to cease and by a diminution of the distressing symptoms—frequency and difficulty in micturition—makes the patient much more comfortable and prolongs life. Permanent fistulae can have apparatus so fitted that distress from leakage of urine is almost entirely obviated.

7. Operation in the later stages of the disease, when sepsis is present and the symptoms are aggravated, and the patient suffers from toxic absorption, gives great relief.

8. In all cases of vesical tumour, whether the operation be curative or palliative in its object, the suprapubic route is the best to adopt.

11 Rutland Street.

THE RESULTS OF INTERNAL URETHROTOMY WITH BAZY'S MEASURING URETHROTOME, BASED ON FORTY-TWO CASES.

From the Beaujon Hospital, Paris, service of Dr. Bazy.

By Dr. F. Joly.

EVERY stricture of the urethra does not require urethrotomy, because progressive dilatation with ordinary sounds or Beniqué's bougies will often suffice in mild structures with slightly indurated walls, the sclerogenous process being still at its commencement, while the stenosis has not become definitely and irremediably formed, and likewise other strictures which, a priori, are not suspected of being dilatable.

However, many are the indications for urethrotomy, and, as has been said by Forgue, in the seventh volume of the *Traité de Chirurgie,* " it must be done when dilatation is insufficient or injurious, when one is dealing with old tight strictures, and above all those aged by tentatives at dilatation, and indurated by a badly directed treatment for an old urethritis. Under these circumstances, a dilatation is useless and still more would be injurious in the so-called irritable types, which bleed ever time a catheter is passed, producing exacerbations of urethritis and cystitis, with temporary urinary retention. And still more, urethrotomy becomes imperative when one is dealing with a urethra which is sclerous and stenosed over a large extent, when periurethral inflammatory indurations form an imminent danger from urinary abscess; when incontinence of urine shows the presence of a dilatation behind the stricture with all its train of mechanical and infectious complications, such as passive distension and sclerosis of the bladder, upon which chronic cystitis becomes grafted, and above all, ascending infection of the renal pelvis and kidney, which is made evident by cloudy polyuria, especially nocturnal, dyspeptic and general symptoms, which ordinarily terminate the evolution of affections of the lower

urinary tract, when acute infectious accidents, with repeated chills and high elevation of the temperature, do not make urethrotomy an imperative operation."

Consequently, for many years the idea of cutting urethral strictures has preoccupied the minds of surgeons and the enormous number of instruments invented is quite sufficient to indicate the important place that the operation has held in surgical therapeutics. The cutting sound of Ambroise Paré, Physic's urethrotome, invented in 1795, represent the first stage in the development of urethrotomy. In more recent years numerous instruments have been devised; some, like those invented by Arnott, MacGhie, Amussat, and Leroy d'Etiolles, are intended only to make multiple and superficial sections of the stricture; others are constructed so as to freely incise the entire thickness of the urethral walls without limiting their action to the strictured part alone.

As I am only desirous of considering instruments of recent date, it becomes necessary to establish a distinct division among urethrotomes. Some, among which Maisonneuve's instrument is the type, cut the stricture from in front backwards; others, after having passed through the strictured portion without attacking it, section it from behind forwards while withdrawing the instrument. The first of this type, invented by Ricord, Reybard and Civiale, were far too voluminous, so that the instrument could not be passed through the stricture and the operation became impossible; or the instrument passed through it with ease, and the section was consequently made in a slightly developed stricture, where dilatation alone would have been quite sufficient. To this class of instrument belongs that of Desnos, Albarran and Bazy.

Maisonneuve's urethrotome is certainly the instrument whose fortune has been the greatest and which had a decisive influence upon the destiny of urethrotomy. It had over its predecessors the enormous advantage of a metallic conductor, which was guided by a conducting bougie, thus avoiding making false passages, a thing which was always possible with those instruments which had been invented previously. The cutting blade, with its blunt apex, directed with all desired security in the groove of the conductor, should, according to the idea of its

inventor, only cut the stricture, and respect those parts of the urethra whose calibre was normal and whose mucosa was soft and non-indurated.

Performed with this instrument, urethrotomy certainly gives excellent results in the vast majority of cases, but it is, however, subject to numerous criticisms, the following being the most important: (1) Maisonneuve's urethrotome is a blind instrument, which is introduced armed and ready to functionate at any point from the meatus to the bladder, and whose action cannot be graded according to the degree of the stricture if several of various calibres are seated along the canal. In spite of the construction of the blade it cannot always pass through the healthy portions of the urethra with impunity and from autopsies made by Voillemier, and more recently by Bazy, it has been demonstrated that the urethral mucosa has been sectioned along its entire extent. This is one of the important causes of hemorrhage observed after urethrotomy with this instrument, because an incision has been made into vascular tissue, especially when the prostatic portion has been involved, while the strictured part, where sclerosis has choked up the vessels, may be slit up with impunity without giving rise to hemorrhage. (2) Since the apex of the triangular blade is blunt, this blunt part pushes the tissues before it and results in their contusion and the formation of erosions. This explains why a sensation of resistance is felt, often considerable, when a stricture is cut with this instrument. (3) And still more, although this instrument may avoid the healthy portions and only cut those points where the calibre of the urethra is reduced, it may happen that in passing it will leave a parietal fibrous band intact, and the same thing may be said of the mild type of stricture, which has been termed "retrecissement large" by Guyon and Albarran. From all this arises the inefficiency of this urethrotome, because, as Forgue says, in the work already alluded to, "every time that a projection is encountered in the urethra after a urethrotomy, and against which the olive point of the bougie comes in contact, and every time that a full and regular calibre has not been re-established, a recurrence should be awaited." (4) This is not all, because the necessity of withdrawing the cutting blade, after section of the

stricture, necessitates a second passage of the instrument through the same cut, and from the very shape of the apparatus, with its single groove, only allows the section of a single wall, usually the upper, or at least only the upper and lower, and here, if this is done, it is necessary to change the grooved conductor and the cutting blade. Let me add that section of the lower wall is usually useless, always dangerous, and consequently should be absolutely proscribed.

Now, since the process of cure of strictures following urethrotomy has been demonstrated, it is known that it is necessary to make as many sections as possible, multiplying the points of section in the circumference of the stricture, so that later on dilatation may be rendered more efficacious. By cutting through the entire thickness of the stricture, and even the periurethral tissues, Reybard intended to intercept a band of healthy tissue in the urethra, consequently supple tissue, in the midst of the inelastic tissues of the stricture. A manoeuvre such as this, however, was not exempt of considerable danger, and, at the present time, the end to be attained is a different one. The section does not extend beyond the thickness of the tissues composing the stricture and the re-establishment of the calibre of the canal must be obtained by only acting on the diseased tissues.

Now, what takes place in the wound of the urethral walls? During the days following the operation an inflammatory process occurs, with an intense diapedesis and a marked embryonal neoformation. At the commencement this neoformed tissue is supple and consequently can be dilated and the more there is of it in the circumference of the stricture, the more efficacious will be future dilatation, from which comes the conclusion that the more useful will be the operation the greater the number of sections made, a thing which cannot be done with Maisonneuve's instrument. (5) The impossibility of making multiple sections offers a last inconvenience, namely that in cases of tight stricture, in a very sclerous and undilatable canal, a single section of the stricture increases its lumen very slightly and when the metallic conductor is withdrawn the greatest difficulty in introducing a permanent catheter will be encountered, whose opened end will hit against and become arrested at the stricture which has been insufficiently and irregularly dilated, an obstacle that

can be avoided by resorting to multiple sections at several points of the circumference of the stricture. To sum up Maisonneuve's instrument has the great drawback of only making a single section, which is often insufficient, and of injuring the mucosa of the prostatic urethra, whose section will frequently give rise to very serious hemorrhage.

For all these reasons surgeons have been brought to substitute the blind and dangerous cutting from in front backwards, for the inoffensive and methodical section from behind forwards, as well as making multiple sections which allow very much greater dilatation without injuring the healthy structures.

The first instrument constructed with this end in view was the urethrotome of Civiale (1848), preceding a few years that of Maisonneuve (1855), and which is subject to three serious objections. If straight it can, in point of fact, section any part of the urethral wall, but it is not furnished with a conducting bougie, from which the possibility arises of making a false passage. Another objection is that by its shape it hugs poorly the curves of the canal and consequently its mere introduction is painful. Lastly it presents the serious inconvenience of being too large and from this fact it cannot be pushed through tight strictures whose lumen is less than No. 14 of Charrière's scale.

In order to obviate these defects Albarran had an apparatus constructed which presents the following advantages: (1) That of cutting from behind forwards; (2) making multiple sections; (3) a conducting bougie can be screwed on; (4) it presents a very small calibre, corresponding to No. 8 Charrière, which allows it to pass through the tightest strictures; (5) by an ingenious arrangement the instrument is supplied with a jointed blade which can be made to project to the desired height. Thanks to this arrangement one can approximately limit the effects of the blade to the strictured portions alone.

But besides these undoubted advantages, this urethrotome presents certain objectionable points. Two types have been constructed. The first is straight, useful in ordinary cases, but the introduction of which is difficult and painful, as is the case for Civiale's instrument. The second type is curved and intended especially for traumatic strictures, resulting in a lesion to the lower wall of the urethra which it can readily attack, but the curve

being adapted to the prostatic urethra, prevents rotation of the instrument in the canal and consequently the lateral, and especially the upper walls of the stricture cannot be cut. And lastly these instruments cannot be made to cut wide strictures and in order to do away with this defect, Albarran was obliged to construct a third type, the so-called dilating urethrotome, thus necessitating much complication in instrumentation. Another drawback to Albarran's urethrotome is that it must be manoeuvred altogether at once in order to cut the stricture. The cutting blade certainly comes out at the operator's will, but does not slide in a grooved conductor solidly held by an assistant, as is the case for the urethrotome of Maisonneuve or Bazy.

All the urethrotomes which I have considered present the defective point of being blind instruments to handle, or at any rate they do not exactly measure the extent of the stenosed portions which must be cut. Without any doubt, Albarran's urethrotome represents great progress by limiting the effects of the blade to the stricture alone, but it necessitates very great experience in its management. In the first place, according to the inventor's own words, one must explore the stricture with the non-cutting portion of the blade, after which by a continued and stronger pressure the stricture is cut. Consequently, great manual dexterity must of necessity play a great part in this manoeuvre, a thing which is very advantageously replaced by the measuring attachment, a capital point in Bazy's urethrotome. This instrument can be made to make all incisions that are desired and at all points in the circumference of the stricture, while it only cuts through the desired portions.

As in Maisonneuve's instrument, the blade slides in a groove, which gives all the required security in making the section, as well as all desirable precision. The instrument is constructed as follows. (Fig. 1.)

A grooved conductor which can be screwed on a conducting bougie as in Maisonneuve's instrument; this conductor is slightly curved at its end, like the beak of a slightly curved sound. The curved portion is not grooved. The instrument measures about thirty centimetres. The straight and curved portions of the instrument are separate and are united together by a joint in such a way that the curved portion remaining

immovable allows the straight part to execute movements of rotation. Now, supposing that the curved portion is introduced into the prostatic urethra with the beak directed upwards, the groove of the instrument is also directed upwards, but it can be made to turn in any position that may be desired. The blade is made to travel along the groove of the conductor.

The knife is composed of two small blades measuring about one and one-half centimetres each, and articulated in such a way that they may be placed end to end, or, on the contrary, may be made to form a more or less acute angle; from this it follows that this jointed knife, which is straight, may be given a triangular shape, and thus be made to rise more or less above the

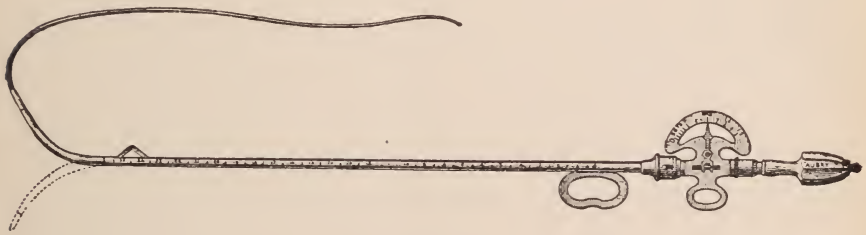

Fig. 1

grooved conductor which directs it and consequently, according to the acuteness of the angle the incisions into the stricture will be more or less deep.

Now, in order to obtain this result the part of the instrument which carries the blade is composed essentially of two rods, one upper and one lower, the latter being a single piece. The upper one carries a compound knife at its vesical extremity, composed of two blades which are jointed together. The blade nearest the bladder articulates with the bladder end of the lower rod. Now, let it be supposed that these two rods are made to move parallel to each other, the result will be the raising up of the two blades, thus forming a more or less obtuse triangle, which will project more and more.

If the upper rod is pushed towards the bladder end of the instrument, both blades are raised and if it is drawn backwards, both blades become straight, and are hidden in the groove of the conductor.

Another instrument in every way the same as the one just

described, also has two blades, which may be raised and hidden in the same way, but instead of being sharp, the blades of this instrument are blunt and this is used for measuring the seat, the number and length of the strictures.

The measuring instrument and the cutting instrument are both furnished with an indicator which measures the height reached by the blades above the level of the grooved director. Besides this the rods carrying the blades either of the measuring or cutting urethrotome, are graduated in centimetres so that one can know exactly how far down the blades are in the urethra.

The construction of the instrument having now been explained, we will consider the manner of employing it. After having taken the ordinary antiseptic precautions the patient is anesthetized, the grooved conductor with the measuring blades is introduced into the urethra. It should be pushed down deeply so that the curved part will be situated in the prostatic urethra and in order to do this, the patient being in the dorsal decubitus, the rod is held horizontally and is then solidly held by an assistant. The measuring blades are then made to project about ten or twelve millimetres, and the instrument is drawn outwards until it becomes arrested. The point at which it becomes arrested should be noted on the graduation of the rod, in other words, how many centimetres one has been obliged to withdraw the rod. Let us suppose that this has been found to be one and one-half centimetres. The measuring blades are then pushed back in the groove and the instrument is withdrawn to the extent of eight to ten centimetres. The blades are again made to project and the instrument is pushed back toward the bladder, being arrested after following a more or less long course; the length of the instrument, which has remained outside the meatus, is then noted, let us suppose this to be nine centimetres, and by a very simple calculation ($9\text{-}11\frac{1}{2}$) the length of the stricture is given. Consequently the cutting urethrotome should incise from the one and one-half centimetres to the nine centimetres, but it is possible that between these two points there are no other strictured portions, and, in order to ascertain this, the measuring urethrotome is pushed back closed to a certain depth, and the blades are then made to project, which can or cannot be done. If they cannot be made to project it shows that one is in the

midst of the stricture and then one should try another point of the canal. If the blades can be made to project it shows that the instrument is in a healthy portion, and with the blades still projecting the instrument is moved backwards and forwards. One can then ascertain that there is a more or less considerable space of healthy urethra between the two extreme points. For instance, it may be found that the healthy portion extends from the fourth to the seventh mark. Consequently, one must incise from the one and one-half to the fourth, and from the seventh to the ninth mark. Consequently, all that is necessary is to change to the cutting urethrotome.

Three incisions are usually made in each stricture, one below and to the right, one below and to the left, and the third in the middle line above. Since at the first incision the canal is only slightly opened, the blade is made to project about six and one-half millimetres, which corresponds to No. 20 Charrière, and the incision is then made at the desired points. In order to do this the groove is turned so that it faces the right lower lateral portion of the stricture, and when the incision has been made here it is turned to the same position on the left, but here the blades are made to project about eight and one-half millimetres; and, lastly, for the third incision they are made to project at least ten millimetres. As a matter of course, the blades are returned into the groove between each incision.

As may be seen, Bazy incises much deeper than with the blade of Maisonneuve's urethrotome, which only projects to the extent of No. 23 Charrière, and nevertheless, although these incisions are deeper, and although there are three instead of one, there is always much less hemorrhage than with the Maisonneuve instrument, which in reality gives rise to very little.

The calibre of the grooved conductor is oblong, and at its greatest diameter it measures No. 11 Charrière, and at its smallest No. 9. On the other hand it is smaller than the smallest bougies of Lefort's dilator, which corresponds to No. 12 Charrière.

We will now rapidly review the cases of urethrotomy performed by Dr. Bazy, with his urethrotome, the first nineteen being taken from the Beaujon Hospital; the remainder are private cases.

Case 1. Patient fifty-three years of age. August 7, 1900. Gonorrhoea at the age of thirty. Exploration: very tight stric-

ture. Bougie a demeure for three days. Stricture measures 2 centimetres. Sections: lower right lateral 6½ millimetres, lower left lateral 8 millimetres, upper median 10 millimetres, sound No. 17 Charrière. Cocaine anesthesia. Consecutive dilatation.

Case 2. Patient forty-eight years old. December 20, 1900. Gonorrhoea at 21, morning drop. Exploration: filiform bougie. Measurements: stricture 7 centimetres long. Sections: lower right lateral 6 millimetres, lower left lateral 7½ millimetres, upper median 9 millimetres. Sound No. 16. Consecutive dilatation.

Case 3. Patient thirty-nine years old. March 12, 1901. Gonorrhoea at twenty, gleet. Exploration: filiform bougie, stricture measures 5 centimetres. Sections: lower right lateral 6½ millimetres, lower left lateral 8½ millimetres, superior median 10 millimetres. Sound No. 17. Dilatation.

Case 4. Patient forty-five years old. October 24, 1901. Gonorrhoea at twenty-five years. Exploration: bougie No. 10 passes. Stricture 5 cm. long. Sections: right lower lateral 8 mm., left lower lateral 9½ mm., median superior 10½ mm. Sound No. 16. Dilatation.

Case 5. Patient twenty-nine years of age. January 12, 1901. Gonorrhoea at twenty years. Exploration: filiform bougie, stricture measures 5 cm. Sections: right lower posterior 6 mm., left lower posterior 8 mm., upper median 10 mm. Sound No. 17. December 27, bougie No. 20.

Case 6. Patient fifty-five years of age. January 2, 1902. Three gonorrhoeas. First urethrotomy in 1884, second urethrotomy in 1886, and the third in 1886. Exploration: filiform bougie. Stricture measures 1 cm. in height, 5 cm. in length; in the middle of the stricture is a free space 1 cm. in length. Sections: right posterior 5 mm., left posterior 5 mm., superior median 8 mm.; incisions difficult to make. Open end catheter No. 14 cannot pass and a bougie No. 14 passes with friction. Dilatation up to No. 47 Beniqué.

Case 7. Patient forty-two years of age. January 25, 1902. Two gonorrhoeas. Exploration: filiform bougie passes; stricture measures 1 cm. in length, 1½ in height. Sections: right lower 5 mm., left lower 7 mm., superior median 9 mm. Sound No. 15 passes easily. Dilatation.

Case 8. Patient sixty-seven years of age. January 26, 1902. Gonorrhoea in 1889. Exploration: filiform bougie passes, stricture measures from 1½ to 7 cm. Sections: right posterior 6 mm., left posterior 7½ mm., median superior 9 mm. Sound No. 16. February 2, bougie No. 18 passes easily. February 8 bougie No. 20, February 20 Beniqué No. 46, and March 8 Beniqué No. 48.

Case 9. Patient twenty-nine years old. April 16, 1902. September 3, 1901, was operated on by external urethrotomy for ruptured urethra and periurethral phlegmon. Exploration: April 10, 1902, No. 10 passes. Length of stricture 1 to 9. Section: right lower 6½ mm., left lower 8 mm., superior median 10 mm. Sound No. 15 a demeure. April 26, bougie No. 18, May 1 bougie No. 21, May 3 Beniqué No. 43, May 5 Beniqué No. 44, May 13 Beniqué No. 46, October 16 foul urine. November 6, urethrotomy for urinary infection. December 20 Beniqué No. 53.

Case 10. Patient 45 years of age. May 16, 1902. Two or three gonorrhoeas, syphilis in 1895. Exploration: No. 12 passes, stricture measures 4 cm. Sections: right posterior 6½ mm., left posterior 8 mm., superior median 9½ mm. Sound No. 16. Dilatation. September 13 bougie No. 17, September 15 No. 19, October 1 Beniqué No. 43, October 8 Beniqué No. 49, October 20 Beniqué 51, July 2, 1903, Beniqué No. 49. Dilatated up to No. 60.

Case 11. Patient sixty-seven years of age, June 9, 1902. Many gonorrhoeas. Exploration: No. 12 passes; measurements show 1 to 3, 4½ to 9. Sections: posterior right 8 mm., posterior left 9 mm., superior median 10 mm. Sound No. 16. Dilatation.

Case 12. Patient forty-five years of age. June 16, 1902. Gonorrhoea. Exploration: filiform bougie, measurements 1 to 8. Sections: right posterior 6 mm., left posterior 8½ mm., superior median 10½ mm. The anterior part of the stricture is harder and tighter than its posterior part. Sound No. 16.

Case 13. Patient fifty-two years of age. July 1, 1902. Gonorrhoea at twenty-five years of age, gleet. Exploration: No. 16 becomes engaged, filiform passes. Measurements 2 to 6. Sections: right posterior 6 mm., left posterior 8 mm., superior median 10½ mm. Although the patient presented many varicose

veins, hardly a few drops of blood were lost. Sound No. 16. July 21 bougie No. 23, July 24 bougie No. 24, July 26 Beniqué No. 50, July 28 Beniqué No. 52, August 2 Beniqué No. 55, August 4 Beniqué No. 56.

Case 14. Patient forty-seven years of age. July 2, 1902. Traumatic stricture. Exploration: filiform passes, length of stricture 5 cm. Sections: right posterior 7 mm., left posterior 8½ mm., superior median 10½ mm. Stricture harder at its anterior than its posterior portion. Sound No. 16 a demeure. Dilatation.

Case 15. Patient fifty-three years of age. July 9, 1902. Gonorrhoea at eighteen and twenty-two years of age. Exploration: No. 10 passes, stops at the root of the scrotum where No. 6 passes. Measurements 2 to 9½, in the middle of the stricture is a free space measuring 1 cm. Sections: right posterior 7 mm., left posterior 9 mm., superior median 10½ mm. Sound No. 16. Dilatation. August 4 bougie No. 18, August 13 Beniqué No. 46, August 18 Beniqué No. 48, August 25 Beniqué No. 53.

Case 16. Patient fifty-four years of age. July 26, 1902. Gonorrhoea at thirty years of age, never cured. Cystitis. Exploration: No. 9 passes. Sections: right posterior 7 mm., left posterior 9 mm., superior median 10½ mm. Permanent catheter introduced over the conductor passes tightly through the stricture, a portion of which has not been cut. During the cutting there must have been some slight error in reading the measurements. Sound No. 14 a demeure. Dilatation. August 13 bougie No. 21, August 18 bougie No. 22. Patient was not seen again until February 2, 1903. Cloudy urine. Irrigation. Salol. Urotropin. November 23, 1903, irrigation. Salol. Urotropin. June 2, 1904, same treatment. September 1, 1904, urinary abscess in perineum. Incision, recovery.

Case 17. Patient forty-nine years of age. October 20, 1902. Gonorrhoea at twenty-five years of age. Exploration: No. 10 passes. Measurements 1 to 9. Sections: right posterior 6 mm., left posterior 9 mm., superior median 10½ mm. Sound No. 16 a demeure. Dilatation up to Beniqué No. 47. In 1903 dilatation up to Beniqué No. 50.

Case 18. Patient thirty-one years of age. October 29, 1902. Gonorrhoea at twenty-one years of age. Exploration:

No. 6 passes. Measurements 1 to 6. Sections: right posterior 6½ mm., left posterior 7½ mm., superior median 10½ mm. Sound No. 16 a demeure. Dilatation. November 19 bougie No. 19, November 24 Beniqué No. 42, December 14 Beniqué No. 46.

Case 19. Patient thirty years of age. November 6, 1902. Gonorrhoea at twenty years of age. Urethrotomy at twenty-eight. Exploration: filiform bougie passes. Measurements 5 to 10 cm. Sections: right posterior 5 mm., left posterior 6½ mm., superior median 10½ mm. Sound a demeure. Dilatation up to Beniqué No. 46.

Case 20. Patient sixty-three years of age. November 19, 1902. Gonorrhoea at thirty years of age, gleet persisting for several years. Exploration: bougie No. 10 is arrested in the scrotal region. Filiform passes. Measurements 1 to 8. Sections: right posterior 7 mm., left posterior 9 mm., superior median 11 mm. Sound No. 16. Dilatation.

Case 21. Patient thirty-eight years of age. December 24, 1902. Gonorrhoea at twenty-four years of age. Exploration: No. 10 stopped at the scrotal region. Filiform passes. Measurements from 2½ to 5½ and from 8 to 10. Sections: right posterior 4 mm., left posterior 7 mm., superior median 11 mm. Sound No. 16 a demeure. Dilatation.

Case 22. Patient forty-three years of age, February 16, 1903. Gonorrhoea at eighteen and at twenty-three years of age. Exploration: No. 8 passes. Measurements from 1 to 7. Sections: right posterior 7 mm., left posterior 9 mm., superior median 11 mm. Open end sound could not be passed, olive pointed No. 14 passes. Dilatation. February 24 bougie No. 18, February 26 bougie No. 20. Continued until Beniqué No. 48 reached.

Case 23. Patient thirty years of age. May 7, 1903. Gonorrhoea at twenty years of age. Exploration: No. 12 stopped at 1½ cm. from the meatus, No. 6 passes after a short time of arrest at the perineum. Measurements from 1 to 3½ and at 6 from the meatus. Sections: 7 mm., 8½ mm., and 10½ mm. Sound No. 16 a demeure. Dilatation. On February 20 again underwent urethrotomy by Dr. Tuffier. Dilatation.

Case 24. Patient fifty years of age, November 12, 1903.

Gonorrhoea at thirty years of age. Hematuria. Exploration: No. 18 arrested at the meatus, No. 12 at the scrotum, No. 6 passes. Measurements show a small posterior band and then a stricture measuring 1 to 5. Sections: 7 mm., 8 mm., 11 mm. Sound No. 16. November 24 bougie No. 18. Discharged November 26.

Case 25. Patient fifty-five years of age. December 1, 1903. Many gonorrheas. Exploration: No. 17 arrested at 1 cm. from the meatus, No. 12 at the root of the scrotum, No. 8 in the deep perineal region, filiform passes. Measurements 2 to 8. Sections: 8 mm., 9mm., and 10 mm. Sound No. 17. Dilatation the following days until Beniqué No. 45 was almost reached. May 14, 1904, cystitis, instillations. Dilatation up to No. 60 Beniqué.

Case 26. Patient fifty-one years of age. December 16, 1903. Two gonorrhoeas. Exploration: No. 20 stopped in front of the scrotum, No. 7 stopped at the root of the scrotum, filiform passes. Measurements 1½ to 5 and 8 to 10, the latter allowing the passage at 10½. Sections: first stricture, 8 mm., 9½ mm. and 11½ mm.; second stricture, 11½ mm., on the anterior wall alone. Sound No. 17. January 7, 1904, dilatation up to No. 41 Beniqué. January 21, urine cloudy. Nitrate of silver, irrigations, salol and milk. February 18, bloody urine. Dilatation. During 1904 dilatation resorted to several times, irrigations and salol. January 12, 1905, urine cloudy, but patient empties bladder. Urotropin. Irrigations, milk diet, nitrate of silver instillations. February 16, 1905, urinates every three hours, continues salol and irrigations.

Case 27. Patient thirty-nine years of age. December 19, 1903. Gonorrhoea at twenty years of age, morning drop. Exploration: No. 16 arrested at the anterior perineal region, filiform passes with difficulty, allowed to remain a demeure. Measurements 1½ to 5½. Sections: 8 mm., 9½ mm., and 11½ mm. Sound No. 16 a demeure. Dilatation. Discharged December 24.

Case 28. Patient thirty-six years of age. December 21, 1903. Gonorrhoea at twenty-two years of age, never cured. Exploration: No. 6 passes. Measurements 3 to 12. At point No. 9 the measuring instrument can be opened up to 10½. Sec-

tions: incision 10½ millimetres on superior wall on account of the presence of a small perineal fistula following the incision of an abscess.

Case 29. Patient 38 years of age. February 25, 1904. Gonorrhoea at 22 years of age. Four times suffered from infiltration of urine. Forced dilatation by Dr. Routier. Exploration: No. 7 passes with difficulty. Filiform a demeure. Measurements 1 to 7. Sections: 7 mm., 9½ mm., and 11 mm. Sound No. 17 removed on the fourth day. A cloudy fluid flows from the urethra coming from a tumefaction seated at the root of the scrotum. March 6, by pressure a few drops of cloudy liquid can still be made to flow, but the induration is much less extensive. March 14 salol and irrigations. March 24 urine purulent, salol and irrigations.

Case 30. Patient 65 years of age. August 19, 1904. Gonorrhoea at 28 years of age. Exploration: filiform bougie a demeure. Measurements 1½ to 5½. Sections: 8 mm., 8 mm., and 9 mm. Sound No. 16. Dilatation. October 17 urine cloudy, instillations. Beniqué No. 51. The next higher number produces bleeding. January 9, 1905, urine cloudy, irrigation and dilatation.

Case 31. Patient 55 years of age. October 17, 1904. Gonorrhoea with chordee, rupture of the cord. Exploration: No. 12 arrested in the scrotal region, No. 8 at the perineal region. Twisted filiform bougie passes. Measurements from 0 to 2 and from 5 to 7. Sections: 7 mm., 9 mm., and 11 mm. Open end catheter No. 17 cannot pass, being arrested at the root of the penis, sound No. 14 introduced. October 19 sound removed. October 27 dilatation, bougie No. 16, October 29 No. 18 passes.

Case 32. Patient 40 years of age. November 5, 1904. Gonorrhoea at 23 years of age. Exploration: No. 8 passes. Measurements 2 to 11. A healthy space between 6 and 7. Sections: 7 mm., 9½ mm. and 11½ mm. Sound No. 16. November 20 bougie No. 21, December 6 bougie No. 23, December 26 Beniqué No. 48 and January 9 Beniqué No. 52.

Case 33. Patient 33 years of age. November 6, 1904. Gonorrhoea at 20 years of age. Exploration: filiform bougie a demeure. When the bougie was removed the instrument could not be passed until a urethral injection of oil of vaseline had been

given. Measurements 3 to 5½. Sections: 7 mm., 9 mm. and 11½ mm. Open end sound No. 17 passes easily. November 20 bougie No. 20, December 5 Beniqué No. 46 and January 15 Beniqué No. 48.

Case 34. Patient 32 years of age, November 17, 1904. Gonorrhoea 3 years ago. Exploration: No. 20 stopped just behind the meatus; No. 12 arrested at the root of the penis; No. 6 passes with friction. Measurements from 1 to 10. Sections: 7 mm., 9 mm. and 11½ mm. The patient bled a little more than usual, because he had undergone tentatives at dilatation and had had a sound a demeure. Sound No. 16, a demeure for 48 hours. November 19 urethrorrhagia has stopped. January 16, 1905, urine clear with a few filaments. Irrigations and Beniqué up to No. 52. February 25 urine clear, two instillations a week.

Case 35. Patient 40 years of age, November 28, 1904. Three or four gonorrhoeas. Inveterate gleet. Exploration: all the instruments are arrested in the bulbous region. Filiform bougie passes. Measurements 1 to 3. Sections: 7 mm., 9½ mm., and 11½ mm. Sound No. 16 passes easily. December 19 urine cloudy. Dilatation. Bougie No. 20. December 31st bougie No. 24, January 9, 1905, irrigation and massage, January 16th irrigation and massage, January 25th Beniqué and instillation.

Case 36. Patient 52 years of age. December 3, 1904. At 28 years of age. Exploration; filiform bougie passes. Measurements 2 to 7. Sections: 8 mm., 10 mm. and 11 mm. Sound No. 18. January 10, 1905 bougie No. 19, January 24 bougie No. 20 and January 31 Beniqué No. 46.

Case 37. Patient 61 years of age, February 2, 1905. Gonorrhoea at 18 and 23 years of age. Gleet. Exploration: bougie No. 8 arrested at the root of the scrotum. Measurements 1 to 3 and 5 to 7. Sections: 8 mm., 9½ mm. and 12 mm. Sound No. 16. Dilatation. February 10 bougie No. 20.

Case 38. Patient 54 years of age, February 6, 1905. Gonorrhoea at 28 years, not treated. Exploration: bougie No. 9 arrested at the scrotal region. Measurements 1 to 9, in the middle a free space of 1 centimetre. Sections: 9 mm., 10½ mm. and 11½ mm. Sound No. 16 passes easily. Dilatation. February 20 Beniqué No. 42.

Case 39. Patient 57 years of age, February 13, 1905.

Gonorrhoea at 22 years of age. Exploration: bougie No. 8 passes with hard friction. Measurements 7 cm. Sections: 8 mm., 10 mm. and 12 mm. Sound No. 16.

Case 40. Patient 60 years of age. Complete retention, bougie a demeure does not enter the bladder. Imperative internal urethrotomy. Exploration: perineal stricture 3 centimetres long. Sections: 7½ mm., 9 mm. and 11 mm. Retention lasted fifteen days, necessitating the passage of the catheter three times daily. Recovery. Died two years later from pneumonia.

Case 41. Patient 30 years of age. April 8, 1904. Congenital stricture. Micturates by overflow, diurnal and nocturnal incontinence. Exploration: only a filiform bougie can be passed, but on the next day a metallic bougie with a blade can be introduced which was at once replaced by the cutting bougie of Bazy's urethrotome. Measurements stricture 4 cm. long. Sections: 7 mm., 9 mm. and 11 mm. Patient seen in October. Bougie No. 20 passes easily.

Case 42. Patient 63 years of age, June 1903. Infected, fever, retention. Imperative internal urethrotomy. Exploration: stricture 5 cm. in length. Sections: 7 mm., 9 mm. and 11 mm. Only a drop or two of blood. Recovery.

From all that has been said we may conclude that the principal reproach that may be made against the various urethrotomes in general is the impossibility or difficulty of exactly measuring the stricture and consequently the risk that one runs of cutting the healthy portions of the urethra. With Bazy's instrument one can exactly determine the seat, length, calibre and number of strictures. His urethrotome, contrary to that of Maisonneuve, will only cut the stenosed tissues and respects the healthy parts. No hemorrhage occurs, although three incisions are made, because fibrous tissue alone is cut. It allows one to introduce a sound of quite large calibre, generally No. 16 Charrière and in almost all the cases operated on the increase in calibre of the urethra obtained has been quite sufficient without any danger of recurrence.

RENAL NEOPLASMS ORIGINATING FROM ABERRANT SUPRARENAL TISSUE GERMS.

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(*Conclusion.*)

RENAL carcinoma occurs as an infiltrating tumor, which frequently gives rise to a very extensive growth, the kidney retaining its shape, while in adenosarcoma it is apt to be lobulated, but not in the same way as smaller suprarenal tumors which are at the beginning of malignant degeneration, and which appear as characteristic growths prejecting above the renal parenchyma.

The differential diagnosis may be considerably aided by palpation, but which, as already mentioned, is rarely satisfactory. In the extremely rare carcinomas arising from the renal pelvis, however, which, in their further course may give rise to growths detected by palpation, symptoms of renal retention with all its results, severe attacks of pain and alternating swelling of the tumor will be in evidence.

Carcinoma of the kidney, while still small, contracts adhesions with the surrounding parts and, for this reason, gives rise to considerable difficulty in removal by nephrectomy, whereas, renal tumors of the suprarenal type are easily shelled out.

The development of renal cancer is slow and frequently only gives rise to metastases late in its progress, or they may be for a time localized in the neighboring lymphatics, although extension into the veins is occasionally met with, whereas malignant suprarenal tumors produce matastases at a very early date in their development, the distant organs becoming involved almost exclusively by way of the vascular system.

If, in a patient who is near the prime of life, an intermittent hematuria occurs and which is proven by cystoscopy to be of renal origin, and at the same time there is little or no pain and no renal retention, and if the hematuria cannot be accounted for by the presence of any other disease of the kidney, it is probable that one is dealing with the suprarenal type of growth. If to this a tumor

can be palpated which is distinctly limited from the kidney tissue the probability then becomes a certainty.

The prognosis of malignant suprarenal tumors is not favorable. They may remain for some time as benign neoplasms without endangering the life of the patient, but if they commence to give evidence of progressive growth and rupture into the blood vessels, a change which is clinically shown by the occurrence of hematuria, death will, in all probability, soon take place. It is unfortunate when the hemorrhages occur, which cause the patient to consult a physician, that it is usually too late to undertake any radical cure, especially if a certain time elapses before the diseased organ is removed by operation. Generally speaking, in five or six months after the first hematuria, metastases arise and from two to three years after the first evidence of blood in the urine the patients will die. At the same time, it is possible that during the time of the first hematuria the neoplasm is still histologically non-malignant and only later on shows anatomical evidences of malignant degeneration. Therefore, any tumor of the kidney which presents clinical evidences of the suprarenal type should be considered as an extremely malignant new growth.

The treatment naturally can only consist of nephrectomy, complete removal of the diseased organ being undertaken. Hornborn questioned whether or not in certain cases enucleation of the growths, or rather resection of the kidney might not be sufficient. But although the very sharp demarcation from the kidney tissue may render enucleation of the tumor a possibility, still, on account of the malignant character of all these growths, as radical a procedure as possible is to be recommended. Nephrectomy, at the present time, can be accomplished with quite a degree of safety, because with the present methods of renal examination an exact idea of the functional activity of the normal kidney can be obtained.

It must, however, be admitted that even a radical operation gives an unfavorable prognosis, as far as a permanent cure is concerned. Küster considers that a permanent cure has been obtained if no recurrence occurs within the first three years following the operation. According to Burkhardt's statistics based on 15 operations, 1 patient died from metatases within one year, 6 died from a recurrence varying from four weeks to almost two

years after the operation, 1 died from some other cause, and 6 were alive and well from six months to seven years afterwards.

If hemorrhages have already occurred for a considerable time before the operation is done, it is then very probable that neoplastic emboli have been carried throughout the organism and have given rise to metatases, consequently the prognosis is almost always fatal.

In our first two cases the patients had remained perfectly healthy up to the time of coming under observation, in spite of the fact that in case 2 hematuria had occurred three years before the operation. Of course, up to the date of writing, only about two to two and one half years have elapsed, so that one cannot as yet speak of a permanent cure. However, from the fact that the tumors were still comparatively small, and that during the operation no visible nor palpable metastases or tumor thrombi were discovered in the large vessels, and also from the histological examination, which showed only the beginning of proliferation and atypical tumor tissue, and in the second case from the long duration of the hematuria without metastatic formation, the conclusion may be drawn that a permanent cure has been obtained, especially since about two-thirds of the time has passed which is considered the limit for recurrence. Our third case deals with a very malignant tumor, which six weeks after the first appearance of the hematuria had given rise to a distinctly palpable tumor and evident metastases twenty-one months after nephrectomy. Death occurred comparatively late, namely, two years after the occurrence of the metastases and three years and nine months after the operation.

Opinions differ as to the method of operation, and whether or not lumbar incision or the transperitoneal route should be adopted. Billroth advised first ligating the renal vessels and then to remove the tumor, so that while the manipulation necessary for the removal of the kidney was going on, bits of the growth could not become detached and enter the blood vessels. Although removal of large renal growths through a lumbar incision can be carried out successfully, especially if it is carried forwards and downwards, still the organ with its delicate vascular tumor is pulled upon and squeezed in spite of careful handling before the hilum is reached, so that, in all probability the above mentioned

danger may take place. Examination of the vessels of kidneys removed under these circumstances very often show tumor thrombi.

From this standpoint laparotomy is much more advisable, especially as it gives the best possible opportunity for detecting metastases and adhesions, while the present methods are so perfect that there is no more danger in opening the abdominal cavity than performing the extraperitoneal method. Laparotomy is to be advised especially in doubtful cases where symptoms of a renal growth exist, but where palpation remains negative. Thus, one can ascertain the condition of both kidneys, both by sight and touch and is prevented from making a useless renal incision, as was done in our first case, where cystoscopic examination gave evidences of a left-sided renal tumor. If a growth is found adherent to the surrounding parts, rendering its removal difficult, a diagnosis of a true carcinoma of the kidney can then be made and the main object is the removal of the lymph glands in the region. However, if the growth is found to be encapsulated, especially if very extensive, one is then dealing with a suprarenal tumor and the hilum of the kidney and its vessels are to be looked out for. Laparotomy is also preferable in cases of very large tumors, which are still operable. In these cases of extensive adhesions and metatases, it is quite permissible to discontinue the operation without trying to remove the tumor so as not to subject the patient to the dangers of an extremely difficult and incomplete operation.

The approximate mortality of operation for suprarenal growths has been placed by Wendel at 50% and he attributes this unfavorable condition of affairs to the fact that in many of the cases the time within which a safe operation could have been undertaken had been exceeded. Out of 24 cases who survived the operation, 5 patients died in the course of five months to three years and four months from recurrences or metastases, making 21%; in the remaining cases cures were observed varying in length from seven months to six years. Israel has done nephrectomy for malignant suprarenal growths in 17 cases with four deaths from operation which were caused partly by severe anemia, while 5 others died from metastases. Once he operated a second time in a case of recurrence in the cicatrix; 7 of the patients operated

on lived, 4 of whom were well two years after the operation, while 5 were living five years after.

How greatly the results of extirpation of the kidney in malignant tumors have improved, is shown by the statistics of Chévalier and Heresco. The former authority compared all cases which had been published up to the year 1890 and found a mortality of 62.6%; and those reported from 1890 to 1899 showed a mortality of only 19.33%. Israel's statistics of nephrectomy up to the year 1896 showed a mortality of only 12.5%.

Case 1. T. O., 50 years of age, admitted June 24th, 1902, discharged October 4th, 1902. In 1888 the patient had typhoid fever and since then has never been ill. On April 29, 1902, at four o'clock in the morning after a quiet sleep, the patient had a sudden desire to micturate, passing dark red urine without any difficulty, with the exception of having experienced shortly before a slight dragging sensation in the right renal region. There were no radiating pains from the kidney to the bladder. The hematuria lasted for three days, during which time the urine gradually became clearer. At the beginning of June, after palpation of the right kidney had been practiced, blood was again voided with the urine, but this did not last long. Similar hemorrhages were repeated on the 19th, 20th and 21st of June. Pain was never complained of. Occasionally small fibrinous looking particles were passed with the urine, which microscopically were found to be composed of fibrin. Many leucocytes were enclosed within the fibrin meshes. Latterly the patient has lost much weight.

On examination, when the patient entered the hospital on June 24th, we found a strong, well nourished man, the thoracic viscera being normal. The abdomen is not distended, is soft and nowhere tender on pressure. No enlargement of the liver or spleen. The kidneys cannot be distinctly palpated. The urine has an acid reaction, is clear and contains neither albumen nor sugar and even by the use of the centrifugal machine no sediment can be obtained. On the next day cystoscopy showed that the vesical mucous membrane was normal, but the ureteral orifices could not be found. On June 27th, the urine was slightly cloudy but by centrifugalization no macroscopic sediment could be recognized. In every preparation the microscope showed numerous red blood cells equally distributed. No albumen. The freezing

point of the urine was 1.01°. At twenty minutes past four in the afternoon an injection of 0.005 g. of phloridizin was given and in half an hour the urine contained 0.5% sugar and twenty minutes past six, both qualitatively and quantitatively, no sugar could be found.

On July 1st, under narcosis, the lower extremity of the right kidney could be felt, but the lower pole of the left gland could not be detected. July 4. After renewed hemorrhage cystoscopy was again tried with the following results: the right side of the bladder was perfectly free, on the left there were blood clots, which could not be completely removed by irrigation. The clots were elongated and, after removal of the catheter, no free blood made its exit from the nozzle.

July 8. At four o'clock in the morning there was another hemorrhage without any pain, as in the previous one. Cystoscopic examination showed that the bladder was free from blood. At the top of the organ was seen an ulcer the size of a linseed, with injected edges and a grayish colored base. The examination strengthened the suspicion that the hemorrhages were renal in origin, but which kidney was the seat of the trouble still remained unsettled. However, according to the cystoscopic examination it was more probably the left.

On July 14th morphine-chloroform narcosis. Patient on right side. Incision made from the twelfth rib to the iliac crest and carried anteriorly parallel with the crista. The quadratus lumborum having been exposed was clamped. The kidney was peeled out of its capsule with difficulty on account of adhesions existing between its fatty capsule and the capsula fibrosa. The adhesions appeared to be edematous. Upon exposure of both poles of the kidney the organ was not found enlarged and its surface was smooth. Only at one spot there existed a yellow node about the size of a split pea in the kidney substance. At the poles the kidney felt softer than in the middle. No tumor could be felt. The renal pelvis was free. A diagnostic incision of the kidney was made showing that the renal parenchyma was unchanged. The kidney was closed with deep catgut sutures. The wound was packed and the skin closed with three silk sutures.

July 15. Urine still somewhat bloody and in the sediment many casts, erythrocytes and a few epithelial cells were found.

August 4. Convalescence has been uninterrupted, the urine is clear and contains little sediment. On the 12th the patient was allowed to get up. On the morning of the next day the urine was again dark-colored and the supposition that it contained blood was verified by microscopic examination. In the preparations small bacteria are found, some of which show active motion.

August 17. Urine is somewhat cloudy, contains a few casts, erythrocytes and particles of tissue. The right kidney cannot be felt, but the left one can distinctly and is somewhat tender on pressure. On the next day the patient returned home, but on August 19th, during the night, there was a severe hemorrhage with pain in the right renal region. The pain which was not cramp-like, lasted all night; at the same time there was a desire to micturate, but the patient did not pass any urine until a blood clot had been voided by the urethra, after which a large amount of bloody urine was expelled. The patient then returned to the hospital and in the afternoon the urine was again perfectly clear. By the cystoscope, a blood clot was found hanging out of the right ureteral orifice. Towards evening a vermiform clot, about $2\frac{1}{2}$ centimetres in length was passed, the urine, however, being clear. Shortly afterward the patient complained of pain in the right side which extended downward from the renal region.

On August 20th the morning urine was again bloody, while on the 28th there had been no more hemorrhages and operation was decided upon. Morphine-chloroform narcosis. Patient on left side. Incision from the twelfth rib toward the iliac crest and carried parallel to the latter forwards. After separation of the soft parts the fatty capsule of the right kidney was exposed. The organ was peeled out of the fatty tissue, which was more firmly attached than normal to the fibrous capsule. Exposure of the upper pole was especially difficult. At the hilum, the ureter, renal artery and vein were ligated separately. After removal of the kidney the fat capsule was almost entirely removed. The wound was packed with gauze and an aseptic dressing applied.

On the next day the patient voided 600 cm. of clear urine, feels perfectly well and has no uremic symptoms.

September 6. The wound discharges fairly well. The total amount of twenty-four hours urine reached 1500cc., being clear, golden yellow in color and free from albumen.

October 4th. The urine is free from albumen and contains no pathologic elements, so that the patient was discharged. Two years after the operation he was still perfectly well.

PATHOLOGICAL REPORT. The removed kidney measured 12.5 cm. in length and 5cm. in width. On the anterior surface of the organ, almost at its middle, an irregular semi-circular growth is found extending to the hilum, whose greatest diameter is 4 cm. and its highest point above the surface of the kidney $2\frac{1}{2}$ cm. The neoplasm lies under the fibrous capsule which can be easily peeled off from it and the renal parenchyma. The growth consists of single nodules varying in size from a pea to a cherry, is soft and yellowish brown in color. On section, a fibrous capsule is distinctly seen separating it from the kidney tissue but the growth extends in the form of a yellowish red nodule, about the size of a hazelnut into the renal pelvis. The central portion, especially, gives evidence of extensive hemorrhage, is soft and brittle, while its peripheral parts are also soft, yellow in color and project above the cut surface. Macroscopically the surrounding renal tissue shows no change.

Microscopic examination of the tumor showed that it was separated from the renal tissue by a distinct capsule, from which firm outshoots are interwoven, which give it an irregular appearance. At some points this capsule is very thin, at others quite thick. At one point the capsule was wanting and here the neoplastic cells appear to penetrate directly into the kidney tissue in little clusters. In the tissue layers of the capsule, collections of pigment are found as well as débris of the urinary tubules and glomeruli, the latter, however, being only in the peripheral layers. The neighboring renal parenchyma shows the presence of increased interstitial tissue, the glomeruli and urinary canals appear compressed. The remaining kidney tissue shows no pathologic change. From the fibrous capsule, an irregular network of the finest capillaries pass through the growth, upon and between which the true neoplastic cells are situated in groups and convolutions. These have a light, large, partly cubic and partly polygonal protoplasma body, the nucleus is large and shaped like a vesicle, usually without any distinct nucleoli and almost without exception the cells contain cavities making them look hollow and light. When fresh, these cavities were found filled with fat.

In structure and arrangement the cells resemble those of the cortex of the suprarenal body, only they are larger and more distinct.

No true stroma can be found, but possibly a few fine tissue fibres accompany the capillaries from the capsule, but these can only be traced for a short distance. Stroma is lacking in the centre of the tumor and here the cells are placed directly upon the endothelium of the capillaries. Here, also, in the older portions of the growth, the capillary network becomes wider, the tumor cells form large clusters and present the most varied and grotesque shapes. In some the protoplasma is degenerated, so that only the nucleus remains, and which in places is found to have undergone granular degeneration. In those parts where the destructive process has been more extensive cavities are formed, some of which are filled with severe hemorrhages. The renal vessels are free from tumor thrombi, while the lymphnodes removed at the operation show no malignant transformation.

Anatomical diagnosis: malignant renal tumor of the suprarenal type, arising from one of the aberrant suprarenal body germs in the cortex of the kidney.

Case 2. R. W., 48 years of age, admitted September 11, 1902, discharged October 24, 1902. In 1899, the patient, who had always been well, suddenly became ill with cramp-like pains in the right side, which extended from the renal region down towards the bladder. Shortly after this he voided pure blood by the urethra, which afterwards was mixed with urine. In three days the urine was again clear. After this attack a period followed during which he was absolutely free from symptoms, this being for about nine months. After this, the patient again noticed blood mixed with the urine for several days; four weeks later a hemorrhage again occurred. Almost every two weeks for one year the patient bleeds very profusely. Usually the hematuria arises during difficult defecation or coughing. Four weeks ago at the time cystoscopy was done and since then almost daily, he has voided blood. The patient says that suddenly after having voided perfectly clear urine there is some difficulty in micturition, whereupon urine containing clots is passed and after that pure blood. Before the hemorrhage commences he experiences pain in the loins on the right side extending from the kidney to

the bladder. Frequently the patient was surprised to be awakened from his sleep by the occurrence of a hemorrhage.

When admitted the patient appeared strongly built and well nourished. The integuments and mucous membranes, however, are pale. The examination of the thorax negative. The abdominal walls are firm and very fat, but at no point does pressure elicit pain. By bi-manual palpation the kidneys cannot be felt through the fat abdominal walls. Urine clear, free from albumen and sugar.

On September 16th. a severe hemorrhage occurred upon the occasion of the patient leaving his bed. This attack was preceded by dragging pains, which radiated from the right renal region down to the bladder. Clear urine was at first passed, then retention took place with severe incontinence, until a blood clot was passed by the urethra and then blood colored urine was voided. On the next day at noon the urine was still quite bloody, but at five o'clock in the afternoon, it again became clear.

Cystoscopic examination. On the right side of the bladder a vermiform blood clot could be seen, which from time to time rythmically moved towards the right and then back again as though it were attached. After a while the anterior portion of it became released; the clot then looked like a button, and after a certain time it became vermiform in shape. In front it was thickened and bossed, showing several notches. It moved again back and forth. On the left side the papilla of the ureter could be seen as an elevation with a depression; on the right the elevation of the papilla could also be recognized, but where the depression ought to be found was the blood clot.

The urine was found free from albumen and sugar, its freezing point being 0.75°. The subcutaneous injection of phloridzin, 0.005 g. given at 11 o'clock in the forenoon showed a half an hour later 0.6% of sugar in the urine; at noon there was 3%, at 12.30 P. M. there was still a trace, while at 1 P. M. and 1.30 P. M. the sugar reaction had disappeared.

September 19. Three vermiform blood clots were passed in the morning in clear urine; these measured respectively 2, 5 and 7 cm. in length. No new attack of hematuria. September 20. During the night the patient experienced from time to time pain in the right side radiating from the renal region toward the

bladder. At about 5 A. M. a clot was passed in clear urine immediately after the patient had been to stool, after which some liquid blood was voided by the urethra. Cystoscopic examination distinctly showed hemorrhage from the right kidney, due probably to a malignant neoplasm of the organ.

September 22. Morphine-chloroform narcosis. Left-sided position. Incision carried from the twelfth rib downward toward the iliac crest and parallel to the latter forwards. The abdominal muscles were in part separated, the quadratus lumborum clamped, after which the fat capsule was split. In shelling out the kidney the albuginea was torn and parts remained attached to the fat capsule. Exposure of the upper renal pole was difficult, but was finally accomplished without resection of the twelfth rib. At the upper pole a very soft neoplasm was found, which was torn during the operation and bled profusely. After the kidney had been freely exposed the organ was twisted out of the wound and the vessels and ureter were ligated separately. After removal of the kidney the fat capsule was extirpated and the wound packed with gauze.

September 23. The patient passed 700 cc. of bloody urine during the night and in the morning 200 cc. of clear urine. The next day the urine remained clear, but the patient complained of nausea and vomited once towards evening.

September 26. Vomiting did not recur. The total amount of urine in twenty-four hours was 1950 cc. The patient complains of little pain. Moderate secretion from the wound; the region of the wound was not red nor swollen. The gauze commenced to loosen up. On the next day the gauze had become loose. The wound was still covered with a grayish coating, but here and there patches of red granulation tissue were appearing. Wound secretion was still profuse, but the urine was clear and free from albumen. Gauze packing changed. October 10. The wound granulating well, so that on October 24th the patient was discharged with a small fistula, which, during the next three months, gave exit to a few of the buried sutures. Two years after the operation the patient was still well.

PATHOLOGICAL EXAMINATION. The length of the kidney was 12 cm. and 6 cm. in breadth. In the centre of its convexity was found a semi-circular growth projecting about 2½ centimetres

above the level of the organ and which extends equally on both sides over half the breadth of the kidney. The fibrous capsule covered it and could easily be peeled off. The growth had a yellowish brown color. On section it was found that the neoplasm was completely encapsulated and composed of several rounded masses varying in size from a pea to a cherry. The neoplastic tissue was soft, light yellow in color and projected above the cut surface. In the larger and older nodules, extensive and old hemorrhages were detected. The growth extended into the renal pelvis and almost filled it and here it was of a bright red color, distinctly showing fresh hemorrhages on the surface. The free portion of the renal pelvis contained many blood clots. Macroscopically the renal tissue showed no change, the blood vessels were empty, while in the perirenal fat no neoplastic formations could be seen.

Microscopic examination. The tumor was distinctly separated from the renal tissue by a thick and tough fibrous capsule from which broad fibrous offshoots penetrated the neoplastic tissue, dividing it up into nodules. The inner layers of the capsule are in general less rich in cells than the outer ones, the latter showing isolated groups of round cells and also some scanty remains of the glomeruli and urinary canals. Here and there some pigment granules were found. The capsule can be recognized in all sections made of the tumor, although in various degrees. Penetration of the neoplastic tissue into the kidney parenchyma can nowhere be seen. The renal tissue itself only shows an increase of interstitial tissue in the neighborhood of the tumor, otherwise there were no pathologic changes.

The neoplastic tissue consisted of a network of capillaries forming large and small meshes, filled with tumor cells. No stroma could be discovered, the cells in the neighborhood of the capillaries being placed directly upon the capillary epithelium, while the remaining tumor cells lie directly beside each other. Their arrangement around the capillaries was in rows; in the centre of the meshes they lie together in little clusters. The cells are polygonal and square, while especially in the more recent portions at the edge of the growth they are sharply defined; in size they are larger than the cells of the borders of the suprarenal capsule, which they otherwise resemble. The nuclei are

large and generally show the presence of nucleoli. The protoplasma is very light and glossy and contains vacuoli representing the remains of fat infiltration, from which the cells take on a vesicle-like appearance. In the central portions of the growth extensive hemorrhages were observed with necrosis arising around them, and also in the border regions the centres of the capillary meshes were frequently found replaced by hemorrhages, while only the marginal tumor cells remained. In some of these spots the blood has disappeared, giving rise to the development of a gland-like structure.

The renal vessels were found free from tumor cells and the extirpated lymphnodes contained no metastases.

Anatomical diagnosis: malignant neoplasm of the kidney of the suprarenal tissue type, originating from aberrant suprarenal capsule germs.

CASE 3. Female, forty-one years of age, admitted June 1, 1896, discharged July 17, 1896. Ten years ago the patient had a severe and painful intestinal affection, and was confined in bed for ten days. For the past fifteen years she suffered with chronic constipation, which was generally overcome by enemas. For the past year the patient has suffered considerably from headache, especially in the back of the head. For the last six months she has been losing weight. Three months ago the urine was red in color for several days. About six weeks ago the patient noticed a movable tumor on the right side of the abdomen which was not painful on pressure, and of late had grown larger. Just after Christmas, 1895, she had an attack of vomiting consisting of bile.

Upon admission the patient was a medium sized, slender and healthy looking woman. Nothing in the heart and lungs. The abdomen was soft, not distended, and the liver not enlarged. On the right side a tumor the size of a fist can be detected when the patient is lying down, with its upper end disappearing up behind the liver, over which a tympanitic percussion sound can be elicited. The tumor is slightly movable and can be pushed down as far as the anterior superior iliac spine, so that its upper pole can be grasped. The length of the growth was estimated to be about 11 cm. It was not tender on pressure. When the patient lies on the left side, the tumor drops slightly to the left.

June 3. In the evening the patient complained of a severe pain in the right renal region of an intermittent character, which lasted until the evening of the following day and was accompanied with nausea and the vomiting of bile upon several occasions. On the afternoon of the previous day the urine was dark red and microscopically was found to contain blood. The next day, however, there were only traces of blood and in the evening it was again perfectly clear.

June 5. In the morning the urine was very dark red, at noon it was again clear. On the previous night the patient complained of severe colicky pains in the bladder, which lasted for an hour and a half. On the next day the urine was clear and free from blood. When centrifuged flattened epithelium was found along with a few hyalin casts. Cystoscopy showed no changes in the fundus or neck of the bladder. The patient complained much of headache and a heavy feeling in the head, but presents no urinary symptoms. The examination led to the diagnosis of a malignant tumor of the right kidney.

June 17. Morphine-chlorform narcosis. Incision carried along the external border of the right rectus commencing at the ribs and carried nearly to the inguinal region. When the abdomen was opened the intestines were pushed towards the median line. Incision of the peritoneum covering the kidney. The organ was then shelled out and partial removal of the fat capsule was accomplished. Numerous vessels in the capsule had to be ligated. The vessels and ureter were ligated separately. The stump was buried and the cavity left was packed with iodoform gauze, the abdominal wound sutured except that part which gave exit to the gauze packing.

June 18. 700 cc. of dark brown urine was drawn by catheter which was found free from albumen and blood. For some days the urine was withdrawn by catheter, at first slightly cloudy, but soon became clear. In the sediment were found a few leucocytes, but no casts nor renal epithelium. The reaction was always acid.

June 26. Gauze packing changed and sutures removed.

July 17. Wound completely healed. Patient still complains of a sensation of pressure in the bladder during micturition. She was discharged.

Six months later pains recurred in the left hip and thigh and knee. At Easter, 1898, the patient entered another hospital where a neoplasm in the left gluteal region was diagnosticated and which increased in size. The patient became rapidly emaciated. Later on a swelling in the condyles of the left femur was detected, as well as some irregular growths in the left side of the abdomen and on June 7, 1900, in other words three years and nine months after the operation, the patient died from metastases.

Unfortunately the macroscopic preparation was not saved so that I had at my disposal only a few notes. It may, however, be said that the kidney exhibited at its upper pole a grayish yellow, bossed and encapsulated growth the size of a hen's egg, which extended to the renal pelvis. In the latter, evidences of a hemorrhagic catarrhal process were seen. The renal parenchyma had undergone no change.

Microscopic examination. Sections made from the borders of the growth showed that the neoplasm was completely walled off from the renal tissue by a fairly thick capsule. In this capsule scanty remains of atrophied glomeruli and urinary canals were seen in a few preparations. A narrow zone of the attached renal parenchyma showed the presence of increased interstitial tissue, but otherwise presented no changes, especially no inflammatory ones. From the fibrous capsule, narrow strands of tissue extend into the neoplasm, dividing it up into separate sections. These septums showed the lumen of vessels and a few cell nuclei. The stroma consisted almost exclusively of capillaries and only in the vicinity of the tissue septi could a few separate bands of tissue be recognized, accompanying the capillaries for a short distance. The latter were mostly arranged in meshes placed lengthwise while at other places, however, they formed a dense network with somewhat rounded or square meshes. The capillaries were more or less filled with blood, but at many points their walls were collapsed. Hemorrhages were scanty and were only found in the centre and older portions of the growth. The tumor cells were large, square and oval and larger than normal suprarenal capsule cells, which they otherwise resemble. Their nuclei were large, easily stained and supplied with a distinct nucleolus. Mitoses could only be found at a few spots at the borders of the growth. The protoplasma appeared very light, finely studded and con-

tained regular vacuolae, representing the remains of fat infiltration. As a result of this the cells looked exactly like vesicles. They were distinctly separated from each other and no intermediate substance could be found. They were mostly arranged in rows, especially in the more recent portions of the growth and resembled in every respect the arrangment of the cells of the zona fasciculata of the suprarenal capsule. The cells were arranged perpendicularly to the capillary epithelium. These rows of cells come in contact with each other, principally at the sides opposite the capillaries, but often also one or even more rows of cells were wedged in between them and which did not present such a regularly perpendicular arrangement to the capillaries. These pictures form the transition to the cluster arrangement of the tumor cells in the older central portions of the growth, while the rounded meshes of the capillary network were filled with clusters of tumor cells arranged irregularly together. But here also the cells were placed directly upon the capillary epithelium without any stroma layer. Retrogressive metamorphoses can only be recognized in the central portions of the growth in the neighborhood of the small hemorrhages, in the form of circumscribed necroses.

Anatomical diagnosis: renal tumor of the suprarenal capsule type with commencing malignant transformation, originating from the aberrant germs of the suprarenal capsule.

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EDITORIAL.

SARCOMA OF THE PROSTATE.

SARCOMA of the prostate is a very infrequent affection and hardly more than forty cases have been so far recorded, while, out of this total, only 27 of them were submitted to a microscopical control. The disease is extremely serious, the duration varying from a few weeks to a few months. It may be met with at any age, but is more common in infancy and youth. Thus, for example, 3 cases are reported occurring in subjects from 8 months to one year of age, 8 instances between $1\frac{1}{2}$ years and 10 years, 3 cases occurring between the tenth and the twelfth year, 6 from the twenty-first to the thirty-fifth year and 7 after fifty years of age. Surgery is powerless and all operative interferences have been regularly unsuccessful. The simplest and most rational treatment is to allow the affection to continue its progress.

In a recent clinical lecture (Journal des Practiciens, September 16, 1905) Guyon relates the case of a young man 19 years of age who entered the hospital for a retention of urine complicated with distension of the bladder. Micturition only took place by overflow. The patient had never had gonorrhoea nor a trauma-

tism of any sort. The diseased commenced a year previously by disturbances in micturition, which little by little increased in intensity and soon the patient could only urinate in a squatting position with considerable straining. When he entered the hospital a large tumefaction was present in the perineal region and the vesical globe extended up to the umbilicus. By the catheter 800 cc. urine was withdrawn. After the organ had been emptied the patient complained of pain, which, for that matter, occurs in all instances when a distended bladder contracts and is completely emptied. Palpation combined with rectal examination showed a diffuse tumefaction extending around the prostate, projecting upwards in the direction of the iliac fossa. The tumor appeared to be fluctuating, but an exploratory puncture only resulted in the withdrawal of some serum and blood. After the patient had been in the hospital a few days the tumor had made evident progress and extended higher up in the iliac fossa.

In discussing the treatment Guyon said that a few years previously another patient, somewhat older than the present subject, presented a completely similar lesion in the prostate, but it did not project into the perineum, nor did it extend upwards towards the iliac fossa. The entire prostatic urethra was surrounded by a large and soft tumor, which was also believed to be a sarcoma, but Prof. Fournier, who saw the patient, found signs of hereditary syphilis and believing that the lesion was a specific one prescribed mercurial treatment. Greatly to the surprise of everybody the patient was completely cured and he has remained well ever since.

On account of this successful case, it was decided in the present instance to employ injections of mercury benzoate and afterwards gray oil was tried. A slight improvement appeared to take place at first, but very soon the disease took on its fatal progress and the young patient died from urinary and malignant cachexia.

The autopsy showed an enormous dilatation of the ureters and renal suppuration. The bladder contained pus and its walls were covered with false membrane. Mucous granulations covered the wall. The tumor in the pelvis had taken on a sudden expansion on account of a series of hemorrhages which had arisen in its parenchyma. The entire prostatic portion was surrounded

by a collar-like neoplastic formation; the prostatic urethra had become elongated and its lumen increased.

The symptomatology of sarcoma of the prostate is ordinarily that met with in the case just related, but it is to be pointed out that, after the fiftieth year of life, the vesical symptoms are less accentuated and it is more frequently in the rectal region that the symptoms are observed. In 5 out of 7 cases there was obstinate constipation and only two of the patients presented lesions of partial retention.

When in presence of similar cases one should not hesitate to prescribe massive mercurial treatment and perhaps one will have the good fortune to hit upon a case of hereditary syphilis, such as the one mentioned. For that matter, even if the case is not one of a specific nature, the treatment will do no harm, which is still another reason for resorting to it in doubtful cases.

ABSTRACT DEPARTMENT

"Concerning Early Operation in Renal Tuberculosis."—H. KUMMELL. (*Arch. f. klin. Chir.*, vol. 74, No. 1.)

In a most instructive and valuable article, based upon his experiences and results in forty-eight cases (thirty-three females, fifteen males), Kümmell has reached the following conclusions:

The source of the renal infection was, in most of the cases, a primary tuberculosis focus at some other part of the body, most frequently in the lungs, or in a previous tuberculous adenitis.

That in tuberculosis of the urinary system, the kidney is the primary seat of the tuberculosis disease, from which the infection of the ureters and bladder gradually develops.

That, in bilateral renal tuberculosis, it seems improbable that the second kidney becomes infected by way of an ascending infection from the bladder; but that in his cases, rather, a simultaneous infection of both kidneys occurred, the severity of the disease on the one side forcing the other side into the background.

Vesical tuberculosis, when present, is best treated by the removal of the diseased kidney, presupposing that the other is capable of functionating.

The vesical tuberculosis, as the secondary disease, should never be treated by operation; but, on the other hand, the cause thereof, the diseased kidney, should be removed at the earliest possible moment.

According to his experience, every vesical catarrh (particularly in the female), which is not due to gonorrhoeal infection, or to infection from without, as by catheterization, is suspicious of tuberculosis, and repeated, searching examination for the bacilli, as well as the application of our modern methods of examination, is necessary.

The sooner the diagnosis is made, and the sooner the kidney, which is in the early stages of the disease, is removed, the more certain is the direct result of the

operation at this stage, when the general condition of the patient is still good, and the more promising the outlook for a lasting cure.

In the diagnosis of the disease, in the early stage, the cystoscope leaves us in the lurch, and ureter-catheterization alone assures us the desired diagnosis.

There is no form of kidney disease in which catheterization of the ureters is so necessary to a certain diagnosis, as in tuberculosis.

In general, tuberculosis of the kidney is a more or less rapidly progressive, destructive process, which extends to the renal pelvis, the ureter and the bladder, causes, here, ulcerations which constantly extend, and to the patient great suffering, lengthy invalidism, and, finally, ends in death.

The most rational therapy, and one that promises the longest duration of cure, is nephrectomy, in the removal of the diseased kidney in the earliest possible stage.

The article is a mine of valuable information, and should be read in the original, as it is impossible to do it justice in a short abstract.

"The Importance of Roentgenographie in Surgery."—KUMMELL. (*Zeitschr. f. Aertztliche Fortbildung,* No. 9, 1905.)

In the course of this article Kümmell takes up the value of the X-ray in the surgery of the urinary organs, particularly in the detection of vesical and renal calculi.

Regarding the latter, he is of the opinion that every renal calculus becomes visible upon a good plate, and that, vice versa, if a shadow is wanting, no concretion is present.

"An Air Cystoscope Without an Optical Apparatus, With Inverted Lamp at the Upper Part."—CATHELIN. (*Tribune médicale,* May 27, 1905.)

The cystoscope, which is without prism and lenses, has an eye-piece at the outer end as its only optical part. The lamp in the tip of the beak of the instrument *inside* the sheath, and throws its light downward. The lower, posterior surface of the curved beak of the instrument is wanting, thus forming the window through which the bladder-wall is seen. A flexible mandim fills out the shaft and beak during the insertion of the instrument. This is then removed, the eye-piece is affixed, and the bladder filled with air.

"A New Method to Aid in the Diagnosis and Treatment of Gonorrhoea."—ALEXANDER. (*Centralbl. f. d. Krank. h. d. Harn. u. Sexual, Org.,* April, 1905.)

By the injection of a solution of hydrogen peroxide, Alexander claims it to be possible to demonstrate the presence of gonococci, even where the usual provocative tests fail. The strength of the solution employed must vary in proportion to the duration of the process and the amount of urethral secretion, the quantity according to the capacity of the urethra. The procedure is that a quantity of a one per cent. solution of H_2O_2 is injected—just enough fluid until the patient experiences a slight distension,—and allowed to remain in the urethra for one minute, less if the gas-formation in the urethra is very active. The first part of the escaping foam is not used; rather the latter, and the expelled shreds. The secretion to be examined is then placed upon a clean slide, dried, and stained as usual.

According to Alexander, it is possible, by this method, to bring about a dislodgment of the gonococci from their hiding-places, without injury to or irritation of the membrane. He prefers Merck's "Perhydrol," which contains thirty per cent. of H_2O_2, adding twenty-nine parts of water to one of Perhydrol to prepare the one per cent. solution.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. JANUARY, 1906. NO. 4

A CASE OF HYSTERICAL ANURIA.

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MRS. Mc C. was first seen October 19, 1905. She was a large, strong-looking woman of thirty, and in general appearance seemed well. She was married at eighteen to a worthless man who had never been anything but a care to her, and from whom she had been separated several times. Her father is living, but her mother died at the age of fifty-six of apoplexy. There is a history of heart trouble on the mother's side. The patient has always been very nervous and high-strung. At the age of fifteen, she was assaulted at midnight, under terrifying circumstances, by a man, who, although he failed in his purpose, so thoroughly frightened her that she never got over it. A little later she had the grippe, and this disease was followed by a period of unconsciousness which lasted off and on for several weeks. During this time she recognized her mother's name and nothing else. Since this time she has had attacks of the same kind, but they have been decreasingly severe. Three years ago she had a fractured skull with bleeding from the ears, nose, and mouth. She was in bed ten weeks with this injury and was unconscious at times and had "spasms." Two years ago while riding in a street car the catch of a window falling behind her, struck her on the neck and she immediately began to have a train of symptoms which have been present off and on ever since. These symptoms have been retention of urine, oliguria, and persistent severe vomiting.

When at her worst she would have complete anuria lasting two or three days, and coincident with the anuria there would be severe vomiting, which could not be controlled. A long attack of these symptoms would reduce her to such an extent that it seemed that she could not possibly survive. She got over each attack. In June, 1904, she fractured the internal condyle of the left arm. This produced further shock and she had a period of further trouble with the urine. Coincident with the car injury, there is said to have been hematuria which lasted a year off and on. At about the same time also there is said to have been edema of the extremities and of the face. The edema has never been marked except on one occasion when it affected the face and caused it to swell considerably. She says she also had a good deal of swelling at the time the hematuria began to appear. She has had at times headaches, some palpitation, backache, and pains in both iliac regions. There is also a story of jaundice with pains in the right hypochondriac region, about two years ago, but there have been no pains in this spot since the attack. This rather eventful history ends with a curretting in September, 1905.

She has been actively ill for about seven weeks. During that time she has passed but little urine and with great effort on her part, and generally it has had to be drawn from her with a catheter. She strains, but no water comes. What is passed is highly colored, but not bloody. She seems fairly comfortable and talks about her case in a reasonable, intelligent way, without dread, and with the confidence that all will be well in a short time. She has had so many of these attacks that they do not worry her any more. Analyzing these periods of temporary complete anuria and partial suppression, it is found that she had the first attack three days after the injury in the street car two years ago. There was total anuria for three days then. At the end of this time there was a little to be obtained, about two or three ounces at a time. This condition persisted for three months and then there was a time when she passed a fair amount. There have been several relapses since then. It is noticeable that after falling and breaking her arm, there was relapse and she could not pass her water for two or three days. There seems to be no exciting cause for the last attack.

On examination, she presented the appearance of a perfectly

healthy woman, with clear complexion and smooth skin. The chest was negative. There was a large protruding abdomen which was very tense but not sensitive. Under ether, nothing was made out abdominally, and neither kidney was felt. The ureters were not remarkable vaginally. Luys' instrument was used to separate the urines, and it was seen that urine flowed from both kidneys, but in a much diminished stream. The cystoscope showed an ecchymosis or two in the bladder that might have been caused by the pressure of the instrument; otherwise the bladder was negative; both ureteral orifices were easily identified.

While the patient was under ether the urethra was dilated with the finger.

Before the ether was given, the urine was drawn with a catheter, and it was noticed that there was a great deal of resistance to the passage of the instrument. The catheterized urine was analyzed with the following result: urea, 2.02 per cent.; color, high; specific gravity, 1010; very acid; albumen, absent; sediment, very slight and consisted of a few calcic oxalate crystals, and a very few medium sized epithelial cells. There was no blood and no casts.

She stayed in the hospital only five days and then, refusing further treatment, went home. While she was in the hospital there was persistent vomiting and constant anorexia. She ate hardly anything. She was able to urinate voluntarily, however, under the influence of strong suggestion, aided, no doubt, by the thorough dilating of the urethra. The amounts of urine were never large, and once there was complete suppression for forty-eight hours. She was most carefully watched and it can be stated with certainty, that there was no chance for malingering. The vomiting was the most distressing symptom. It occurred at night especially, was large in amount, out of proportion to the quantity of food ingested, black in color, and of a decidedly urinous odor. There was some pain complained of, but it was not at all considerable, and it was not especially localized. She said that her back ached. There was no fever and the pulse remained good while she was under observation. Only on the day of discharge did she look ill. She had been vomiting all the previous night, and there was a very severe headache in the morning, the pain being on the right side of the head. For the first time also, on that morning

there was some slight edema of the feet and legs. The tongue was coated and she looked badly. She persisted in going home, however. Some urine was obtained by catheter just before she left, with this very interesting analysis: Amount, 45 ccm. (the first urine for forty-eight hours); urea, .8165 gram; sp. gr., 1025; very acid; albumen, a very large trace; no bile; no sugar; sediment, considerable, and consists of a few crenated blood corpuscles, considerable numbers of pus cells, a few calcic oxalate crystals, a few caudate epithelial cells, very many small round cells, all granular, and a few granular and hyaline casts.

The patient was last heard from three weeks after leaving the hospital. At first there was a good deal of vomiting, but this has since subsided so that now there is very little. The amount of urine secreted daily has gradually increased and now she voids 450 ccm. on some days; when she first returned home, she sometimes secreted only 30 to 120 ccm. in four days. She still has to be catheterized and this has been necessary for two weeks or more. The urine has been carefully examined and no albumen was found, nor were there any casts or blood corpuscles in the urinary sediment.

There has also been one so-called convulsion, evidently a hysterical convulsion, during which she doubled up both hands, clasping the thumbs in the palms and became rigid all over. This was like the convulsions she had been having during the whole course of her trouble, and at no time did these spasms resemble true uremic convulsions. There has been no edema of the extremities, though the face is said to be a little swollen. Her physician says she looks well most of the time and does not present the appearance of a very sick woman.

The diagnosis of this case is open to some speculation. Either it is a case of pure hysteria with unusual manifestations, or else we have to do with some obscure renal disease of long standing. The hysterical element, however, cannot be eliminated. The retention was hysterical without any question, and this alone makes us suspicious that the whole train of symptoms is purely and simply hysterical. There is no lesion of the bladder here which might have given rise to retention, and we can absolutely rule out any spinal disease, such as locomotor ataxia, which sometimes interferes with the emptying of the bladder. The condi-

tion of the urethral muscles, one of extreme tonic contraction as evidenced by the resistance to the passage of a catheter and the chronic retention, favors the diagnosis of hysteria. The diagnosis is furthered by the yielding of the spasm to dilatation and suggestion, although there has since been a relapse.

The exciting causes of hysteria in this case are numerous. We have, in the first place, a severe mental shock at the age of fifteen, then an unhappy marriage attended with continual mental distress for a period of twelve years, grippe, followed by unconsciousness for several weeks (probably hysterical unconsciousness), fractured skull, and injury in a street car.

The various symptoms may be arranged thus:

1. Anuria and oliguria.
2. Vomiting (coincident with the suppression and in inverse proportion to it).
3. Edema.
4. Spasms and unconsciousness.
5. Bloating.
6. Fleeting pains.
7. Palpitation.

All these are well recognized symptoms of hysteria and they were all well marked in this case. What is most significant is that although she has been ill for many months, so ill that her attending physician gave her up on more than one occasion, she has the ability to rally with great rapidity and appear well at very short notice. This is most significant of hysteria, and not at all usual in persons afflicted with severe renal lesions. While she was in the hospital, although she had eaten nothing to speak of for several days previous to entering and ate hardly anything while she was there, yet she maintained an appearance of comparative health in spite of frequent vomiting. The patient was carefully watched while she was in the hospital and malingering can be ruled out.

The hematuria occurring about two years ago is difficult to explain. Here there is room for speculation. It is possible that she added the blood to the urine herself, as hysterical persons are capable of doing, although this seems hardly possible, as she was under the charge of a careful physician at the time, who would have been on the lookout for this species of deception. It is

possible also that the hemorrhage may have been hysterical and possibly have been let loose from the kidney by a tremendous spasm of the renal vessels. And, finally, it may have been the result of some renal lesion as yet undiscovered. The only reference found in literature bearing on the subject, is that of B. Guisy, (referred to later). His cases seem to have been well authenticated, but they are no more remarkable than the one under discussion. A small quantity of blood, microscopic in amount, was found in the urine after the ether examination but it might well have come from the damaged urethra, the result of divulsion. No blood was found at a subsequent examination made some days later.

The albumen found in the urine, a few days after the ether examination was transitory, as it was not found ten days later. Either it was hysterical, which seems unlikely, or else it was the result of the ether, which is much more probable. It was never found before in this case although the urine had been examined numerous times by competent physicians. Had it been due to serious renal lesion it is probable that it would have been observed before. The pus found in the urine after the ether examination may have come from the urethra. It was not enough to account for the albumen found.

The edema of the extremities and face observed throughout the course of her sickness is more probably of hysterical than of renal origin, because if renal there would have been albuminuria with it. Hysterical edema is very common.

The spasms or hysterical convulsions do not resemble uremic convulsions in any particular. They have been observed for many months, and no longer excite any alarm on the part of the patient's family. They are of short duration, do not prostrate, and are quickly recovered from.

Uremic convulsions are always of great severity and give rise to marked prostration.

Finally the fleeting pains, the palpitation, and the bloating of the abdomen are all characteristic of hysteria.

The diseases which may be considered in this case are:

1. Primary renal tuberculosis.
2. Calculus.
3. Double atrophic kidneys of congenital origin.

4. Horseshoe kidney with double ureter and disease of the isthmus (carcinoma, calculus).

5. Carcinoma.

Primary renal tuberculosis ushered in by renal hemorrhages is wholly unlikely here. The hemorrhages took place some time ago, have not recurred, and there has been no secondary vesical involvement. It is hard to imagine renal tuberculosis of two years standing, without having given rise to focal symptoms on the part of the kidney or bladder. Primary carcinoma of the kidney may be ruled out for the same reasons.

In regard to double atrophic kidneys there is something to be said. Double congenital atrophy of the kidneys has been known to occur. Morris [1] mentions a case reported by Tennent (*Glasgow Medical Journal,* Vol. XXXI.), in which the patient, aged twenty-eight, died from uremia. At the autopsy, the left kidney measured two and one-half inches in length and weighed less than one ounce; its surface was very irregular; the pelvis was a double one; the right kidney was three and one half inches in its longest diameter and weighed two and one-half ounces. Its pelvis was divided into three divisions, the upper of which was subdivided into two. The surface of this kidney was also very irregular, and the upper part was more atrophied than the lower. There was no obstruction anywhere, and the condition was looked on as one of congenital atrophy and malformation. This is the only reference given in Morris' exhaustive study of the subject. Atrophy of one kidney is commoner, and yet Morris was able to find only three cases of congenital atrophy of one kidney in 15,904 autopsies at St. Bartholomew's, Guy's, the Middlesex, and the Hospital for Sick Children. He also discredits Tennent's case, saying that it might well have been a case of unrecognized chronic interstitial nephritis.

It is evident, therefore, that the condition is a very rare one, and it is very doubtful if double atrophic congenital kidneys have ever been found. In the case under consideration, it is fair to assume that double atrophic kidneys are not present, from the fact that the patient in the intervals of her anuria passes a normal amount of urine and is in a good state of health.

Instances of horseshoe kidney are not very rare, being found

[1] Surgical Diseases of the Kidney and Ureter, London, 1901, Vol. 1, p. 69.

about once in one thousand autopsies. Morris [2] mentions the possibility of disease occurring in the isthmus of such a kidney and gives the case of a patient admitted to the Middlesex Hospital who died with symptoms of uremic poisoning. At the autopsy, a horseshoe kidney was found with calculous nephritis, in consequence of the impaction of a stone in each ureter. Carcinoma affecting the isthmus of such a kidney is also mentioned by Morris [3] in a woman of sixty years.

Calculus is the only one of these conditions which deserves mention. The history of hemorrhage, pain in the kidneys, anuria, albuminuria, calcic oxalate in the urinary sediment, and convulsive attacks, make it open to suspicion that there may be calculus present.

On the other hand, a critical analysis of the symptoms has shown that not one of these symptoms, except that of hemorrhage, is quite characteristic. The last hemorrhage was about a year ago and there has been none since that time, nor has there been any abnormality of the urine barring the slight transitory albuminuria and the calcic oxalate in the sediment which would indicate calculous disease. Calcic oxalate is frequently found in the urine of patients who are below the normal in health and is suggestive only. What is decidedly against diagnosis of renal calculus, is the fact that the anuria is atypical of calculous anuria. The attacks of anuria in this case have been many and have covered a period of many months. Gowers [4] in discussing the differential diagnosis of hysteria and calculous disease, says that the anuria arising from calculus usually goes on and gives rise to symptoms of uremic intoxication at the end of a week and causes death inside of three weeks, while the anuria dependent upon hysteria may last in a complete form as long as ten days without causing uremia. The repeated attacks of anuria without uremic symptoms, constitute the strongest point against calculous disease. The "spasms" which occurred are not true uremic convulsions; they have all the characteristics of hysterical seizures.

The first thing which strikes one in connection with hysterical anuria is the fact that it occurs mainly in women. Typical

[2] Loc. cit., p. 74.

[3] Loc. cit., p. 73.

[4] Diseases of the Nervous System, Vol. II, 2d. ed., 1893, p. 1013.

examples of the phenomenon are to be found in medical writings as far back as the sixteenth century.

In 1811 Nysten [5] reported two supposedly genuine instances of the phenomenon, which created considerable furore until it was discovered that the first case did not belong to the category of hysteria at all, and that the second was a most flagrant deception. As reported by Nysten, this latter case was nothing less than remarkable, the anuria being associated with vomiting and with the vicarious elimination of urine through the umbilicus, ears, eyes, and nipples, and the voiding of fecal matter through the mouth. The case subsequently fell under the observation of another clinician and was brought under the sobering influence of a camisole, a form of therapeutics which immediately brought about a cessation of the entire list of extraordinary phenomena and gave rise to the discovery in the patient's bed of carefully prepared boluses of fecal matter which the crafty malingerer was about to pretend to evacute per orem. At this the marvel crumbled and for many years, in fact nearly up to 1873, hysterical anuria was looked upon askance.

Through the clinical and chemical observations of Charcot (about 1873), anuria was again recognized as a bona fide semeiologic factor in hysteria, and our present knowledge of the subject is due largely to Charcot himself and to the researches, inspired by him, of his pupils.

Anuria may constitute either a transitory or a permanent symptom of hysteria, and it is both interesting and important to note that in the majority of cases it is accompanied by vomiting. Whether the latter causes the anuria or is caused by it is a matter not altogether easy to determine. It would appear, however, that, for the most part the vomiting is the primary phenomenon.

Curious and interesting as is this second order of anuria, with its preceding or accompanying emesis, it is not to be compared in either of these respects with a third, and far rarer order, in which the anuria stands alone, so to speak, without any discoverable vicarious accompaniments.

In the second order, in which anuria and vomiting are constantly associated, clinical investigators have naturally followed a

[5] Nysten, Recherches pathologiques de physiologie et de chimie, Paris, 1811, art. iii, p. 265 *et seq.*

line of inquiry as to whether the vomited matter did or did not essentially replace the waste products of metabolism ordinarily excreted by the kidneys.

As a result, nearly all the earlier clinicians note with emphasis a strong odor of urine to the vomitus, and practically all the moderns have succeeded in recovering from the material rejected by the stomach, a quantity of urea which varies, with notable constancy, inversely with the amount of urine voided through the natural channels.

Charcot has expressed himself as somewhat sceptical on the subject of the urinary odor of the vomitus, but the reasons for his scepticism are not altogether obvious. Certainly in the case presented in this paper an urinous odor has been detected at times in the matter vomited.

The course of events in this second order of hysterical anuria is very variable. For weeks, months, and in certain cases, years, the urine, while not completely suppressed, may be secreted in insufficient quantities, which often vary from one day to another and are governed by the vomiting or by the profuse sweating and diarrhea which may accompany or replace the vomiting. By reason of this latter phenomenon, nutrition may suffer to a marked extent and the patient lose weight appreciably.

On the other hand the secretion of the urine may at any time, without determinable cause become normal in amount, its excretion take place through the usual channels, the vomiting and other vicarious phenomena disappear and the natural order of events be otherwise restored.

We now come to the consideration of the third order of hysterical anuria, that in which this condition exists alone as a so-called *permanent* symptom, without discoverable concomitant vicarious phenomena. Here, certainly, one might reasonably look for marked uremic complications, but clinical data on this point are startling to say the least. They show that this form of anuria may persist for a period of nearly two months without producing anything more remarkable in the way of symptoms than a slight cephalalgia and an inconsiderable degree of general tremor, and that the maximum of its pernicious effects amounts to nothing worse than the same cephalalgia coupled with nausea, itching of the skin, enfeeblement of vision and dyspnea.

Owing to the marked infrequency of the occurrence of this type of hysterical anuria, it is difficult to draw any specific general conclusions with regard to it. This much we can, however, say: that the bare fact that it may exist day in and day out for a period of nearly two months without symptoms more marked or dangerous than those above enumerated, tends to shatter all our preconceived ideas on autotoxemia.

The question of an hysterical albuminuria is interesting. Gilles de la Tourette and Cathelineau,[6] have never seen albuminuria nor have they ever found any abnormal elements in the urine of an hysterical patient not affected with renal disease. These authors studied the urine of hysterical patients and were able to observe thirty-six cases of true hysteria during an attack, meaning by this an hysterical convulsion or other severe manifestation of hysteria.

They quote Lécorché and Talamon,[7] who looked up the subject and who think albuminuria of a transitory nature quite possible, basing their opinion on cases observed by Martin Solon and Peschier who claim to have observed transitory albuminuria at the end of hysterical attacks; they also mention Maclagan and Fiori, the latter especially claiming to have observed transitory albuminuria after hysterical convulsions. Oppenheim [8] also mentions the possibility of albuminuria in his text-book, but gives no cases in detail.

Sugar has been found by both Oppenheim [9] and Gibb,[10] but it must be of very rare occurrence for no other reference in literature was found bearing on the subject.

Polyuria is so common in hysteria that it hardly deserves mention. It is probably due to dilatation of the renal vessels.

The excretion of urinary solids has been well studied by Gilles de la Tourette and Cathelineau.[11] These authors found that during the interparoxistic stage the urine was practically normal, but that during an hysterical paroxysm, the following changes in the urine are noted: (*a*) There is a notable diminution of

[6] Le Nutrition dans l'Hysterie, Paris, 1890.
[7] Traité de l'Albuminurie et du Mal du Bright. Paris, 1888, p. 285.
[8] Diseases of the Nervous System. (Translated by Mayer).
[9] Quoted by Gilles de la Tourette and Cathelineau.
[10] Loc. cit., p. 30.
[11] Loc. cit., p. 99.

urinary solids. (*b*) The urea is reduced to about one-third the normal amount. (*c*) The phosphates are decreased to about one-half the normal in the twenty-four hour amount. (*d*) The normal proportion of the alkaline to the earthy phosphates is greatly altered: ordinarily it is in the ratio of three parts alkaline to one of earthy phosphates, but during an hysterical attack or immediately after one, it is found that the two phosphates are about equal in amount. These four characteristics are marked and are of diagnostic importance, especially the fourth; taken together they are extremely suggestive of hysteria in doubtful cases.

The only reference found relating to hysterical hematuria was that of B. Guisy.[12] He relates three cases of interest. The first was that of a female, thirty-eight years old, who after a severe mental shock suffered from trembling of the limbs, a feeling of heat in the head, pains in the lumbar regions and an abundant hematuria. With the beginning of the attacks she passed a large glassful of bloody urine, and half an hour later a half a glassful of blood, and two hours after that some more bloody urine. Then the urine became clear. A year and seven months later there was another attack of hematuria, transitory in character, and again a few months later there was still another attack of the same kind, though the amount of blood was slight. The bladder and kidneys were healthy in this case and the urine between the attacks was quite normal. There was a neurotic history in the family, one brother being insane, and the patient herself having been nervous all her life. The diagnosis of hysterical hematuria was made by exclusion. In this case we cannot help considering the possibility of beginning renal tuberculosis, ushered in by a renal hemorrhage which was repeated later; still, one would look for focal symptoms during a period of nearly two years, during which apparently there was no suspicion of either renal or vesical trouble.

The second case was that of a woman forty-nine years old. When she was twenty-seven years old, she suffered a severe mental shock, which was followed by an attack of hemoptysis, apparently without demonstrable lesion. Since the age of forty-six, any marked emotion or stress of mind is at once followed by an attack of hematuria, and sometimes hemoptysis; the former lasts

12 Annales des Maladies des Organes Génito-Urinaries, 1901, p. 1460.

several hours and then disappears. During the attack she urinates every half hour. She is subject to vomiting and headaches, has always been nervous, and her family are hysterical. The bladder and kidneys are healthy and always have been. The general health also is excellent.

The third case was that of a Russian farmer of forty-eight years. After a severe mental shock twelve years previously, he immediately urinated a large amount of blood; two hours later he urinated two large glassfuls of bloody urine. Five years later, after a quarrel there was a recurrence of the hematuria, but it was of slight severity. Five years after this there was another attack which came on after the death of his only son. At this time he urinated a glass and a half of blood. He suffered habitually from trembling at the slightest provocation, was subject to melancholia, headache, but his general health was excellent. Both his kidneys and bladder were normal and always had been. The urine was negative.

Edema of more or less intensity is common enough in hysterical states. Dana [13] mentions it and so do Church and Peterson.[14] The latter say that the edema may assume a variety of forms, red, white, and blue, and that the condition may persist for many days. As to whether albuminuria may be a coexistent feature, little is said although Lépine [15] asserts that this is quite possible, and relates a case of an hysterical woman, not affected with oliguria, who, between her hysterical attacks exhibited both albuminuria and anasarca, both transitory in nature. Lépine does not hesitate to ascribe the condition to hysteria and compares it to the transitory albuminuria of adolescence.

The subject of pathogenesis has not to date got beyond the realms of pure speculation, and into these realms the authors of this paper have no desire to step foot. In the matter of treatment, on the other hand, they do feel impelled to caution against instrumental interference, believing that its psychic effects are, on the whole, bad.

[13] Text-Book of Nervous Diseases. 5th ed., 1901, p. 497.

[14] Nervous and Mental Diseases. 1904, p. 596.

[15] Quoted by Gilles de la Tourette and Cathelineau. Loc. cit., p. 31.

REMARKS ON TUMORS OF THE BLADDER, WITH PARTICULAR REFERENCE TO SARCOMA; AND REPORT OF A CASE OF GENERALIZATION AND SARCOMATOUS GASTRIC ULCERS.

(From the Pathological Institute of the University of Wurzburg, Germany.)

By Dr. Moritz Loewenheim.

THE knowledge of tumors of the bladder is a modern acquisition, the result of numerous pathological and experimental researches as well as the perfection of diagnostic means.

Tumors of the bladder belong to the rarer pathologic entities. According to the statistics of Küster and Gurlt, vesical neoplasms do not form 0.5 per cent. of all tumors arising in the human organism. As to the sex, investigations seem to show that they occur more frequently in the male. Antal found 179 tumors of the bladder in the male, and eighty-six in the female, while Albarran found 334 males and forty-seven females; among the cases observed by Zuelzer, twenty were men and two women.

The frequency of malignant growths, as compared to the benign tumors of the bladder, does not agree in statistics, probably because some authorities have a tendency to regard all sessile neoplasms as carcinomatous, whereas others label all pedunculated growths as benign. In his work on the surgery of the genito-urinary apparatus, Thompson reports twenty cases of bladder tumors coming under his observation from 1880 to 1884. Among these, two were supposed to have been carcinoma. Antal mentions sixteen tumors of the bladder, six of which were carcinoma, while Küster met with twelve vesical neoplasms, two of which were carcinoma. After a careful histological examination of eighty-eight new growths of the bladder, Albarran came to the conclusion that sixty-six of them were atypical epithelial tumors.

Among the benign tumors most frequently met with are papillomata. These arise in the submucosa and mucosa of the bladder and have been variously named according to the prevailing

tissue elements they contain, namely, fibroma papillare (Virchow), villous polypus (Küster), papilloma (Kramer), papilloma fimbriatum and fibropopilloma (Thompson), papilloma fibrosum (Antal).

Fibroma papillare is the classical name which has been given to the above mentioned group and represents the typical growth, in that a collection of papillary formations rests upon a more or less thick pedicle. Histologically the growth consists of a tissue framework arising from the submucous tissue and extends into the separate villi toward their periphery. It is also the bearer of an extensive vascular network from which each villus receives a branch which extends to its free extremity. The villi are covered with several layers of typically arranged epithelium. These growths frequently have a broad base or, on the other hand, they are possessed of a long pedicle and may be single or multiple. Usually, the pedicle contains one or more large vessels and occasionally muscle elements are found in it along with the fibrous tissue. These villous growths may arise anywhere in the bladder, even in a diverticulum, but this type of tumor is more apt to occur on the trigonum. As a result the ureteral or urethral orifices may become obstructed, and the same may also occur when a portion of the neoplasm becomes torn off and is caught in the urethra, thus plugging it. Smaller portions are often voided in the urine during life. On account of the considerable vascular supply of the villi, hemorrhage is frequent. During each violent contraction of the bladder hyperemia must occur in the villi on account of the resulting construction of the base of the tumor, which together with the simultaneous mechanical action, such as pressure against the opposite wall of the bladder, explains the frequency of the loss of blood. Chronic inflammation of the bladder is also often present and may take on a malignant character, especially in those instances where there is extensive necrosis, ulceration, or even purulent degeneration of the neoplasm.

Perforation of the bladder may result from the progress of the degeneration, which, naturally, is more apt to occur in cancerous than in simple villous growths.

The papillary excrescences are sometimes short and wartlike, while at others they are jagged or threadlike. In the former case the tumor is firmer in consistency and resembles a cauliflower,

while in the latter it is very soft and tender so that the surface becomes almost semi-fluid.

Less frequent in occurrence than papillomata, are those tumors which do not give evidence of a villous structure and are always pedunculated. These are the true polypi. They are usually found at the neck of the bladder, or at the base of the organ. According to their histological structure they are divided into fibrous and mucous polypi. The former are chiefly composed of fibrous tissue, the latter of mucous tissue. On account of their firm structure and their small vascular supply and being covered with hyperplastic mucous membrane, these growths do not tend to give rise to hemorrhages as is the case with the villous type and they are more prone to occur in childhood.

Carcinoma in its various forms comes second in frequency (Küster). Primary carcinoma of the bladder mucous membrane is most difficult to clinically distinguish from that of the prostate and it certainly does occur, in spite of the contradictory assertions of Klebs. Carcinoma of the bladder arises sometimes in the form of hard or medullary nodules; at other times it appears as a diffuse flat infiltration, which may involve a large portion of the bladder. From the progress of the growth the rectum and vagina become secondarily involved. Secondary carcinoma is more frequent than the primary form, because carcinoma of the rectum, prostate, uterus and vagina very frequenty invade the bladder. Metastatic carcinomatous nodules are rarely found in the bladder wall.

According to their structure one may distinguish the scirrhous, medullary and alveolar types, cancroid and melanoma. The histological starting point is usually the epithelial layers, less frequently the glands of the mucosa. The most frequent form met with is carcinoma simplex, ordinarily termed scirrhous, in which there is an abundance of fibrous tissue elements, while the specific cell elements are less prominent. These growths may be met with in the form of marked infiltrations or hard nodular outgrowths which present ulcerations over their surface after a certain time. However, those rich in cell elements, carcinoma medullare, representing the softer forms, are by no means rare. This type is extremely malignant and shows a tendency to ulcerative degeneration at an early date. The gelatinous cancer, alveolar carcinoma,

shows a characteristic colloid degeneration of the epithelium; it is especially malignant. The cancroid contains the typical epithelial pearls. Melanoma, the pigment cancer, is characterized by a deposit of black pigment in the cells. Another type of cancer which not infrequently arises in the bladder is what has been termed by many authorities as villous cancer. The combination of carcinoma and villi can occur in two ways; either the villi formation is primary and was originally benign, but later carcinomatous changes develop in its base and the epithelium may grow through it from below (Rokitansky, Virchow), or villi may develop around a cancerous tumor during the growth of the latter. These may be called villous cancers, but this name, which was formerly erroneously used for papillomata by Rokitansky, should be rejected because it is used too generally and inaccurately.

In rare instances the bladder may contain a few round or oval crypts which are covered with cylindrical epithelium. Their ordinary location is at that portion of the bladder near the urethra and they have the same characters as the glandular neoplasms developing in the urethra; they sometimes, however, are found near the fundus of the bladder. These structures may represent the commencement of new growths, but it is true that only very few such cases have been observed.

Cysts are more apt to be met with in the posterior bladder wall, especially in the tissues between the bladder and rectum. According to English, they generally originate from the remains of embryonal structures of the Wölffian body and Müller ducts or they may be due to cystic enlargement of the seminal vesicles and the sinus prostaticus.

Among the rare new growths in the bladder may be placed myoma. This tumor originates from the muscular structures of the organ. Histologically they consist principally of unstriated muscle fibres, a small amount of fibrous tissue and a few blood vessels. Generally they are pedunculated and very tough and it would appear that they are more frequent in the male than in the female. Generally speaking their growth is slow, but, under certain circumstances, it may take on a rapid progress. Mixed forms have been repeatedly observed, as for example, fibromyoma, myxomyoma and so forth.

Sarcoma is another comparatively rare growth of the

bladder and, although at the present time its existence is recognized, it was not long ago that it was very strongly doubted, to such an extent that Virchow and Klebs do not even mention it, while Rokitansky limits himself to this remark: "That new tissue formation occurs in papillary growths of the mucous membrane of the neck of the bladder, especially as a fibrous tumor in the bladder wall." Birch-Hirshfeld refers to the subject as follows: "A very rare tumor termed myoma of the bladder was found combined with sarcoma elements, the growth occupying the posterior bladder wall, its pedicle being imbedded in the muscular tissue. This case was described by Gussenbauer. Ziegler refers to "sarcoma of the bladder as a rare growth." Podratzki says: "New growths of the bladder sometimes arise primarily in its walls and this is without exception as regards the benign tumors and frequently also in sarcoma and carcinoma." And further on he makes the following remark: "In women occasionally new growths project from the bladder through the urethra, which are red and fleshlike; as a rule these are sarcomata." Hueter states that myosarcoma is a very rare form of tumor. Fritsch expresses himself as follows in the Handbuch der Gynäkologie, edited by J. Veit: "Sarcoma of the bladder is a great rarity, contrary to all other bladder tumors, and they have been found more often in females. This, however, must be mere chance, as there have only been a very few cases recorded. The growth is usually seated in the fundus and is composed of spindle or round cells." Up to the year 1886 Küster was only able to collect five well described cases of sarcoma of the bladder, and he says: "The site of the growth appeared almost always to be in the fundus, exceptionally in the trigonum or anterior bladder wall. It is sometimes composed of spindle cells, at others of round cells. In one case metastases were found in the lung. In one instance the growth had a narrow pedicle, in two the pedicle was broad and in two there was no pedicle. This is about all that we know of sarcoma of the bladder and in the future much attention should be given to this type of growth." Guterbock states in his text book that: "Sarcoma and chondrosarcoma are rather the exception." The following statements are to be found in Zuelzer's text book: "Sarcoma has been observed in a few cases, principally in the female, in the form of a spindle cell or round cell growth; they

may be sessile or pedunculated. They are to be considered among the very rare forms of vesical growth." Ebermann writes: "Guyon found only one case and that during postmortem examination, but he refers to an article by Clado not as yet published in which twenty cases are recorded. Stein of New York has met with five instances of sarcoma of the bladder. According to the statistics given by Thompson at the Berlin Congress in 1890, out of forty-one cases of bladder tumors which were operated on, there were three instances of sarcoma. Southon gives the largest percentage of sarcoma because he found six instances out of eighteen cases of bladder growths. Out of eighty-two tumors of the bladder, Albarran only found two cases of sarcoma. Cases of sarcoma of the bladder which he collected from various sources showed that thirty occurred in males and nineteen in women. According to the conclusions drawn by this authority, sarcomata are more apt to be seated in the anterior wall of the bladder than are epitheliomata, the relation being as eighty to forty-nine. Tumors of the bladder during childhood are considered as rare. (Powers). According to Fenwick there is a certain group of multiple sarcoma which arise in polypi and are more apt to be found in children under the age of five, while there is still another group pertaining to another category, where these growths are found in adults after the age of fifty; they are seated on the posterior wall and are usually sessile, rarely pedunculated."

The above extracts taken from text books are very unsatisfactory and in many ways are quite inferior to the more definite reports given in other literature. Even the teaching of the great infrequency of primary sarcoma of the bladder should be corrected, since the publication of more recent literature on the subject.

However, before examining the more recently reported cases, some remarks about the classification of sarcoma are not out of place here. In this respect König merits the greatest credit. He distinguishes myosarcoma, round cell and spindle cell sarcoma. However, the more recent classification is more exact than König's. According to Borst, this form of growth should be divided into simple sarcomata and the highly developed sarcomata. In the former, Borst includes the round cell and spindle cell sarcoma and the star cell and reticular cell sarcoma, while

in the more highly developed types he includes fibro-sarcoma, lympho-sarcoma, myosarcoma, myxosarcoma and chondro-sarcoma.

The former types of sarcoma are derived from an excessive growth which finally results in a secondary filling up with embryonal cell elements. The character of the original tissue from which the growth sprung was entirely different from the tumor and there was tissue which did not show the least resemblance to the structure of the original tumor formation forming the base. The second group of sarcoma shows manifestations of a slight degree of degeneration, evincing unmistakable relationship to the various tissue types of normal tissue growth, typical growths coming from various adult tissue structures.

Having made these preliminary remarks relative to the classification and histology of vesical growths, I would now briefly consider the cases recorded in literature and then describe a case which I examined at the Pathological Institute of the University of Wurzburg.

The first case of bladder sarcoma is recorded by von Senftleben in 1854 in the Archiv für klinische Chirurgie. The patient, a female, was twenty-nine years of age. A large soft tumor was situated on the right side at the fundus of the bladder, below and near to the ureteral orifice. It had penetrated outwardly through the urethra by means of pedunculated offshoots and was extirpated per urethram. Death followed from peritonitis due to perforation of the bladder. Miscroscopical examination showed that the tumor was a spindle cell sarcoma. The second case is reported from the Greifswald Clinic by Siewert. The tumor, which was a round and spindle cell sarcoma, was found in the anterior wall of the bladder and had been made to extrude through the urethra by the contractions of the organ; this caused dilatation of the urethra and the growth extended and grew into the vagina, dilating the latter to such an extent that even the os-uteri was dilated. There was gangrenous degeneration in some portions of the growth, purulent cystitis, atresia of the left ureter with hydronephrosis, pyelonephritis and purulent peritonitis. Death.

Another case is reported by König, who in 1872 operated on a man presenting a pedunculated round cell sarcoma the size of a hen's egg, seated at the entrance of the bladder. Marchand

has also reported the case of a round cell sarcoma in a female fifty-seven years of age, in the Archiv für klinische Chirurgie in 1878. In 1883 Sperling found thirteen instances of sarcoma out of 120 neoplasma of the bladder; eight of these occurred in the female, three in the male, while in two the necessary information was lacking. As to age there were two female children, one twenty-two months and the other four years of age, six occurred in women between the ages of twenty-nine and fifty-seven years, and the three men varied in age from twenty-one to seventy-three years. Histologically three were spindle cell sarcomas, five were round cell sarcomas, two were mixed cell sarcomas and three fibrosarcomas.

During the following years, up to 1890, about twenty-four more cases were reported and which were collected by Hinterstoisser. This authority found that they were described as large, broad, or pedunculated tumors, frequently completely filling the bladder; others were also described as diffuse infiltrations and thickenings of the bladder wall. He also found that the starting point in the majority of cases was in the submucosa and not infrequently in the muscular layer. The surface of the growth was usually described as being ulcerated, rather than covered with normal mucous membrane. The occurrence of metastases was rarely noted. From this summing up it may be assumed that sarcoma of the bladder is relatively frequent in childhood, as well as in adults, usually in the sixth decade of life and that it is by no means more frequent in the female as has usually been thought, because out of forty cases which this authority collected in literature only fifteen occurred in women.

In the same year a case of small round cell sarcoma was published by Bernstein. A round, hard, nodular tumor, with an ulcerated surface was found on the anterior bladder wall. In 1893 Frölich reported an instance of spindle cell sarcoma which had partially undergone fatty changes, while in 1894 Steinmetz recorded a case of mixed cell sarcoma occurring in a boy two years and three months of age, and he also collected thirteen other cases of sarcoma of the bladder occurring in childhood. Clado records this case and one of his own in his work entitled "Traité des Tumeurs de la Vessie." In the years following up to 1900 four more cases were published and which were collected

by Jäger in his thesis which was published at the beginning of 1904. He was able to collect eighty cases from the literature and adds another of his own which was a round cell sarcoma. Part of the cases recorded by Jäger have already been referred to in some of the above mentioned articles, but Jäger emphasizes, and justly so, that sarcoma of the bladder is not as rare as the representative text books would lead one to believe. Among the eighty cases which he collected, forty-six occurred in men and twenty-six in women, while in eight there was no definite information regarding the sex. Histologically round cell sarcoma appears to be the most frequent, because he found thirty-five instances of round cell sarcoma, thirteen spindle cell sarcoma, twelve cases which were merely called sarcoma, five fibrosarcomas, five mixed cell sarcomas, four myosarcomas, one alveolar spindle cell sarcoma, two chondrosarcomas, one teleangiectatic sarcoma, one lymphosarcoma with spindle and round cells and one small cell sarcoma.

Three more cases have more recently been reported from the Pathological Institute at Innsbruck in the Seventh Number of the Zeitschrift für Heilkunde, July, 1904. It is especially noteworthy in these cases that macroscopically the probable diagnosis was carcinoma, while miscroscopically the growths proved to be sarcomata. The first was a small round cell sarcoma of a partially alveolar structure situated in the region of the posterior bladder wall on the right in a female sixty-two years of age, with secondary diffuse growths in the vagina, the latter being closed by the hymen. Kroph makes the following remarks relative to this case: "What was especially noticeable and of great importance relative to the nature and development of this tumor, were the foci found at many places in the bladder and which were characteristic, in as much as they contained products of hyalin changes, and also on account of the retained clusters of red blood corpuscles, as well as the presence of eosinophiles showing their relationship to the blood vessels and incidentally to the lymphatics surrounded by the blood vessels. Here and there this relationship was verified by the presence of a sharply outlined stroma which surrounded the cell clusters. The lymph spaces and lymph vessels supplied with endothelium were found to serve as passages for the growth and its extension in the muscular layer of the bladder and in the perivesicular and fatty tissue, as well as in the

submucosa under the intact mucous membrane of the bladder. In this way, probably, infiltration of the bladder by the growth arose, which was especially easy on account of the numerous lymphatics in the vagina."

The second case represented a giant cell sarcoma of the fundus and top of the bladder in a male forty-eight years of age, with extreme gangrenous degeneration, resulting in peritonitis from perforation. The third case was an endothelial angiosarcoma around the trigonum of the bladder in a male sixty-four years of age. The metastatic nodules in the heart, suprarenal bodies and subcutaneous fat of the upper arm are of interest.

I will now give a detailed history of the case which came under my observation, for the notes of which I am greatly indebted to the kindness of Professor Dr. Borst.

The patient, a workman, entered the Julius Hospital at Wurzburg on December 5, 1903. Both parents are dead, but brothers and sisters well. In 1880 the patient contracted gonorrhea, which was superficially treated. Three years ago the first symptoms appeared, represented by difficulty and frequency of micturition requiring more pressure than customary before the urine could be voided. The jet was intermittent. For the past few weeks micturition had become still more difficult. Four weeks ago he complained of pressure pain in the renal region and his face became puffy. For the last few days the patient has not been able to pass his urine. Catheterization was tried, but was unsuccessful, so that puncture of the bladder was resorted to. He was pale, but fairly well nourished. In the lower half of the abdomen a semi-circular tumor in the middle line could be detected, which was sharply defined from the surrounding structures and represented the distended bladder which reached to the umbilicus. By the rectum the prostate could be felt, quite as hard as a stone and so much enlarged that its upper borders could not be distinctly felt. On its sides a narrow strip of normal tissue could be felt between the gland and the bony pelvic walls.

December 21. Patient was catheterized twice successfully. Much foul pus was withdrawn. In the evening there was a rise in temperature. Therefore, several days later external urethrotomy was done by Professor Schönborn. After opening the urethra a partially necrotic tissue of hard consistency was

found near the prostate and was removed in large pieces. A permanent catheter was inserted.

After the operation the temperature remained down for a while, but at the beginning of February it again rose. Urine was passed by the perineal fistula. Soon after a perforation through the anterior wall of the rectum was found and at the same time a deeply seated pocket of pus was detected extending on each side towards the region of the tubera ossis ischii. In order to obtain a more simple condition of the wound a larger opening was made and it was then found that the entire pelvic tissue between the bladder and rectum, as well as on the sides, and probably also part of the posterior aspect of the bladder, was markedly infiltrated and undergoing purulent degeneration. There was a large cavity into which the rectum and bladder opened and the urethra could not be seen. Posteriorly the walls of this cavity were formed by the posterior walls of the rectum, while in front, behind and on the sides was composed of neoplastic tissue. The condition looked very badly and the temperature rose in the evening.

Although locally there was not much apparent change, the general condition of the patient became worse. He gradually lost his appetite completely, became very anemic and suffered from chills and sweating. He died on February 16, 1904, in an extreme condition of cachexia.

The clinical diagnosis was malignant tumor of the bladder and prostate; gangrenous degeneration, pyelonephritis, sepsis and cachexia.

Postmortem performed on the following day gave the following results. Both lungs were much dilated; the left one being completely dilated and the right one at its upper portions was adherent. A cicatrix at the apex of the right lung was found and there was great edema of both organs.

The cardiac walls were completely adherent and in the adherent layers of the pericardium many grayish colored nodules were found. The heart was enlarged, especially on the right, the right ventricle being dilated. Heart muscle very soft. There was a fatty growth on the right. The right auricle was also enormously dilated. The anterior wall of the right ventricle was almost as thin as paper, while the heart muscle of the left ven-

tricle was cloudy and light brown in color. One of the aortic valves was sclerotic at its point of attachment.

On the perineum was seen an old cicatrix with gangrenous walls. A fold of peritoneum was found extending downwards toward a patent inguinal canal and bended sharply downwards towards the process at this point. The vermiform appendix very long, its distal third offered a cystic dilatation but was free from adhesions.

The testicles, scrotum and spermatic cord presented nothing of note excepting some dilatation of the veins. The lymphnodes running along the iliac vessels and aorta were enlarged, soft and vascular.

After the urethra had been split open the abscess cavity already alluded to was reached at about twelve cm. behind the external orifice. The remainder of the urethra was wanting. A portion of the vesical neck was distorted and the trigonum infiltrated with a tumor formation. The walls of the bladder, excepting a portion of the fundus, were filled with several thick, whitish neoplastic masses. The posterior wall of the rectum laid free in the abscess cavity.

The prostate was included in the neoplastic mass, but nevertheless by far the greater part of the growth belonged to the bladder walls. The perivesical pelvic tissue was infiltrated.

The spleen was soft, flabby and pale. The kidneys were decapsulated with difficulty. The left kidney was large, its cortex pale and pelvis somewhat dilated; it contained a few soft nodules. The entire left suprarenal body was included in a vascular neoplastic mass. The right kidney, as well as the left, contained metastases; the right suprarenal body had become converted into a neoplasm the size of a child's fist, fairly firm in consistency, and partially yellow, partially dark red in color. By way of the suprarenal vein neoplastic masses had reached the vena cava and protruded into its lumen. The stomach was considerably dilated. On the greater curvature were three necrotic ulcers, with infiltrated edges. There were no clots in the pelvic arteries nor iliac veins. Both ureters were patent.

The anatomical diagnosis was: emphysema and pulmonary edema. Bilateral adhesive pleuritis. Old cicatrices of tuber-

culosis in the right apex. Tuberculous adhesive pericarditis. Dilatation of the heart with atrophy and fatty degeneration of the muscle. Hydrops of the vermiform appendix. Right inguinal hernia. A carcinomatous or sarcomatous neoplasm of the vesical neck and prostate (?). Perforation of the walls of the bladder and rectum. Chronic cystitis. Metastases in the lymphatics of the iliac region and retroperitoneal space. Metastatic (?) growths in the kidneys and suprarenal bodies. Thrombi of the right suprarenal vein. Hemorrhagic erosions of the stomach with three ulcers (metastatic ?).

Microscopic examination was made of the bladder walls, the surrounding retroperitoneal tissue, kidneys and suprarenal bodies, and particularly of the gastric ulcers, because it was of special interest to ascertain whether or not one was dealing with metastatic ulcerating sarcoma or simply ordinary gastric ulcers; macroscopically these ulcers looked like the simple gastric ulcers; they were perfectly flat and did not extend deeper than the submucosa, while their borders were only slightly infiltrated. A cross section of the bladder wall showed that the growth was an infiltrating vascular round celled sarcoma with marked tendency toward degeneration. The cells were moderately large and were generally rounded or oval and contained somewhat vesicular nuclei. Infiltration of the bladder with round cells was very diffuse and in many places the tissue fibres and muscle-fibres were isolated from each other by the interposition of the sarcomatous cells.

Thrombi were frequently found in the vessels in combination with necrosis of the neoplastic tissues. There were profuse hemorrhages in the growth, the cause of these being due to the fact that the sarcoma cells were more prone to develop along the vessels and penetrated through their walls, rupturing into their lumen. Many small veins had ruptured into the tumor mass in this way. There were inflammatory processes in the bladder walls along with the tumor formation. Especially to be noted were clusters of leucocytes and fibrinous exudates. The neoplasm had invaded all the structures of the bladder wall, but at many points the inner surface was more particularly involved. At those points where the growth extended through the bladder into the pelvic tissue, many large veins were seen surrounded by sarcoma cells and many of these vessels contained neoplastic thrombi.

Occasionally at these points the masses of the growth had spread into the intima of the larger veins and had led to a thickening of the latter to the extent of about ten times its normal thickness. The vessel lumen, impaired by the sarcomatous growth in the intima, was frequently only separated from the sarcoma masses by the endothelium. At those points where the mucous membrane and submucosa of the bladder had become totally infiltrated, necrotic degeneration occurred with the formation of thrombi; at some points the entire mucous membrane and submucosa were necrotic and enormous masses of bacteria had gathered around these necrotic parts. The severe inflammatory process which in this case accompanied the sarcomatous growth was probably due to the points of necrosis and ulceration on the internal surface of the bladder. In several sections taken from points where the infiltration had made only a slight progress, showed that here the tumor had spread in the mucosa and submucosa without involving the muscular structures, so that, on the whole, as has already been mentioned, the bladder growth had probably extended from within outwards.

The metastases in the kidney showed clearly that they came by way of the vascular system of the kidney, especially the capillaries, from the bladder. The first evidences of the sarcomatous growth occurred along the network of capillaries in the renal cortex, while secondarily there was penetration into the lumen of the urinary canals, resulting in their destruction. Evidences which might have distinctly demonstrated that the sarcomatous growth arose from the glomeruli were not found and the glomeruli were, as a rule, secondarily surrounded and destroyed by the malignant invasion. The renal metastases also showed the presence of an inflammatory process, and, like the primary growth, gave evidence of profuse hemorrhages and necrosis, as well as the same tendency of the tumor cells to extend along the veins and to grow into the lumen of the vessels.

The metastases in the suprarenal bodies and retroperitoneal tissue around these bodies exactly resembled the original growth. The neoplasm invaded the retroperitoneal tissue, this being accompanied with great dilatation of the vessels, especially the veins; many of these showed the same sarcomatous cell layer around them and in many points the walls of the veins were

penetrated by the cells, while extensive hemorrhagic foci complicated the histological picture. The suprarenal bodies were practically transformed into a malignant tumor and at many points they were considerably broken down by hemorrhages and necrosis.

The gastric ulcers were of great interest and microscopically showed a decided sarcomatous character. The mucosa and submucosa were diffusely infiltrated with sarcoma masses which had also involved the muscular layer of the stomach. The proliferation of the sarcoma in the gastric mucous membrane occurred in the interstitial tissue between the glands, the latter becoming secondarily destroyed. There was also chronic gastritis with interstitial cell infiltration and glandular hyperplasia of the gastric mucosa. Many small vessels, especially the veins of the submucosa and muscularis, were filled with sarcoma cells.

All things taken into consideration this was a large round celled sarcoma which was characteristic, not only on account of its enormous local extension, but on account of its numerous metastatic ulcers, which were particularly interesting as far as their localization was concerned. The growth was also interesting on account of its intensely infiltrating tendency and its extension along the vessels, especially the veins, and its penetration into their lumen. From this fact the pathologic diagnosis of angiosarcoma was decided upon. The invasion of the vascular system by the growth not only led to profuse hemorrhages, but also to thrombi and combined with these, there was ischaemic necrosis in the tumor tissue. The relation of the neoplastic cells to the vessels and their penetration into the lumen of the latter, accounts for the secondary growths in the distant organs. Since the lungs were free from metastases and since, on the other hand, there was no patent foramen ovale, it is consequently most plausible to attribute the renal and suprarenal metastases, as well as those in the stomach, to venous, rather than to arterial emboli. From the localization of the primary growth, as well as the large veins and portal system being affected by the growth (the rectum was very considerably destroyed), therefore, extension of the tumor cells by way of recurrent blood streams in the above mentioned vessels may be accepted as probable. At all events arterial emboli were not so likely, because were this the case it would have

to be assumed that the neoplastic cells had passed through the pulmonary system, especially the pulmonary capillaries, without becoming deposited and producing metastases.

Considering the relations of the local extension of the tumor, the mother tissue of the neoplasm must have started in the bladder, probably in the mucous membrane or the submucosa. The report of this case is consequently justified, not only on account of the infrequency of vesical neoplasms in general, but also on account of the metastases from venous emboli, which resulted in the formation of multiple gastric ulcers, microscopically proven to be of a true sarcomatous nature, thus rendering the case of extreme pathologic and clinical interest.

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NEPHROPTOSIS FROM THE GASTRO-ENTEROLOGICAL VIEW POINT.

By Robert Coleman Kemp, M.D., New York.

IT is an unfortunate, but well recognized fact, that our profession often suffers from "operative mania" in certain special directions and frequently, I fear, to the detriment of our patients. Among such notable attacks, the fad of ovariotomy, some few years ago, was carried to an extreme, and I believe you will agree with me in the statement that many women were thus unnecessarily "unsexed." I can well remember that a well-known gynecologist, having thus operated for certain nervous conditions in a number of cases, was therefore desirous of so treating one of my patients. I merely asked him if the operation of "castration," for a similar train of nervous symptoms, would be popular with our own sex, and if he would himself be willing to submit to this operation for a similar condition. Needless to say no operation was performed, and my patient made a perfect recovery and is still the happy possessor of her organs. Since that time, however, there has been, unfortunately, a decided "coolness" when I approached my professional friend.

At the present time, it seems to me, there is among us the same "operative mania" for nephroptosis, and I do not hesitate to say that I have frequently seen nephropexy performed in many cases where there was absolutely no scientific basis for the operation whatever. Time precludes my describing the various degrees of nephroptosis, which are familiar to you all, and I shall simply generalize in this paper.

Prolapse of the kidney occurs at least six or seven times more frequently among women than with men. You are well aware that, on account of the position of the liver, the right kidney lies lower than the left, and nephroptosis occurs more frequently on the right side than on the left. It may occur with both kidneys, however. Prolapse of the kidney is *acquired,* while floating kidney is congenital.

Nephroptosis is said to exist in about one out of every seven women. Edebohls finds it in about 20 per cent. of his cases, while

some even state that this condition exists in fully 33 per cent. of all women examined. The advocates of promiscuous nephropexy state that even slight mobility of the kidney will cause severe reflex disturbances.

At this point let me call to your attention that the "*normal kidney is movable,*" and on abdominal section it can even be observed moving in harmony with inspiration and expiration.

Let us consider for a moment the various symptoms imputed to movable kidney by numerous authors.

A. H. Cordier, in the *American Journal of Obstetrics,* Vol. XXIV, 1896, speaks as follows:

1. A movable kidney often produces a dilated stomach, with all the accompanying symptoms of disease of the latter.

2. It is a fruitful source of gall stones, by the pedicle producing a partial obstruction of the common duct.

3. The bending of the ureter often gives rise to hydronephrosis.

4. It may produce death by complete strangulation, by a torsion of the vessels and ureter.

5. By dragging on the abdominal aorta and kinking of the vena cava, a condition simulating an aneurism of the vessels may be produced.

Jaundice and catarrh of the gall bladder have been attributed to nephroptosis.

Dr. J. Cameron Anderson, now of New York, in an article entitled, "Bilateral Nephropexy and Operation for Chronic Appendicitis Through Right Lumbar Incision," *Western Medical Review,* Lincoln, Nebraska, July, 1900, imputes renal calculus, hydronephrosis and chronic nephritis to nephroptosis.

He believes that movable kidney may produce reflex disturbances of the generative organs, especially during the menstrual period, but that it cannot "per se" produce a diseased condition of these organs.

Edebohls states that movable right kidney produces chronic appendicitis in 20 per cent. of all women with nephroptosis of the right kidney, due to congestion resulting from compression of the superior mesenteric vein against the head of the pancreas and spinal vertebræ.

He furthermore attributes numerous stomachic disturbances

to nephroptosis, such as dyspepsia, flatulence, pains sharp and lancinating in character, apparently in the intestines, nausea, vomiting, and anorexia, pain referred to the cardiac extremity of the stomach. He explains these symptoms by traction and pressure upon the duodenum, causing a narrowing of its lumen and resulting in a residuum in the stomach undergoing fermentation, also by the renal plexus being so closely associated with the solar plexus, which receives terminal filaments of the right pneumogastric nerve. Pressure on the common duct has caused jaundice. Nervousness and restlessness result, and the patients sleep poorly, lose weight rapidly, and headache, backache, a dragging sensation in the loin, radiating to the pelvis, are sometimes present, often simulating uterine flexions, versions, or displaced ovary.

All these symptoms yield quite readily to fixation.

Pregnancy, tumors of the uterus, ovarian cysts and tumors of the lower abdomen, as soon as they attain any size, cause a cessation of the most severe symptoms by gradually pushing and holding the kidney in its normal site.

In the last statement we have a most important admission, for one of the chief factors in maintaining the kidneys in their normal position, and the continuance of normal intra-abdominal pressure on these organs, is the maintenance of the normal position of the intestines, and I shall shortly endeavor to demonstrate that enteroptosis, in a large percentage of cases, has a direct bearing on the resulting prolapse of the kidneys.

In the *Medical Brief,* December, 1903, Dr. Augustin Goelet gives, as the consequences of neglected prolapse of the kidney, the following:

1. The patient may be reduced to a state of chronic invalidism as a result of the symptoms produced by the prolapse, or the condition depending upon it.

2. Many diseases of the female pelvic organs are caused, or maintained by a prolapse of the kidney, by pressure upon the ovarian veins, interfering with the return circulation from the pelvis.

3. In 75 per cent. of all the cases of prolapse that have progressed to the third degree, or beyond, there is a pyelo-nephritis or interstitial nephritis, as shown by careful microscopical examination of the urine.

4. Hydronephrosis, pyo-nephrosis, or atrophy of the kidney, may and does occur in a certain number of these cases.

5. Fixation of the kidney in abnormal position may result from perinephritic inflammation, provoked by irritation of the organ, or interference with its circulation.

Attempts at correction of this condition, by the use of belts or corsets, cause irritation and inflammation of the kidney, owing to the pressure necessary to support it. They may be of value in the earlier degrees of prolapse, or what might be designated movable kidney, before the organ has descended below the level of the ribs in front, to retard the progress of the descent, but later they are not only of no value, but are positively injurious. Therefore fixation in its normal position, by operation, is the only reliable means for overcoming this condition, and the operation should be resorted to early, before the health of the patient is seriously impaired, or the kidney is disabled. Dr. Gill, Wylie and others hold similar views to the above authors, but time prevents my discussing them.

Since, according to these authors, from 20 to 33 per cent. of women suffer from nephroptosis, the outlook is a sad one for our present generation, though *certainly satisfactory* from a *surgical viewpoint*. On the other hand, my friend, Dr. Achilles Rose, in an interesting article entitled, "Floating Kidney Idolatry—A Polemic," quotes from an article by Alexander Macgregor in the *Lancet* of December 14, 1901, entitled, "Movable or Floating Kidney a Cause of Acute and Chronic Painful Dyspepsia, Etc." "The cause of dyspepsia in some cases is not the stomach itself, but the symptoms are due to the wanderings of a floating kidney. The kidney is not really thought of as being the cause of an acute attack of jaundice, etc., yet it has been known to give rise to such symptoms." Dr. Rose hereupon remarks that "Schleiden has shown that some natural philosophers have accused the moon of influence on events in nature of which she is innocent, and compares the rôle the moon is made to play with the rôle of the cat accused of having broken dishes, while the kitchen maid is the malefactress. This applies to the rôle the floating kidney is made to play in regard to gastric and nervous symptoms.

"Studying the history of medicine, or the history of religion, we see nothing is too paradoxical to find believers, at least for a

time. The imprtance which at present is attributed to floating kidney is one of those aberrations of men of science, of which we find examples enough in history. It is surprising to observe how much learning has sometimes been employed by serious men to support a theory which appears in a later period to be entirely unscientific."

Macgregor describes a number of cases in which one or both kidneys were movable, and in which the abdominal walls were flaccid. He remarks, "Nothing abnormal was detected in the stomach. We do not know whether the gastric contents were examined, the condition of the motor function, or whether or not gastroptosis existed."

Let me say right here that *careful investigation on my part* reveals the *astounding fact that* in *none of the papers* written by the *ardent advocates of nephropexy* can I find the *least evidence of investigation* into these *important data.* The kidney was designated *at once* as the *"casus belli,"* and operated upon in consequence.

Furthermore, Kraft-Ebing warns us against overestimating the importance of the floating kidney so often found in emaciated neurasthenic pluriparæ. He says, in many instances, this floating kidney only becomes of importance when the attention of patients has been directed to it and when their minds become occupied with this wandering organ. He has adopted the principle, not to reveal to the patient the condition and in case he has been informed of it by some other physician, to make little of it and to inform the patient they will have to eat well to reduce the ptosis.

Bazet, in the *Transactions of the Medical Society of the State of California,* 1898, says: "There are patients,—they are mostly women,—in whom the floating kidney is but a part of a complex condition, where enteroptosis and neurasthenia appear to play the principal rôle. Here all the viscera are altered in their suspension, and these patients are nervous in the proper meaning of the word. When in such cases nephropexy is performed, there is absolutely no therapeutic benefit.

James Israel, of Berlin, at the International Congress in Moscow, in 1897, said: "Careful observation made on a great number of cases has convinced me that the operation of nephropexy is often superfluous and irrational, because the many symptoms which are attributed to movable kidney,—a very common occur-

rence,—are, in only a *very small number of cases,* really related to this displacement; these symptoms are caused mostly by enteroptosis, or neurasthenia, or affections of the generative system." He speaks against popularization of this affection, because many women who have heard of floating kidney and all the *ghost stories* about them, keep these horrors in their minds and have no peace until they are operated on.

Dr. Rose furthermore says: "Edebohls and his apostles find a movable kidney in almost every woman that presents herself for examination. He and his followers have perfected the method of examination to such a fine point that hardly any woman can escape being accused of having one or two movable kidneys if she happens to go to these virtuosos. A list of symptoms which includes the whole clinic of internal medicine was attributed to movable kidney. I saw a number of women at a medical meeting on whom demonstrations of movable kidney had been given and when they passed the stand to be let out, they reminded me of the Roman gladiator's *Morituri te salutamus.*"

Modern diagnostic technique has discovered what the "Gods formerly had covered with night's shadows."

I desire you to keep continually before your mind the *two chief factors* which *support the kidneys* in *their normal position.*

First—the fatty capsule (perirenal fat).

Second—and of equal, if not of greater importance, the pressure exerted by the intestines with their suspensory ligaments and omental covering.

My investigations have been carried on, for the past fifteen months, at the Manhattan State Hospitals, Wards Island, where there are over 4000 patients—male and female—equally divided. Special research has been conducted at my Tuesday clinics at the West Hospital. Furthermore, I have examined many patients at St. Bartholomew's Clinic and in my private practice. Some of the results were reported by me in a paper entitled "Observations on Dilatation of the Stomach and on Gastroptosis," read at the Academy of Medicine, March 14, 1904, before the Medical Association of the Greater City of New York. The gynecological conditions were investigated by Dr. LeRoy Broun, who visits the West Hospital in that special department. *In no case could* any *connection be found* between the *prolapsed kidney* and the genital

organs, as regards the production of disturbances—or inflammatory conditions. Thorough examinations of the genito-urinary tract and of the urine were made by Drs. Ferd. Valentine and Terry M. Townsend, and in *no case* was there evidence either of *nephritis,* or *pyelo-nephritis,* although nephroptosis of the third degree, or more, existed in these cases. They examined twenty cases or more in person, and I have tested numerous other cases with a similar result. This would seem to dispose of the statement that seventy-five per cent. of all cases of nephroptosis of the third degree give evidences of nephritis, or of pyelo-nephritis.

I have seen, however, in the course of my experience, nephritis or pyelo-nephritis, resulting from nephroptosis. Nephropexy would certainly be indicated in these conditions and in hydronephrosis. Fixation of the kidney from perinephritic inflammation is a rare condition, as are the dangers of death from torsion of the ureter, or kinking of the vena cava.

Strain, or traumatism may cause prolapse of the kidney and when local inflammation is demonstrated by urinary changes, or pain, or tenderness occur, operation is again indicated. Males are more subject to such injury, on account of occupation, but such cases are not very numerous.

Tight lacing and the wearing of tight bands or belts are etiological factors. Pressure is exerted along the lower border of the ribs and we have the additional tendency to continuously force the intestines downward, in fact, with the result of stretching the suspensory ligaments and with the production of *enteroptosis,* thus weakening one of the main supports of the kidneys. Gastroptosis of varying degree then follows the enteroptosis and we have resulting gastrointestinal and nervous symptoms. The nephroptosis is only part of the general condition.

Improper support after confinement, may cause lax abdominal walls and decreasing abdominal pressure, with results similar to the above.

Loss of flesh, by bearing children in rapid succession, may cause absorption of the fatty capsule of the kidney, but what is equally important, absorption of intra-abdominal fat with decreased intra-abdominal pressure. Enteroptosis, nephroptosis and gastroptosis result.

Anything, therefore, or any disease which may cause absorption of fat, may be an etiological factor.

In other words, I do not believe that the fatty capsule of the kidney is alone *especially selected* for *absorption.*

The resulting ptosis of the gastro-intestinal tract may be of severe type, such as described by Glénard, with aggravated nervous symptoms and frequently with prolapse of both kidneys; or the ptosis may be slight and with moderate symptoms; in fact, some cases exist with no symptoms whatsoever.

Thus, in some of my cases at Wards Island, on percussion and palpation, nephroptosis of the right kidney was found, no *enteroptosis was apparent;* yet on careful examination, by the various methods of inflation of the stomach and what is most satisfactory, by transillumination of the stomach with fluorescëin solution, gastroptosis of varying and often slight degree was demonstrated in every case. When this is found we know that enteroptosis exists.

You must remember that it is not the degree of the descent of the lower border of the stomach that constitutes a gastroptosis but that the lesser curvature descends with the greater, while in a dilated stomach, the lesser curvature maintains its relation to the diaphragm.

Atony, hyperacidity, anacidity, or achylia gastrica were found in these cases. The bowels were irregular.

I have about fifteen of these patients at present under observation. In addition, I have some cases of chronic gastritis with dilatation of the stomach, with evidently congenital wandering kidney and with no symptoms pointing to this organ.

We thus readily account, by reason of the ptosis of the stomach and intestines, for the gastro-intestinal symptoms, jaundice, colitis, congestion of the pelvic organs, and tendency to chronic appendicitis and also for the emaciation and tendency to invalidism.

In a large percentage of these cases, I fail to see that the nephroptosis has any relations whatsoever to the patient's condition.

Treatment.—In all cases of nephroptosis, therefore, a careful investigation into the gastro-intestinal tract is necessary, since in a large percentage of cases it is simply a part of a general ptosis.

The stomach and intestines should receive appropriate treatment. Rest in bed with fattening treatment, is one method to employ.

The increase of *intra-abdominal tension* by putting on fat and by *proper mechanical support* are the main objects.

The prolapsed kidney is held in place by the intestines and the intestines are pushed upward and backward by the belt, which exerts pressure from the symphysis to just below the umbilicus.

On this principle one can use the Van Valzah-Hayes bandage, the Gallant corset, or a belt made by Stohlmann & Pfarre, of New York.

I have secured excellent results with the Rose belt, which I have modified, by using adhesive plaster on moleskin (Johnson & Johnson), which is the least irritating form of plaster.

Personally, I allow the patient to be about, employ mechanical support, dietetics, appropriate medication to each case, and endeavor to put on fat.

I have already given you the indications for nephropexy. Even its most ardent advocates, frequently employ support for a long period after operation and endeavor to fatten the patient. Unfortunately they *neglect* a careful investigation into the gastro-intestinal conditions as I have already demonstrated to you.

In *conclusion,* let me say that nephropexy, like all operative procedures, has its limitations and these I have endeavored to define, as far as lies in my power.

The percentage of cases upon whom it is necessary to operate, I believe to be comparatively small, and I must earnestly protest against promiscuous and therefore unscientific surgical procedures.

EDITORIAL

THE SURGICAL TREATMENT OF TUBERCULOSIS OF THE TESTICLE.

THE various local treatments which have been advised in tuberculosis of the testicle are numerous; employed successfully by some, objections and failures have been found by others. Injections made directly into the tuberculous nodules have been tried, Michaux particularly recommending camphorated naphthol, but since the researches of Guinard, it has been shown that this antiseptic may produce very severe accidents. Cauterization with the thermocautery is defective inasmuch as it produces persistent fistulae and at the same time, is always an incomplete operation. The same may be said of excision of the foci in the epididymis, while other foci of tuberculosis when removed, always leave behind minute lesions which will undergo their evolution later. The tuberculous process has certainly a predilection for the epididymis, the testicle itself being frequently free from disease, but this is not an absolute rule, because the seminal gland may often be involved and it is for this reason that epididymectomy is not infrequently insufficient for a radical cure.

For some time the operation of choice has appeared to be castration, but this is far from always being crowned by success. A tubercular fistula coming from the vas deferens may result, and what is still more, castration has no action on the prostatic lesions and in no way prevents the remaining testicle from becoming diseased in its turn. For this reason castration should only be resorted to in desperate cases, because one is never sure that the other testicle may not become involved, in which case castration becomes a very dangerous operation on account of the general nervous and organic disturbances that it brings about, the apparation of which should be attributed to the suppression of the internal testicular secretion.

There is another reason which pleads against castration, namely the great opposition shown by patients. A man always

wants to retain these organs and as soon as their removal is proposed, he frequently changes his physician. Then again, in order that castration shall be a complete operation, the removal of the vas deferens, prostate and seminal vesicles, which are always considerably involved in the tuberculous process, is necessary and this very complex operation offers considerable gravity.

Quite recently Mauclaire has tried a new conservative method, consisting in ligating separately, or en masse, all the elements of the cord, hoping to produce atrophy of the epididymis. According to this authority, gangrene of the testicle will never occur when the technique followed is absolutely aseptic. Ligature with or without section of the cord is especially indicated in cases of tuberculosis which have not gone as far as suppuration; atrophy of the testicle and retrogression of the lesion are very much slower when the tuberculous process has suppurated.

This method appears to offer certain advantages; it is easy to execute and leaves behind a testicular débris which morally satisfies the patient. Occasionally even, the therapeutic action of the ligature extends to the seminal vesicles and the prostate, the tuberculous lesions seated in these organs undergoing a marked retrogression. To this surgical treatment, however, like in any other, one should always institute a general medical treatment in order to improve the general condition and strength of the patient, so that the organism will be able to cope with the specific bacillus and prevent its generalization. It is evident that more experience is necessary before approving or condemning ligature of the cord in these cases, but it would seem at all events that the operation is devoid of risk and in no way would prevent a more radical operation being attempted should it prove a failure.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. FEBRUARY, 1906. NO. 5

THE TREATMENT OF STRICTURE OF THE URETHRA, TOGETHER WITH CERTAIN MEASURES AND PRECAUTIONS NECESSARY TO OBTAIN SUCCESS IN THOSE CASES OF URETHRAL STRICTURE REQUIRING A CUTTING OPERATION.

By GRANVILLE MACGOWAN, M.D.
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STRICTURE may be defined as a lessening of the normal caliber and interference with the dilatability of a urethral canal by round celled infiltration, or deposit within its walls or in the corpus spongiosum of cicatricial connective tissue as a result of prolonged or chronic inflammation, or of mechanical or chemical injury.

These contractions are usually susceptible of dilation by instruments made of whalebone, silk, or steel, called bougies or sounds; and, after a certain increase of caliber has been reached, say 22 to 26 F., and further progress is apparently denied by reason of the density or resilience of the cicatrix, great help may sometimes be obtained by the patient use of expanding dilators, the best type of which is that of Kollmann. Great caution should ever be preserved not to use these powerful levers as divulsors. The operator should be satisfied to advance from one-half to one number on the dial at each sitting; and the utmost cleanliness should be practiced in the toilet of the urethra and bladder, both before and after the use of the dilator, in the asepsis of the instrument and its cover. These dilators are dangerous machines in the hands of the careless or unwary; the canal is always brittle behind or in the site of one of these tight strictures, and I have known of quite a number of cases of rupture of the urethra occasioned by the abuse of Kollmann's dilators in the hands of overconfident or inexperienced persons doing urethral surgery.

In proportion to the very great number of strictures that

come to treatment, very few require any cutting operation. It has, however, been my fate to have treated quite as many, if not more cases of stricture by internal or external urethrotomy, than I have by dilation. The reason for this is that the greater number of the persons who have sought my advice voluntarily have had strictures which were capable of dilation, while a very great number of those for many years in this city and county, and the southern part of this State, whose strictures have been regarded as impassable, uncontrollable, or beyond help, have been brought or sent to me for operation by others. My external urethrotomies alone run into many hundreds, and I have ceased to keep account of them. Necessarily in this experience I have gained some knowledge of why these operations are rarely strictly curative; what is necessary to obtain the best results; and what in technique and after treatment should be avoided. It is this knowledge gained from the study of my own mistakes and the contemplation of the blunders of others, that I now endeavor to express to you.

Before doing a cutting operation, really know that such an operation is necessary: which means that you must be supplied with instruments of precision to determine the greatest degree of contraction present, its pathological nature, and its possibilities of dilation. Positive information as to the presence and grade of stenosis, unless it is severe enough to occlude the channel from the meatus, or only allow of the passage of a whalebone bougie, may be obtained only by the intelligent use of the shouldered or bulbous bougies as stricture searchers, and of the electric endoscope. Any urethra with an approximately normal meatus should allow by gentle manipulation, aided sometimes by the relaxing effects of the local use of a little cocaine and adrenalin solution, the passage of a shouldered bougie, of a slightly less caliber than its meatus, to the bladder; and if upon its gentle return it does not catch or hang at any place so strongly as to require noticeable muscular effort to effect its withdrawal, there is certainly no stricture present, or none that can give excuse for interference by cutting. Every physician treating strictures should have such bougies in the flexible French or German makes, running in alternate numbers from 10 to 30 F., and in steel with copper handles from 20 to 30 F., the latter for use only after cutting operations, to make sure of the

serevance of all bands. The information obtained by a conical steel sound in examinations for stricture, is very deceptive, and though it has in a half-degree the weight of the authority of Keys as a procedure, very few other urinary surgeons would think of relying upon it.

When a tight stricture is situated within an inch of the meatus, and any difficulty is encountered in dilating, it should always be cut. The instruments needed are one small and one medium blunt pointed straight bistoury, a grooved director, and some steel bulbous bougies from 20 to 30 F. The essential points in cutting are that the meatus is to be markedly overenlarged and all of the bands back of it severed so that finally a steel 30 bulbous bougie can be passed to and fro freely through the seat of the stricture. Sometimes the stenosis extends to the roof of the urethra, but permanent benefit is not obtained by cutting the roof in this region. Afterwards for fifteen days a conical meatus sound should be passed daily through the wound to keep it dilated and in spite of this attention there will often eventually be more after-contraction than is desirable. The first few days it is best to keep the sides of the wound apart by gauze strips soaked in melted vaseline. When the stricture is situated in the urethra between the region described and the triangular ligament, it is usually best to do an internal urethrotomy. Here again we need instruments of precision. I do not believe it is proper to undertake such an operation, as I saw two physicians of my acquaintance once attempt in one of our hospitals, with three or four large steel sounds and an antiquated Civiale urethrotome that could not possibly be introduced past the face of the filiform stricture.

The operator should be provided with whalebone filiform bougies, tunneled silver catheters from 8 to 16 F., a Maissoneuve urethrotome or one of its modifications, and an Otis urethrotome, either straight or curved. The blades of these instruments should be sharp and tried in their sheaths to see if they move freely, before the patient is anesthetized; and the distal extremity should be tunneled to thread on a filiform guide. If the stricture cannot be dilated to admit an instrument the size of No. 16 F., the Otis urethrotome cannot be used. However, a filiform can almost always be passed and tunneled silver catheters of increasing sizes

threaded upon it until the passage is dilated enough to take the Maissoneuve, or even sometimes the Otis. Never use great force to introduce these catheters; it is better to tie in a filiform for a few days so that the surface of the stricture may become softer and more dilatable. When there is room for the shaft of a Maissoneuve to go by, the 26 blade may be driven home without fear. If the tip of the instrument is in the bladder and the shaft is not depressed, nothing of importance will be injured in the cutting. After its withdrawal, a warmed and lubricated steel sound of moderate size should be passed to the bladder. This may often be followed by other sounds in increasing numbers until 26 F. or even larger will pass easily, if so it is enough; for it is never to be forgotten that cutting a stricture is not curative, it is only a substitute for dilation and done for the sole purpose to make the latter possible. But if, as usually happens, only an 18 or 20 F. sound can be passed, the caliber of the canal will have to be further enlarged by cutting with the blades of the Otis instrument. When there are false passages in the urethra or enlarged follicles, or pockets in front of the strictured portion, it is sometimes difficult to guide the shaft of the Otis instrument into the bladder. If the search is prolonged, it is best to replace the filiform and thread the eye of the shaft upon it. No violent effort or force must ever be used, for the man has commissioned you to improve, not to render worse, the condition of his urethra. The instrument introduced, its dilating blades are to be expanded until the dial registers 32 to 34 F., then the cutting blade is pulled through the sclerotic tissues and afterward pushed back into its sheath. The screw is now turned until the dial indicates 34 to 36 F., and then reversed slowly, while making gentle traction on the shaft, the instrument is withdrawn. By this maneuver one avoids the disagreeable accident of the dilating blades catching and holding and seriously wounding a fold of the mucous membrane of the urethra. The canal is then dilated with conical sounds and explored with the shouldered bougies to detect unsevered bands. Even with the sharpest of blades, sometimes several distentions with the dilator and cuts have to be made in the resilient or inodular tissues before all the obstructing bands are finally severed and the desired approximate caliber of the normal urethra obtained.

An average caliber of 30 F. should be fixed as the goal in

these operations, but judgment is necessary in these as in other matters. The chief requisites are that all bands shall be severed and the passage of the bulbous bougies be smooth. The urethra will always contract some in the healing of the wounds, so it is best to over cut. It is my habit, and I think it a good one, after cleaning the urethra and bladder of clots, to tie a 20 to 22 Nelaton catheter in the bladder for the first 24 to 48 hours following the operation. This controls hemorrhage and nearly always drains the bladder painlessly and thoroughly. The patient is kept in bed and the bladder washed out with normal salt solutions every half-hour for the first twelve hours, and later every four hours. Spasmodic contractions of the perineal muscles frequently occur before the patient has fully recovered from his anesthetic, thus preventing the passage of a catheter. This condition is usually overcome by a little more ether, but if not the catheter can always be made to pass by the aid of a steel mandrin. The catheter is removed and the patient is allowed out of bed at the end of forty-eight hours. A sound is not usually passed until the fifth day after the operation. This is repeated every four or five days until the wound is healed and no more shreds appear, then if no tendency to contraction reappears, sounds are passed for a month once a week, then for three months once in two weeks; then for six months once a month, and then for six months once in two months, which I think a very good interval for any man who has ever had a stricture operation to pass sounds himself, or have his surgeon do so, for his lifetime.

The weakness of internal urethrotomy is the impossibility of controlling positively the amount of tissue cut by the instrument used, the good often has to be cut with the bad; the tissues are all erectile and do not remain of the same size and in the same place while the cutting is being done. When the operation is done beyond the first inch of the urethra, the incision is never in anyone's hands entirely confined to the diseased structures, except where the urethroscope may be used to bring in sight a band-like constriction which may be cut with a special urethral knife (Oberlander, Kollman), directly under the eye.

In view of these circumstances, it is best to do internal urethrotomy for strictures:

1. When they are not dilatable.

2. If the passage of instruments is accompanied by disagreeable hemorrhage, abundant catarrhal discharge or is followed by chill.

3. First, if the patient has retention and is the inmate of an overcrowded charity hospital; second, in a condition that demands surgical interference; third, has had retention and his business requires him to be in places where he cannot get good surgical care in case of the repetition of the retention.

Where the sclerosis has implicated the greater part of the canal from meatus to bladder do not expect a disappearance of all of the disagreeable symptoms after the operation. If the stiff fibroid tube stands open enough to allow the individual to empty his bladder easily, teach him to be thankful for this; for he will not get rid entirely of the follicular urethritis, the prostatic catarrh and the vesical irritability. Under the influence of errors in diet, venereal excitement, the effects of alcohol or of cold, the patient will suffer from exacerbations of these troubles and will plague you with complaints of the lack of cure following his operation.

Thus are we brought up to the severe strictures of the deep perineal and membranous urethra. Very few American surgeons familiar with the anatomy of this region treat these narrowings by internal urethrotomy. The danger is too great from hemorrhage and infection. In this group may also be included those strictures just beyond the peno-scrotal junction which are impassable to any instrument.

This is the field per se for external urethrotomy, and taken altogether forms a most difficult class of surgical operations. Perineal section is very simple when you get the go of it, but external urethrotomy for perineal stricture is at times appallingly difficult even to experienced operators. It makes much difference whether one of those little thin whalebone strips called filiforms can be passed to show you the way or you have to operate without a guide.

One should have for such an operation filiform bougies, tunneled silver catheters, a Wheelhouse staff, a long curved staff for retrograde work, one or two fine silver probe pointed directors, some eye knives, small curved Graefe eye scissors, a narrow straight gorget, perineal tubes No. 34 to 40 F. with two eyes, a Blizzard knife, needles that will carry No. 0 cat-gut,

needle holder, strong blunt pointed curved scissors, good dissecting forceps, one or two good scalpels, some haemostats, a pair of uterine forceps, some soft rubber catheters, steel sounds and shouldered stricture searchers. Compare this with the list in your books on Genito-Urinary diseases and you will wonder what these are for. In many cases the operator will need every one of them and in most cases they will expedite work that is always difficult. A good light and plenty of time is always necessary.

Local anesthesia is rarely practical. Many of the persons requiring this operation are alcoholics or opium users and are difficult to bring under the influence of ether or chloroform, hard to keep motionless and are prone to collapse. For the past four years I have almost always employed spinal anesthesia in these cases, using from one to two grains of tropococaine. I find this entirely satisfactory. I believe it is without danger, and find the help the patient is able to give me, of great assistance in the search for the opening of the stricture.

In the Wheelhouse operation, either with or without a guide, the precautions necessary, are first to keep the button end of the staff within the urethra. It is so easy to puncture the rotten tissue, and once outside of the mucous membrane, a staff readily finds its way between the layers of the bulb, often feels entirely free, and leads one into difficulties that may prove unsurmountable. Nearly all of the mistakes and troubles arise primarily from violence done to the urethra by the person holding the staff or the use of too coarse knives and probes by the operator. One should always open the urethra a half inch or more in advance of the constricted portion, so as to have sound mucous membrane into which to introduce the sutures used for retractors. The opening of the stricture is always tortuous and frequently eccentric and minute; it often lies among a bunch of wart-like granulations. The folly of searching for the channel with large grooved directors and incising it with coarse bladed scalpels is obvious. It is for this reason I use probe pointed and sharp pointed eye knives for this work. The Graefe probe pointed curved scissors are made use of to remove any wart-like excrescences which may be found; they can easily be taken off level with the mucous membrane with this instrument, and it is the only scissor I know suitable for the purpose.

Having discovered the opening, enlarge it upon the floor, cutting on the fine probe pointed director with a fine knife until a probe pointed straight gorget can be passed to the bladder; then with a Blizzard sever all of the obstructions in the bulbo-membranous urethra on the floor. Do not fear the bleeding, though it is often considerable I have never known anyone to be destroyed by it. If the incision is in the median line no arteries will be cut. If any artery is cut take it up with the surrounding bulbar tissues in a mass ligature, using a round pointed needle. Now right here is where many operators fail. The way appears clear to the bladder and they are satisfied to introduce a catheter through the perineal wound, tie it in, pack the cavity and admire themselves for breaking into the bladder so slickly. In the average case the operation is only half done at this stage. The next step is to introduce an index finger into the wound palmar surface upward and ascertain the condition of the roof of the canal within the limits of the incision and posterior to it. It is important always to save the roof of the canal as much as possible, for from a comparatively narrow strip of healthy mucous membrane on the roof the new channel formed by granulation will be covered and regenerated. But do not allow any bands to remain in this position. Cut them carefully where you can see them, with a thin bladed sharp knife in the median line, and if the infiltration extends through the urethra let the incision also extend through it so that the stiffened tissues in healing will carry a splice in the roof as well as on the floor. Where they are out of sight, cut them carefully with a sharp Blizzard guided by the sense of touch.

Explore the membranous and prostatic urethra with the finger. If there is obstruction to the entrance of the finger not easily overcome, introduce a Kollmann straight dilator or a Wylie uterine dilator along the gorget into the bladder, and cautiously but thoroughly dilate the urethra and the bladder neck to 40 F. There need be no fear of overstretching the bladder neck unless the operator is brutal. This procedure overcomes all spasm and irritability of the bladder after the operation, and allows of drainage through a large tube without discomfort. Sometimes there are bands or dense infiltrations of cicatricial tissue in the membranous urethra beyond the limits of the original stricture which require incision; if they are found the Blizzard is the best agent

to deal with them. In elderly persons I have a number of times met with the disagreeable complication of contracture of the bladder neck, or obstructive sclerotic prostatic enlargement as a complication of severe bulbo-membranous stricture, and these must be removed by appropriate operation at the same sitting, if success is to be looked for. If false passages exist into the bladder they should be cut so as to form one channel with the urethra.

The most common stumbling block is lack of careful examination of the urethra in front of the incision. This should always be cleared of obstructions before the operation is finished. Do not depend on subsequent dilation. If there is any narrowing cut it at the meatus with the blunt pointed straight bistoury, and further along the canal with an Otis urethrotome. Cut freely, so that a 30 F. bulbous bougie will pass smoothly from meatus to the bladder. Then finish the operation by introducing a 34 to 40 F. perineal drainage tube into the bladder and a full zized No. 26 F. catheter through the urethra until it can be felt in the perineal wound impinging upon the perineal tube. Fasten the catheter by a stitch holding it to the glans, and the perineal tube by a silk worm suture passed through both edges of the perineal wound and looped tightly about the tube at a point where careful trial shows the tube is set properly for drainage. If the perineal wound is a large one, a stitch may be placed next to the rectum and one or two near the scrotum, but no attempt should be made to close the wound tightly, the chances of sepsis are too great and the safety of the patient depends upon the freedom of the drainage. If the oozing is considerable, a light packing of a gauze trailer soaked in solution of adrenalin 1-1,000 and a pad under a double " T " bandage will control it.

The bladder is washed with sterile normal salt solution every half hour through the perineal tube, to prevent the accumulation of clots, until posterior active hemorrhage ceases; it is then washed every four to six hours, as long as the tube is retained, with borosalycilic solution, and after the removal of the perineal tube, which takes place in from two to six days, according to the condition of the urine, each time a sound is passed, with solution of silver nitrate 1-30,000 until the urine is clear. The tube is removed from the anterior urethra on the second or third day, and the subsequent treatment is that detailed under internal urethrotomy.

Urinary antiseptics, urotropin and santal are used in small doses three times daily, the former between meals in solution, the latter after meals. Immediately following the operation, or while the patient is still upon the table, two liters of normal salt solution is introduced beneath the skin and this is repeated in from four to six hours. Since adopting this measure nearly ten years ago, I have never seen even in the worst cases, any flagging of urinary secretion or urethral fever follow the operation. Subsequent sounding should be repeated at intervals of four to five days until the external wound is healed. This takes place in from two to six weeks, and after the first week, usually proceeds just as well with the patient up and about as it does in bed.

The congestion incident to the pressure of the full bladder upon the veins of the penis will, when removed, often convert an impassable stricture within twenty-four hours into one that is easily passable to a filiform and a tunneled catheter. There are two ways of accomplishing this: One by sectio alta and drainage by a De Pezzer catheter stitched in the bladder by the Gibson method. This is easy and may be nicely done under infiltration anesthesia. While the bladder is open a retrograde staff may be passed into the posterior urethra from the bladder to the face of the stricture, the perineum and urethra freely opened on the staff and a drainage tube inserted, after which the suprapubic bladder wound may be closed. This is rather a common procedure in France and presents no great surgical difficulty.

In stricture impassable to all instruments, the safest way of gaining entrance to the bladder from the perineum is to make the inverted " Y " shaped incision, and after exposing the bulbo-membranous junction, cut off the recto-urethral tendon and enter the urethra at the apex of the prostate. A gloved finger in the rectum may press the urethra, which the trained finger can easily distinguish, against the pubic arch, a straight sharp scalpel with the cutting surface up can usually be readily thrust into the canal and a small straight gorget passed beside it to the bladder, after which the opening may be enlarged with a Blizzard until a good sized drainage tube can be inserted. Often after drainage for a few days, an internal urethrotomy may be done in what was considered previously an impassably strictured canal. This is sometimes more difficult than it is to tell of, for the anatomical

relations are not infrequently greatly distorted by the inodular masses, fistulae, etc., which have practically replaced the bulbar tissue, and tied down muscles and fascia so that they cannot be separated or retracted. In the final dealing with these conditions all of the cicatricial deposit must be removed with knife and scissors, and all fistulae split up and dissected out before the operation can be considered finished. It is well always to save the roof if it can be done, but if it is hopelessly cicatricial with the rest, it too must be resected and the divided ends of the urethra brought together over a catheter, which I have done successfully several times; or the ends united by grafts, a procedure which has never succeeded for me.

In these old and desperate cases do not look for a 26 F. urethra. Your patient and you will both be fortunate if you succeed in establishing a 16 F. that will remain patulous, and permit of fairly comfortable passage of urine.

As a final admonition, never fail after an operation for stricture, to search the bladder and prostate for stone. Be prepared always after an internal urethrotomy to crush a calculus and remove it, if one be found, at the same sitting. In an external urethrotomy if the stone be a small one, it may be removed through the perineal opening with a pair of stone forceps after the bladder neck has been dilated as directed. If it be a large one, it is best to crush it and pump it out with the evacuating instruments. This procedure is very easy of execution if the surgeon is properly equipped.

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SURGICAL INTERFERENCE IN MEDICAL NEPHRITIS.

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ON January 4, 1896, I published a paper in the *Lancet* "On Some Forms of Albuminuria Associated With Kidney Tension and Their Treatment." Before the paper appeared in print the late Sir William Roberts wrote me that he believed "it will be the starting point of important things in the treatment of inflammatory affections of the kidney." This has proved to be the case, for since its publication, the surgical treatment of nephritis has received a large amount of attention from this standpoint, and much valuable literature relating to the subject has appeared which should be studied in its chronological order as indicating the stages which have so far been reached.

In presenting this subject, it is hardly necessary for me to point out that the present state of renal pathology and treatment relating to the large group of inflammatory affections of the kidney justify the attempts that have been and are being made to deal with some forms and stages of them on principles which are successfully applied to external parts of the body, which can be brought within reach of the sight and the touch. Antiseptic surgery has practically disposed of those distinctions which previously existed between operations performed on the surface of the body and on its internal organs.

Illustration of the application of these principles will be found in the eye. The recognition of the pathology of glaucoma and the adoption of surgical means for the removal of tension and the arrest of degenerative changes thus initiated, resulted in the preservation of sight which otherwise would have been lost. By this means Von Graefe converted an incurable affection into a curable one, and at the same time demonstrated the true nature of the disease. Hence it has been suggested that the term "renal

glaucoma" is not inappropriate. Could anything be more disastrous and permanently damaging to kidney tissue than the tension of nephritis as described by Dr. Dickinson, "as characterized by extravagant congestion and rapid swelling of the gland, so that I have seen at least in one instance the kidneys have burst their capsules." [1]

Time and experience have shown that there are many pathological conditions of the kidney which are beyond the reach of any medicines that have been tried, and which have passed into these hopeless states by the continued presence of mechanical agencies which might have been arrested by mechanical means. Some of the most disastrous conditions of advanced kidney disease and the complications arising out of them are directly due to the continuance of mechanical causes which hitherto have only been imperfectly recognized. An advanced pathology will doubtless appreciate more fully the effects of inflammatory tension as a factor in the production of permanent kidney disease.

For instance: (1) In the direct damage that is done to renal tissue by the excessive pressure which is caused by acute inflammation occurring within the area of the unyielding capsule of the kidney and the compartments it forms as is so often seen in cases of acute scarlatinal nephritis. Here as is well known these organs are thus not infrequently permanently damaged.

(2) In the damage inflicted on the kidney structure by the continued contraction of its thickened capsule. In this way, I believe, the small granular, contracted or cirrhotic kidney is produced and the organ is thus permanently destroyed by a process of gradual squeezing, so far as normal excretion is concerned. The pressure of a thickened capsule is capable of equaling that of a traumatic urethral stricture.

(3) The tension which commencing in the kidney spreads to the entire circulatory apparatus and eventually leads to hypertrophy of the heart. This as we all know is caused by the increased efforts of the heart to drive the blood through the obstructed kidneys.

On these grounds, as well as upon others that might be mentioned, I consider that surgical intervention for the purpose of relieving tension is indicated in some forms of renal disease. In these circumstances it has frequently led to the complete restora-

[1] Allbutt's System of Medicine, vol. iv. p. 354.

tion of these organs, after other methods of treatment have failed.

The following may be regarded as indications for relieving tension surgically in cases of nephritis however arising.

(1) Progressive signs of kidney deterioration as shown by the persistence or increase of albumen when it should be disappearing from the urine as in the natural course of inflammatory disorders ending in resolution.

(2) Suppression of urine or the approach of this state.

(3) Where a marked disturbance of the heart and circulatory system occurs in the course of inflammatory renal disorders.

The question in a case of nephritis sometimes arises as to which organ should be selected for operation. Unless there is something to indicate it, such as the presence of pain, my experience leads me to believe that this is not absolutely material to the issue. Both organs are usually involved in the inflammatory condition, though perhaps not to the same degree. In double nephritis the relief of tension in one kidney aids the other, and thus, as I have noticed, the normal amount and constitution of the urine may become re-established.

Similarly, aid to an injured kidney by the removal of direct pressure caused by the accidental extravasation of blood either within or around it has been shown to assist the opposite one and to restore the balance of the urinary excretion when this has been diminished or entirely suppressed.

These features were in evidence in a case where acute suppression of urine followed an operation for internal urethrotomy. Guided by the intense pain on one side over the region of the kidney, I performed a renal capsulotomy which was followed by the restoration of the urinary excretion and the recovery of the patient. During the fifty-four hours which intervened between the operation on the urethra and the simple division of the capsule of the kidney, only three or four ounces of blood-stained urine had been passed, and uræmia was evidently imminent.

I will pass on to notice the nature of the operation that should be practiced, as a rule, in these cases.

The kidney having been exposed by an incision through the loin, and if necessary for fuller exploration withdrawn through the wound, a linear incision through the capsule should be made

to the extent of two or three inches and sufficient to relieve any tension that exists. The desired object being effected, whether limited to the division of the tense capsule or the thorough exploration of the organ should a stone be suspected, a drainage tube is inserted so as to remain in contact with the kidney and the wound is then closed with sutures and dressed.

More recently Dr. Edebohls, of New York, has advocated and practiced what he designates as "decapsulation of the kidney for nephritis." It seems to me that Dr. Edebohls' method is open to a sérious objection—I refer to the removal of more or less of the capsule of the kidney. How it is expected that anything better in the way of tissue can be substituted for the capsule removed, I certainly fail to comprehend. A new capsule formed in constant relation with a urinous surface is almost sure to be thick and contractile as I showed in my Lettsomian Lectures (1888) in connection with observations made on the healing of wounds in contact with urine.

I do not think I can better express my views in reference to the operation of decapsulation of the kidney for nephritis than in the following passage from a letter of an eminent surgeon in America with whom I have been in correspondence on this subject.

He thus writes: "In the many discussions I have had upon the reports of these operations (decapsulation), I have taken the position that the only benefit derived was from the relief of tension and that this could be better obtained by nephrotomy, or even by incision of the capsule over the convex border. The assumption that the nutrition of the kidneys is increased following decapsulation because of penetration of vessels from the fatty capsule, cannot be sustained histologically, anatomically or pathologically. The new capsule following the operation is of a tough, contracting, fibrous structure that will cause more tension than the one removed. No vessels enter the kidney from the fatty capsule, and the vessels from the renal arteries are terminals, only a few sprigs entering the capsule. My results in these cases have been good and I believe that if the incision is properly made in well selected cases, many good results will follow in most instances."

This is a weighty opinion in favor of nephrotomy as against decapsulation, and with its endorsement I will bring my remarks to a close.

THE DIAGNOSIS OF LARGE NEOPLASMS IN THE LEFT HYPOCHONDRIUM.

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IN this short paper, space will not allow me to pass in review all the physical, functional, and secondary symptoms which of necessity should be taken into consideration when making a diagnosis of neoplasms in the left hypochondrium, or more correctly speaking to differentiate a large spleen from a large kidney. However, the cases which are here reported will give an occasion to bring out the importance of some of these symptoms and come to some conclusions.

CASE 1. (Due to the kindness of Dr. Cade). G. P. Nineteen years of age, entered hospital February 10, 1903, died March 30, 1903. Diagnosis: splenomegalia, probably of tuberculous origin. Autopsy: sarcoma of the left kidney with hepatic and pulmonary generalization.

The patient's father died of apoplexy; mother living and well. He has two sisters alive and in excellent health.

The patient himself has usually been well, no alcoholism, no syphilis. Although he never suffered from otorrhoea nor enlarged cervical glands in infancy, he had a bronchitis at the age of two. At the age of twelve he suffered from anemia for a few months. At seventeen he suffered from an attack of gastritis which lasted for a fortnight. He does not cough, nor has he ever had hemoptysis and although he has never left his home, which is at Vonnas, he never suffered from malaria.

In December, 1901, he was operated on for hernia.

The patient states that the affection for which he now enters the hospital dates back to November, 1902, at which time he was seized with pain in the left hypochondriac region, which he compared to a lumbago. Towards the middle of December his appetite and strength diminished, and at the same time, he noticed that his abdomen increased in size. However, he continued to

keep up with his hard work, which he did not relinquish until the end of January, at which time he was obliged to take to his bed. Since the latter part of December the patient has expectorated bloody sputum. At about the same time another symptom made its appearance, namely, a mild form of varicocele on the left side.

The patient consulted his physician upon several occasions, the first time being in the middle of December, and he again saw him between the 5th and the 10th of January, again at the end of January, and in the early part of February. It was at the last visit that his physician discovered that he had a tumor in the left hyponchondriac region, which he believed to be seated in the kidney.

The patient had lost considerable flesh since the commencement of the disease, his normal weight having been 69 kilograms. On January 25 he weighed 68 kilograms, March 6, 65 kilograms, 800 grams, and on March 14, 53 kilograms, 600 grams.

Upon examination, the patient was found thin, somewhat pale, the lips and gums being quite white, while the cheeks became red upon the slightest effort. He expectorates a gummy sputum which adheres to the bottom of the cuspidor and contains some blood, although there is an absence of pus which recalls to mind the sputum of an infarctus. Slight dyspnoea; at 9 o'clock in the morning respirations 26, which at 11 o'clock had increased to 40. There is dullness of the left base, while the vibrations are diminished. There is respiratory obscurity, but no distinct egophony nor souffle can be made out. At the left apex, both in front and behind, there are dullness, increased vibrations evident to the hand and ear, and a whistling and rough respiration. At the right base, friction sounds of perihepatitis can be detected extending very low, even below the thorax and at this point the patient complains of pain. Throughout both lungs subcrepitant inspiratory rales can be detected, which appear grouped in small areas, but are not accompanied by signs of bronchitis. They are particularly evident at the base of the right lung. Some are detected in the apices, but here they take on peculiar characters.

Nothing could be detected in the heart, the pulse was of low tension and in the morning when he entered the hospital its rate was 110.

Appetite lost, with a slight distaste for meat. Tongue nor-

mal; no hypertrophy of the tonsils, but the patient said that he was subject to sore throat. The patient does not vomit, there is no diarrhea, hemorrhage nor melena.

The abdomen is not distended, it is not very lax and rigidity of the recti considerably hinders palpation. However, a large tumor can be detected under the left false ribs, dull on percussion and whose borders can be with difficulty outlined. The growth continues directly with the splenic dullness under the false ribs. Below, the tumor extends to the umbilicus and inwardly almost to the median line. The spleen measures about 16 centimetres in the nipple line. There is no pain on palpation of the tumor. The liver is also enlarged, measuring 14 centimetres in the nipple line. No enlarged lymphatics could be detected in any part of the body. Left-sided varicocele.

The temperature varied between 37°.8 and 38°.5 C. The first evening in the hospital it reached 39°.5 C., but the next morning it had dropped to 37°.8 C. During the entire duration of the disease there was an elevation of the temperature varying between 37°.5 C. in the morning and 38°.5 C. in the evening.

The urine was normal in color, with a hardly visible clouding from albumen. After being centrifuged the deposit showed only one or two red blood cells such as may be met with in normal urine.

On February 26, 1903, the sputum was examined, but no bacilli of tuberculosis could be found. On March 1, the serodiagnosis of tuberculosis was made and was found positive at 1 for 15.

Blood examination made by Dr. Cade gave the following results: Red blood corpuscles 3,521,600, white cells 21,250 (s. acetic), 25,500 (s. colored). Corpuscular value, $\frac{18}{25}$ below 1. Hemoglobin 5½%. Percentage: neutrophile polynuclears 79.5%, intermediaries 1.5%; large mononuclears and lymphocytes, 18.5% eosinophiles 0.5%. A few normoblasts and megaloblasts. No special change in the red cells, no poikylocytosis and no myelocytes with the triacid stain of Erlich.

On the 10th the sputum was inoculated in a guinea pig, but the animal died at the end of two days. By puncture of the spleen little blood could be withdrawn, and gave rise to no growth when inoculated on suitable media. This blood was also submitted to a

second examination by Dr. Cade and gave the following results: Eosinophiles, 1%, neutrophile polynuclears, 73%, intermediaries, 3%, mononuclears, 22%. Very few small lymphocytes. Koch's bacillus could not be discovered in this sample of blood.

On March 14, the patient became extremely oppressed in breathing, the respirations reaching 50. Over the spleen rough friction could be detected by palpation, while the liver appeared to have increased in size.

On March 18, the guinea pig inoculated on the 13th with the sputum, died, but search for Koch's bacillus by Jousset's technique remained negative.

On March 20, the patient complained of pain on the right and at the base of the lung friction sounds could be elicited, dullness was not absolute, while the vibrations were exaggerated.

Analysis of the urine on March 20 by Dr. Nicolas, gave the following results: Total amount 1100 grams, so that in the twenty-four hour amount was found, urea, 33 grams, uric acid, 2.53 grams, chlorides, 7.04 grams, phosphates, 3.058 grams. The proportion of uric acid to urea being consequently $\frac{1}{12.5}$. No bile, glucose, nucleo-albumen, albumose or peptone. By Esbach's test, about 20 centigrams of albumen per litre was found.

On March 26, the patient became livid and extremely oppressed, but auscultation of the lungs could discover no cause for this, only a slight degree of dullness being found at the left base. On the next day the sputum was found purulent and blood stained. The liver had become very large, measuring 16 centimetres in the nipple line, showing that it had evidently increased considerably in the last few days. The sputum did not contain any tubercle bacilli.

On March 28, the blood was again examined by Dr. Cade, showing 1,984,000 red cells and 25,823 white cells. There were a few giant cells, a few other pigmy cells and numerous nucleated red cells, a marked decrease in hemoglobin and a large number of normoblasts. No eosinophiles nor lymphocytes, polynuclears 74.2%, mononuclears 24.2% and intermediaries 1.6%.

The patient died on March 30, the autopsy being made thirty-three hours after death. Upon opening the abdomen it was immediately discovered that the case was one of a large neoplasm of

the left kidney, which had pushed the colon outwards so that it was in direct contact with the abdominal wall, the tumor projecting particularly upwards and forwards; however, when the colon was distended, it had a tendency to cover the tumor in front. The neoplasm when removed weighed 1 kilogram, 850 grams, being quite regularly oval excepting for a large boss seated on the anterior aspect, and which had been felt during life. The growth was completely encapsulated and adherent to the diaphragm, pancreas and aorta, but these had not become invaded by the neoplasm. The suprarenal capsule was probably included in the principal neoplastic mass, but it seemed that at the upper and anterior aspect of the tumor this gland could be recognized by its shape, but it had become completely involved in the process. The tumor was softened in certain places and at its lower part was found a cavity filled with broken down tissue. Everywhere else it looked rosy and hard, with small dark red hemorrhagic points. The left ureter was patent as far as the renal pelvis, but here it was obstructed by a neoplastic mass. The prevertebral glands were not involved, while the spleen was slightly increased in size, flattened out under the ribs, but presented no macroscopic evidence of disease.

The liver was very much enlarged and riddled with metastases, some of which projected above the surface of the organ, especially over its anterior aspect. These foci were easily enucleated, dark red in color, very friable and partially softened down. In size they varied considerably, the largest being at least that of a walnut. There was also perihepatitis and a lax symphysis united the liver to the diaphragm.

From 30 to 40 grams of bloody fluid was found in each pleural cavity, likewise a few thin adhesions, which, however, were very tough. The right pleural cavity presented in its entire lower half a roughened condition of the serous membrane which explained the extensive friction sounds heard during life. Both lungs were literally riddled with cancerous foci, so that more than half the pulmonary tissue had been destroyed. These metastases were of firmer consistency than those of the liver, while their size and color was very variable.

The heart was perfectly healthy. In the left testicle, or rather in the tunics covering it, were found one or two malignant

nodules the size of a pea. To sum up, there was generalization of the process in the organs, but not in the lymphatics.

In this case the history of the patient was of little value; he did not cough, he had never had malaria, nor blood in his urine. The neoplasm developed quietly and had only given rise to a little pain in the left lumbar region, while the patient rapidly lost flesh and strength. Palpation was difficult, the growth had the feel of the spleen, but it is only right to say that rigidity of the recti considerably hindered the examination, so that the sulci found in the surface of the spleen could not be detected. The tumor was dull on percussion, the dullness and growth both extended up under the left false ribs, so that, combined with the absence of any pathologic condition of the urine or renal ballottement, one was led to suspect splenomegalia. Blood examination could not make the case be considered as a leucemia, but the elevation of the temperature, cough, dyspnoea, bloody sputum, the symptoms obtained by auscultation, leucocytosis, hepatomegalia following the splenomegalia, and lastly, the sero-diagnosis of tuberculosis, led one to think that perhaps the case was one of these forms of tuberculous splenomegalia, several instances of which have been related during the last few years.

In spite of the infrequency of this pathologic process we accepted this hypothesis, although the absence of Koch's bacillus in the sputum and blood, however, would render this diagnosis doubtful, but not to be absolutely rejected. In this case much more importance should have been given to the varicocele whose apparition occurred after that of the tumor on the left side. Then again, if an intra-vesical separation of the urine had been undertaken, it would have allowed us to absolutely affirm the renal localization of the neoplasm, for the simple reason that post-mortem examination made it evident that the diseased kidney was incapable of carrying on secretion of urine.

Insufflation of the colon might, perhaps, have brought out resonance on both sides of the tumor, and at any rate would have given us an exact appreciation of the situation of the descending colon. From all that has been said, the importance of the appearance of a varicocele, the necessity in doubtful cases of intra-vesical separation of the urine and the little value which should be given to palpation, percussion and so forth, seem to me evident.

The next case did not offer the same diagnostic difficulties, but nevertheless if blood examination had not been made, the diagnosis would have been impossible.

Case 2. (Due to the courtesy of Dr. Cade). L. E. Twenty-four years of age, entered hospital October 12, 1903, service of Prof. Bondet. Diagnosis: splenomegalia, myelogenous leucemia. The patient was brought to the hospital on account of daily febrile attacks and for a large abdominal tumor.

The patient's father is in good health, his mother dying in labor. He has brothers and sisters enjoying excellent health.

The patient himself has never been seriously sick and has always felt well. No alcoholism, no syphilis. Three years ago he left for his military service and was sent to Tunis, but was never in the southern garrisons. During the first two years of his service he remained perfectly well; in December, 1902, he had icterus and was treated for a few days in the infirmary. During this attack there was no rise in temperature nor hematuria, but his skin remained jaundiced for a considerable length of time. He then made a stay in the hospital, after which he went back to Sfax, from which point he was given leave of absence for convalescence from anemia.

Six months ago, upon his return to France, he complained of a sensation of fullness and weight in the abdomen after eating. Then attacks of fever with chills and sweating commenced, and according to the patient's statement, the attacks occurred daily. A month ago he consulted a physician, who prescribed quinine, which he took for a fortnight. He told us that his abdomen increased regularly in size, and at the present time it causes him considerable hindrance during an effort or movement. No sharp pains are complained of. There are no distinct digestive disturbances, other than a diminution of appetite and a sensation of abdominal tension and distension, more marked after meals.

Examination. A young man, thin and pale, the mucous membranes are not very pale, the general hue of the integuments is straw color. Slight subicteric tint of conjunctiva. No edema of the lower limbs, and for that matter the patient states that he has never had any. No enlargement of the axillary, inguinal or cervical glands.

Abdomen. What strikes one first is the very large size, but

without any very marked forward projection; it is rather more regularly enlarged without being spread out. Its size prevents the patient from sitting with ease and interferes with respiration. No collateral circulation.

By palpation, a large tumor can be made out, occupying nearly the entire abdominal cavity. This neoplasm is smooth, hard and in direct contact with the abdominal walls. It extends more particularly over to the left, and by percussion it can be followed up under the false ribs, filling up the left hypochondrium and left iliac fossa so completely that its borders cannot be felt. It passes beyond the median line into the right flank and iliac fossa which it fills, but here its borders can be made out and a very distinct fissure can also be detected. Consequently the entire abdomen is practically filled by the growth and alone a little line of resonance separates the dullness of the tumor from that of the liver. Over this point the rounded border of the tumor can be felt, which can be nearly picked up by the fingers, and it is here that two fissures can be felt. Palpation is not painful and reveals friction sounds at several points. Behind, in the left lumbar region, there is slight pain elicited by palpation. Auscultation of the growth does not reveal any souffle, but the vessels of the neck present a continued blow.

The liver appears to be of normal size and its lower border does not project beyond the ribs. Heart normal, beats regular. No pulmonary lesion.

The patient presents attacks of fever, chills, heat, and sweating. When he entered the hospital the temperature was 40°.1 C., the next morning 36°.4 C. and since then has varied between 37° and 39° C.

On October 15, Dr. Cade made an examination of the blood and on the same day the patient was admitted into the service of Prof. Poncet. Dr. Delore made an intra-vesical separation of the urine and found that the urinary secretion was the same on both sides, consequently both kidneys functionate equally.

Blood analysis furnished the following data. Red cells 2,790,000, whites 147,000. Preparations stained with hematein-eosine showed polynuclears 24%, large mononuclears 70%, eosinophiles 2%, intermediary cells 4%, lymphocytes 0%. With preparations stained by Ehrlich's triacid stain was found polynu-

clear neutrophiles 26%, mononuclear neutrophiles 60%, eosinophiles 2%, large mononuclears 12% and lymphocytes absent.

On October 17, the liver came below the costal margin to the extent of about 1 centimetre and by percussion it was discovered that the organ measured from 9 to 10 centimetres in the nipple line.

On October 19, the urine was examined by Dr. Nicholas, who found a general decrease of all the normal elements of the urine, excepting uric acid, which had considerably increased so that the relation between uric acid and urea is increased nearly four times. The twenty-four hour amount of urine was 600 c.c and gave the following result: Urea 12.6 grams, uric acid 1.116 grams, chlorides 7.74 grams, phosphates 1.068 grams, $\frac{\text{uric acid}}{\text{urea}} = \frac{1}{11.3}$. Heller's reagent gave a very distinct disc, which was dissolved at a temperature of 50° C., consequently urates were present. Tauret's reagent gave a very slight precipitate. No sugar nor biliary pigments.

On October 20 a very marked edema of the legs and internal aspect of the thighs made its appearance.

When the patient presented himself at the first examination, one had the impression that the case was one of an enlarged spleen, but the difficulty was to assign a cause for the splenic hypertrophy. Against the diagnosis of leucemia was the absence of hepatomegalia, while malaria might have been suspected, but the patient had never had fever while he was in colonies and had only had a rise in temperature after the apparition of the tumor; then again the neoplasm was very large for a recent malarial spleen, and lastly quinine had been given for a certain time without any effect. Consequently malaria could be eliminated.

Blood examination should consequently allow one to settle the question of leucemia, and if this examination resulted negatively, the splenic nature of the growth would become doubtful. The types of splenomegalia which do not respond to leucemia or malaria being very rare, and the physical characters of the tumor, such as dullness, friction and fissured sharp border, do not give an absolute diagnostic security; then, on the other hand, the first case reported should lead one to be circumspect in these matters of differential diagnosis.

The considerable size of the tumor could in no way do away with the hypothesis of a rapidly developing malignant renal growth, an hypothesis which could well be upheld, given the age of the patient, the anemia and the profound changes undergone by the general health. Consequently, if a blood examination gave a negative result, the hypothesis of a renal tumor could well be sustained and here the intra-vesical separation of the urine was of great value from the fact that, although it might not furnish a decisive argument, it would at least have great weight. Now, both these examinations were done simultaneously and each of them gave a reply, which taken alone, would be sufficient to solve the problem. Each kidney secreted a normal quantity of urine, while, on the other hand, the blood showed all the characters of a myelogenous leucemia.

Case 3. (Due to the courtesy of Dr. Delore). P. F., entered the hospital November 13, 1903. Diagnosis: tumor of left kidney. Operation showed hydatid cyst of the spleen and omentum. Splenectomy.

Patient's father unknown, mother living and well; three brothers who were not born of the same father, in excellent health.

The patient had measles in infancy, but has never had malaria. First pregnancy at twenty-one years of age. A year after her labor, she noticed a small and painless tumor seated in the upper part of the abdomen; the tumor remained stationary for three years. At the end of this time second pregnancy and the tumor then began to considerably increase in size. It never gave rise to real pain, only to a feeling of weight in the abdomen. Eight days before the patient came under observation, she was seized with very severe headache, called in a physician and showed him the tumor, and, upon his advice, entered the hospital.

The patient stated that she had lost much weight during the last year, and at the same time became more and more pale.

Through the thin abdominal wall which was rendered very supple from the two pregnancies, a tumor could be made out on the left hand side under the ribs, extending down and filling the lumbar fossa. Its contours were very distinct, its surface irregular and in consistency hard and resistant. Starting from the left seventh rib it respected the tympanic space of Traube, became frankly abdominal, passed about 3 centimetres to the left of the

umbilicus and before reaching the level of the latter, it turned backward; behind it occupied the entire lumbar region and above overlapped the pulmonary resonance, producing a zone of dullness which stopped 3 centimetres from the vertebral column. In front there was no colic resonance, as is found in renal tumors, while behind was to be found a line of resonance between the tumor and the vertebral column as is met with in splenomegalia.

When the tumor was carefully palpated its anterior aspect was found to be composed of a tumefaction forming a cask over the deeper portion of the tumor which is very much more considerable. Ballottement was extraordinarily distinct; both hands searching this sign may, so to speak, seize the tumor both forwards and backwards. No fluctuating point could be detected.

The patient had never had any urinary symptoms, no polyuria, hematuria nor pyuria, no lumbar or reual pain.

Temperature normal. No plumonary nor bone localization. Examination of liver negative. No albumen in urine. On November 21 laparotomy by Dr. Delore. A vertical lateral incision on the external border of the left rectus, starting at the costal border and carried to within two fingers breadth of the antero-superior iliac spine. The tumor which was irregular and bossed, was adherent to the omentum and especially to the lumbar walls, so that, at first sight, it was thought to have a retro-peritoneal origin, although its reddish aspect with a bluish reflection recalled more particularly splenic tissue. The numerous adhesions with the omentum were easily broken down and the tumor was dislocated outwards. It was then found that we were dealing with a spleen which had become transformed into a hydatid cyst. The normal part of the organ covered the antero-external aspect of this enormous mass like a cask. When removed the spleen weighed 1100 grams. Convalescence uneventful.

This case offered very considerable difficulty from the standpoint of diagnosis, so much so that here in opposition to what was observed in Case 1, the kidney was thought to be the organ involved, when in reality it was the spleen, as the operation proved.

In favor of a renal localization there was a distinct ballottement, while the results of palpation showed a very irregular tumor which could not decide one either for or against the kidney. The tumor was dull but quite a distinct resonance was present behind,

between the dullness of the growth and that of the vertebral column, and here evidently was a sign which pleaded more in favor of a splenic localization. It consequently may be conceived that it was used as a strong diagnostic element and that the much greater frequency of renal tumors, in spite of the absence of any urinary symptom, caused the balance to weigh in favor of the latter. Hydatid cysts of the spleen are, in point of fact, exceptional. The only thing to be regretted in this case is that intravesical separation of the urine was not done, which would have settled the diagnosis.

In the *Journal de Médecine interne,* February, 1903, is to be found the report of a case of primary tuberculous splenomegalia from the pen of Dr. Chauffard. In this case the physical signs were of little value. One of the functional symptoms which I have considered as very important, namely, the appearance of a varicocele, is regarded by Chauffard as of very slight importance. On the other hand, it was by taking into consideration the thermic reaction produced by an injection of tuberculin that he was able to make the diagnosis of tuberculous splenomegalia, but there is a question whether or not certain reserve should not be made. Although this reaction indicates that a focus of tuberculosis is somewhere present, it does not give any information as to its localization, which may be quite as well splenic as renal, and although the patient in this case had no urinary history, such as hematuria or pyuria, the diagnosis of a renal tumor cannot, for this reason, be rejected, because the first case related in this paper presented nothing abnormal in the urine.

Separation of the urine which would have been of great help, was not done in this case and as Schwartz says, who has tried this procedure, the fact of so great an excitability was a very suspicious symptom from the standpoint of the existence of a renal lesion. Distension of the colon with air gave no data; from the analysis of the blood nothing could be concluded other than that there was a slight anemia. However that may be, Chauffard's case is of extreme interest and shows us the difficulties that may be encountered in the examination of tumors of the left hypochondrium. All these cases have not allowed us to take into consideration all the possible hypothesis, and they have only allowed us to put in evidence the diagnostic difficulties in these cases, and particularly

to lay less importance on the value of certain differential signs. The object of this paper was not to consider the diagnosis of all tumors arising in the left hypochondrium, nor the diagnosis of the nature of a renal or a splenic tumor, my desire being simply to discover by what means one might diagnose a renal or a splenic tumor in difficult cases.

From this study I believe the following conclusions may be drawn: In a diagnosis of tumors of the left hypochondrium, it is sometimes very difficult to differentiate a renal growth from a splenomegalia. Under these circumstances the information obtained from the shape and situation of the tumor cannot be of any great value, and the same may be said of the results obtained by percussion. Ballottement is distinctly in favor of a renal neoplasm, but does not constitute a pathognomonic sign. *A recently appearing varicocele* is a most important symptom in favor of a renal localization of the growth. Examination of the blood should always be done and may occasionally solve the problem. On the other hand, examination of the urine is often insufficient, but it would appear to me that intra-vesical separation should be undertaken in doubtful cases and may give rise to very important results. As to insufflation of the colon it may always be undertaken on account of its inocuity and easy execution and will perhaps give some interesting information.

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THE HISTORY OF PROSTATIC SURGERY IN CONNECTICUT.[1]

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Mr. President and Gentlemen of the American Urological Society:

The history of prostatic surgery in the State of Connecticut is neither old nor voluminous. So far as I am able to learn, the only attempt at prostatic enucleation, prior to 1900, was made during an operation for suprapubic cystotomy by Dr. Melancthon Storrs at the Hartford Hospital. Some portion of the gland was removed with the finger in the bladder, but the operation was not undertaken for that purpose.

In 1901, Dr. Harmon G. Howe performed the Bottini operation upon an elderly man suffering from pyelonephritis, plus an enlarged prostate. He lived three months, and was considerably relieved of his bladder symptoms.

The same year Dr. E. J. McKnight performed an elective operation on the prostate upon a patient who was thoroughly septic from retention of purulent urine, operating by the suprapubic route. The patient died soon after from general septicaemia.

Following the meeting of the American Medical Association at St. Paul, much interest was manifested at Hartford in the paper of Dr. Parker Sims, which was read at that meeting, describing his operation for perineal prostatectomy, aided by the use of his inflatable, rubber, prostatic tractor.

[1] Read at the Annual Meeting of the American Urological Association, June, 1905.

Dr. Dawbarn of New York, while at the Hartford Hospital one day, demonstrated the use of Dr. Sims' tractor, while doing an external urethrotomy.

CASE 1. The first perineal prostatectomy performed in Connecticut, occurred at the Hartford Hospital, June 26, 1902, and was accomplished by the author of this sketch. The patient was a feeble man of fifty-six years, suffering from complete urethral obstruction due to a deep prostatic stricture, from a trauma received fifteen months previously. One week before admittance to the hospital, his symptoms, which had gradually been increasing in severity, became alarming. Catheterization was found impossible, and a small quantity of pusy urine dribbled from the distended bladder. Operation was performed under ether, through a median perineal incision, and the prostate drawn down by Dr. Sims' tractor. Patient suffered but little from shock; sat up on the eleventh day; drainage tube removed on fourteenth, on which day irrigation was carried through the penile urethra. On account of the dense traumatic stricture which existed in this case, more of the urethra was removed than in our later cases. The fistula was allowed to close in September, after which the urine was voided through the penis. During the three years which have elapsed, the patient has been operated upon for haemorrhoids and inguinal hernia, and still lives. At the last examination, a year ago, there was still some incontinence.

CASE 2. Our second case was an American architect, seventy-four years of age, who had suffered from prostatic obstruction for six years. For the past two years, following an acute attack of urethral obstruction, he has depended entirely upon a catheter. When first seen by me, he had been confined to bed five weeks. Was anemic, emaciated and extremely feeble, suffering constant distress from bladder symptoms. There was constantly from 100 to 200 c.c. of foul, purulent residual urine. It was decided to perform perineal drainage at his home. This was done June 18. At the end of three weeks his condition had improved to such an extent that prostatectomy was considered feasible, and was accordingly performed July 9, under ether anesthesia. The patient sat up on the seventh day, the first time for eight weeks. Drainage tube was removed at the end of two weeks; patient was out at the end of three weeks, and his further convalescence uneventful.

This patient, now at the age of seventy-seven, more than three years after operation, is in excellent condition. His bladder holds from 200 to 300 c.c of urine, without incontinence, and is emptied at will.

Case 3. Our third case was a feeble man of seventy-four, who had suffered from extreme prostatic disease for two years. Had been confined to bed twelve weeks, voiding purulent urine at intervals of half an hour. Had suffered two attacks of complete retention. Was emaciated and hectic, with marked arteriosclerosis. His condition was considered all but hopeless, but in view of his extreme suffering and our inability to relieve him other than by operation, we decided to make the attempt, and did so on August 9, under local cocaine anesthesia. It was not an easy operation, but the complete prostate was removed. To our surprise, the patient suffered but little from shock, and was at once relieved of his bladder distress. He sat up at the end of the week; his urine was much improved. The following week he was exposed to a very cold temperature from an open window during the night, became thoroughly chilled, and developed bronchopneumonia, of which he died.

Case 4. Our fourth operation was upon a delicate, nervous man of sixty-five years, who in addition to his bladder symptoms had been losing flesh and strength for several months. Median incision, perineal prostatectomy with the Parker Sims instrument, with uneventful recovery as the result. The prostate proved to be cancerous, however, and the patient died one year later of general carcinosis.

Case 5. Our fifth case was at the Litchfield County Hospital; the patient, aged sixty-one, who had suffered bladder symptoms for eighteen months. An attack of complete retention necessitated aspiration, after which he was brought to the hospital, prepared for operation and again aspirated. Operation of perineal prostatectomy with Parker Sims instrument was performed in the evening with uneventful recovery, with the exception of an orchitis on the third day, which subsided early. Patient left hospital November 1, five weeks following operation, with complete control of vesical sphincter. This patient suffered a recurrence, and was operated upon a second time, two years after.

Cases 6 and 7. Our sixth and seventh cases were in the town

of New Britain. They were both veterans of the Civil War, and both aged sixty-nine. Both had symptoms of prostatic obstruction for several years with increasing severity. Both had albuminuria and arterio-sclerosis, and one of them a marked mitral regurgitant murmur. In both it was thought that only perineal section could be safely performed, but in both we removed the prostate with an uneventful recovery in each case.

Case 8. The eighth case was from Waterbury, Connecticut, who came to the Hartford Hospital for operation, having suffered from prostatic symptoms for between two or three years. His urinalysis was indicative of chronic nephritis, the urine having a gravity of 1007, contained albumen and casts, pus and blood with epithelium from pelvis of kidneys. This patient did fairly well for a time, but finally succumbed to general septicemia. At autopsy, two months following operation, kidneys were found markedly contracted with purulent foci; also an abscess in the recto-vesical space.

Case 9. Our ninth case, from Bloomfield, Connecticut, occurred in a farmer aged seventy, who had suffered from prostatic symptoms for past year. Prostate was found to be very large; his urine of low gravity, but free from pus. He entered St. Francis Hospital, but the night following preparation for treatment, had a severe chill followed by temperature of 104° and diarrhea. His operation should have been postponed, but we felt that his bladder sepsis in a measure attributed for his high temperature, and we accordingly operated with the patient in this extreme condition. The operation was uneventful, there was but slight shock, and the local condition did well, but the intestinal infection continued, and he died five days following the operation in a typhoid state.

Case 10. Our tenth case was a resident of Hartford; an American, aged seventy-four. He gave a history of progressive prostatic symptoms with purulent cystitis for past two years. He was a thin, feeble and nervous patient, but bore his operation with but slight shock, and left the hospital at the end of the third week in a very comfortable condition; wound nearly healed. The purulent cystitis, however, continued in this case, and ten months later a vesical calculus was discovered and removed by litholapaxy. Several months following the operation it was discovered that he

had a recto-urethral fistula, the only one in the author's series of cases of which he has knowledge. His patient is still living in a fairly comfortable condition.

Case 11. Our eleventh case occurred in the person of a distinguished physician from New Britain, Connecticut, aged seventy years. Had had marked prostatic symptoms for past two years. Had suffered from three attacks of severe anuria. Has chronic albuminuria, increasing bladder distress, urine voided only by catheter, and that has to be used hourly. Operation has been discouraged by physicians from New York and Boston. Operation at Hartford Hospital, October, 1903. Median perineal incision. Operation uneventful; slight shock. Hiccoughing persisted for two weeks following operation. An attack of bronchitis added three weeks to patient's convalescence. Patient left hospital in five weeks with fistula still open. This closed during first week at home. Nine months later patient reports having gained twenty pounds in flesh, and having resumed his practice as well as local examinership of New Britain, he having been previously entirely out of practice for two years. This patient is now traveling in Europe. At my last examination there was slight urinary incontinence.

Case 12. Y. C. Hartford. Age seventy-five. Referred by Dr. E. W. Kellogg.

Suffered from bladder distention and diminishing stream for past four years. Water passes now only in drops. Attempts at self catheterization futile. Prostate much enlarged.

Operation, June 23, at Bruce Private Hospital, Hartford. Perineal incision. Local cocaine followed by general ether anaesthesia. Three lobes enucleated. Drainage tube removed fourth day. Patient sat up and passed water per urethram on eighth day. Left hospital end of fourth week with complete bladder control. Perineal wound healed.

Case 13. M. K. Norfolk. Age sixty-four. Recurrent case, having been operated upon by the author two and one-half years ago.

Operation, Litchfield County Hospital, July 22. Perineal incision. Chloroform and ether anaethesia. One lobe of prostate found encroaching upon urethra. Operation uneventful. Drainage tube removed at end of week. Patient made slow pro-

gress, as marked atony of bladder existed from attacks of severe distention. Patient left hospital at end of second month with ability to empty bladder, but with some incontinence.

Case 14. G. G. Winsted. Age seventy-three. Referred by Dr. William S. Hurlburt. Patient confined to bed. Feeble health. Purulent cystitis, suffering severe pain. Progressive prostatic symptoms for past year. No urine passed without catheter. Operation, Winsted Hospital, July 27. Inverted V perineal incision. Ether anaesthesia. A greater portion of three lobes removed. Patient made slow but steady progress toward recovery. Discharged from hospital at end of fifth week, with perfect bladder control. Patient up and about. General condition much improved.

Case 15. R. E. M. Kensington. Age seventy-two. Prostatic symptoms of six months duration. Residual urine, three oz. Prostate bilaterally enlarged. Moderate arterio-sclerosis. Operation, Bruce Private Hospital, August 15. Inverted V perineal incision. Ether anaesthesia. Three lobes enucleated. Drainage tube removed fourth day. Patient sat up at end of week. Left hospital at end of fourth week. Complete bladder control.

Case 16. A. W. C. New Hartford. Age seventy-seven. Referred by Drs. J. and Paul Swett. Seven years ago submitted to castration for enlarged prostate. Improvement resulted and continued from two to three years. Since that time progressive prostatic symptoms. During past year has voided urine by catheter only. Three months ago was unable to enter bladder, since which time the Drs. Swett have been obliged to catheterize several times during each twenty-four hours. Patient suffers from chronic rheumatism, and arterio-sclerosis. Prostate much enlarged.

Operation, Hartford Hospital, August 15. Inverted V perineal incision. Gas and ether anaesthesia. Very large median lobe enucleated. Operation remarkably well borne. Tube removed third day. Patient sat up on ninth day, and left hospital at end of sixth week. Can empty bladder at will. Slight incontinence when bladder is full.

Case 17. P. L. Hartford. Age seventy-three. Referred by Dr. Emil Reinert. Prostatic symptoms of one year's duration. Urination has become more and more difficult, until

the past month since which time catheter has been used continuously. Catheterization accompanied now by pain and hemorrhage. Patient suffers from marked arterio-sclerosis. Fine rales over bases of both lungs posterially. Prostate much enlarged bilaterally.

Operation, September 20, at Hartford Hospital. Perineal incision. Chloroform anaesthesia. Prostate removed piecemeal, but completely. Slight shock. Drainage tube removed on fourth day. Patient sat up at end of week. Present writing (October 1), wound not entirely healed, although some urine is passed per urethram.

Case 18 was that of a gentleman from East Hartford, Connecticut, who had suffered from bladder symptoms for past two years, and for the past nine weeks had been unable to work on account of these symptoms. He was rapidly losing flesh, had markedly arterio-sclerotic arteries and bilaterally enlarged prostate, with 8 oz. of residual urine. Operation was done at his home through a median incision, and decided hemorrhage encountered from the start. Prostate was drawn down with Sims' tractor, but before enucleation of gland was commenced, patient showed marked symptoms of collapse, and the operation was abandoned. He died within an hour without getting out of his anaesthesia. This unfortunate case was the only immediate death we have experienced.

Case 19 was in a gentleman from Lake Tahoe, Cal., aged seventy-four. Had suffered bladder symptoms from two to three years; was now passing small quantity of urine, an overflow from a distended bladder, the bladder constantly forming a tumor in the abdomen reaching nearly to the umbilicus. Although care was exercised in drawing but a portion of the urine, this was accomplished only with considerable pain and some bleeding, with a minute soft catheter. There was marked chill following catheterization. Prostate was bilaterally enlarged; arteries markedly sclerotic; the patient was rapidly failing in strength and losing flesh. He was a poor subject for a surgical operation, but catheter life was impossible, and we were forced to operate. Operation was performed through an inverted V incision. The Young prostatic tractor was used. Three lobes enucleated with comparative ease. The patient did poorly from the start, the

abdomen becoming markedly distended; anuria developing at once. Patient died at the end of forty-eight hours.

CASE 20 at Stamford, Connecticut, occurred in a gentleman aged seventy-three. Postmaster. Gave a history of having had good health until two years ago, when he began to fail in strength and flesh, accompanied with hesitation and frequency of urination. Has now been confined to bed sixteen weeks. A markedly enlarged prostate with from 4 to 6 oz. of residual purulent urine; well marked arterio-sclerosis and mitral regurgitant murmur. Operation, Stamford Hospital, March 14. Ether anaesthesia. Inverted V incision. Two large lobes of prostate enucleated. Considerable bleeding. Scarcely any shock. Four months later his attending physician, Dr. Bohannan, reports the patient in excellent condition; up and about attending to his duties, emptying his bladder completely with perfect control.

CASE 21, a resident of Hartford, aged sixty-one, suffered from bladder symptoms for past two years. Entered Hartford Hospital March 18, 1905. Gave a history of having had three attacks of retention, requiring catheterization during past two years. Bladder aspirated upon entrance, urethra being found impassable. Operation, March 21. V incision. Gas and ether anaesthesia. Three lobes enucleated with but little difficulty. Drainage tube removed third day; sat up in chair on seventh day. On twelfth day the hospital note reads, "Condition excellent. Wound nearly closed. Patient up all day, voiding water through urethra." Condition three months later: bladder holds 8 to 9 oz. Perfect control. Condition of urine practically normal.

CASE 22 was from Lyme, Connecticut, referred by Dr Ely. Patient, aged sixty-eight; an alcoholic with marked prostatic obstruction; 6 to 8 oz. residual purulent urine. Operation, Hartford Hospital, March 4. Anaesthetic methods similar to last cases reported. Operation uneventful. Condition of patient excellent up to end of fifth day, when acute lobar pneumonia developed with high temperature and delirium. Death at end of ten days.

CASE 23, a resident of Hartford, patient of Dr. William Porter, Jr. A thin but wiry man, aged seventy-four, who gave a history of having suffered from bladder symptoms for several years. During the past six months progressive loss of flesh and

strength, malaise, evening temperature, frequency of micturition, intervals of one and two hours, restless nights. Examination showed markly enlarged prostate with 4 to 6 oz. of residual urine containing considerable pus. Operation, Bruce Hospital, March 23. Eucaine local anaesthesia for superficial dissection. Ether for enucleation. Three lobes removed. Very little hemorrhage. No shock. Drainage tube removed fourth day; patient sat up at end of week. Made a complete, rapid and uneventful recovery. Now, three months later, rises but once at night. Bladder contracts vigorously and expels normal sized stream. Is under perfect control. Has a very slight fistula remaining at upper angle of incision, which emits a few drops of urine at time of micturition.

Case 24 was a resident of Hartford, aged seventy-eight, with hardened arteries. Mitral lesion, impaired digestion. Attacks of acute dyspepsia. Suffering from attacks of nervous irritability and depression, voiding urine at intervals of one to three hours. Has had two attacks of retention, catheterization at both times causing pain and hemorrhage. As this patient was considered a poor subject for operation, two weeks were spent in an attempt to antiseptize the bladder and reduce the enlarged prostate. At the end of the two weeks the patient had failed, and the urethra and prostate were more irritable than at first. Operation, Bruce Hospital, April 27. Local and general anaesthesia as in case twenty-three. The operation through inverted V incision proved rather difficult, but scarcely any shock followed. A serious anuria occurred early during convalescence, persisting for three days, during which time patient entered a typhoid state. Gradually the kidneys resumed their function, and the patient improved. He left hospital at the end of fourth week with perfect bladder control. This patient continued with excellent bladder conditions up to June 20, when he died suddenly of angina pectoris.

Case 25 was a young man aged twenty-five, a resident of Manchester, Connecticut, who two years previously suffered gonorrheal cystitis. He was treated for this; had urethral vesical irrigations for a greater part of the intervening two years, passing urine at intervals of twenty minutes to half an hour. Urine contained pus and blood. Operation, Bruce Hospital, June 1. External urethrotomy performed through inverted V incision. Constant irrigation following operation for twenty-four hours. Shortly

after operation patient had a convulsion, followed by high temperature, both of which subsided. Drainage tube was left in two weeks, during which time daily boric acid irrigations were used with occasional injection through drainage tube into bladder of 10% argyrol solution. Numerous examinations of urine for tubercle bacilli were made, but none found. Pus and urine is gradually diminishing. Patient left hospital at end of five weeks, still running some afternoon temperature.

In relation to the pathology of the prostates removed from the above series of cases, a large majority of them were fibro-adenomata. A few contained more muscular tissue, and should be classified as myo-adenomata. Unfortunately all the specimens were not examined. This was true in the fourth case, which was undoubtedly cancerous, as the patient suffered a metastasis of left lung and pelvis. The importance of careful pathological examination is apparent, as upon it the ultimate prognosis largely depends. Dr. Monro of Boston, tells me that the present feeling of the operators at the Carney Hospital, is that cases which adhere firmly to the pelvic fascia and are removed only with difficulty and hemorrhage, are probably malignant, and that the pathological findings prove many more cases to be so than was at first supposed.

The drainage in our first cases was accomplished by a single tube one cm. in diameter, stitched to the skin. Later we employed one large and one small tube united by a few silk sutures. In our last eight cases we have used the drainage tube which I here present, which consists of one large tube carrying a small one, the proximal end of the small tube emerging through the wall of the larger, the two being annealed by heat. As the urethra closes about this tube it forms a cylindrical tract, rather than an irregularly shaped one, as was the case when the two attached tubes were used. This tube is tied to the suture through the upper angle of the wound with a silk bow-knot, so that the tube can be removed and replaced at will. This drainage tube is the result of the efforts of one of my associates, Dr. O. R. Witter.

From the foregoing it will be seen that at Hartford, the capital of our State, we commenced our work upon the prostate five years ago, performing both the suprapubic and Bottini operations; that two years later we employed the perineal route with the

median incision and the Parker Sims' tractor. Still a year later, following the lucid and scientific article of Dr. Young, which appeared in the *Journal* of the American Medical Association, we employed the incision as recommended by him, and his metal tractor. Our results have certainly improved with this method. Our dissections are more carefully and completely executed; the work is done with more room and better view. It is our feeling in Connecticut up to the present time, that this is the operation of choice in the majority of cases, and we feel that great credit is due the men who have worked out these problems.

As this work is practically in its early stages, few of us are able to report on a large number of end results. That some cases will be lost of complications and sequellae, depending largely upon the degenerate condition of patients suffering from enlarged prostates, must be admitted, but that the relief from suffering and prompt and vast improvement in local and general conditions with the majority of these cases is most gratifying, we must all acknowledge. That the operation has come to endure there can be no question. There will, undoubtedly, be greater discretion used in the selection of cases, as in all other new fields of operative work, as we attain more experience.

It is anticipated by the writer that an honest comparison of experiences and statistics in this operation by operators from various parts of the country will greatly aid us in arriving at correct conclusions, and the most desirable lines of treatment.

BOOK REVIEWS

Operative Surgery. For Students and Practitioners. By JOHN J. MCGRATH, M.D., Professor of Surgical Anatomy and Operative Surgery at the New York Post-Graduate Medical School. *Second edition, thoroughly revised.* With 265 illustrations, including many full-page plates in colors and halftone, 628 royal octavo pages, extra cloth, $4.50 net; half-morocco, $5.50, net. Sold only by subscription. F. A. DAVIS COMPANY, Publishers, Philadelphia, Pa.

This book, the second edition of which we now notice, has been carefully and thoroughly revised, while a number of illustrations and much new matter have been added. The operative surgery of the stomach, intestines, pancreas and spleen are worthy of particular mention.

The author has endeavored to combine in a practical way the subjects of surgical anatomy and operative surgery and in this he has succeeded admirably.

The work will be found of much value to all engaged in the practice of surgery, while for the student the teachings in its pages will be reliable, sound and fruitful.

Die Chronische Gonorrhœ der Männlichen Harnröhre und ihre Komplikationen. By Prof. Dr. F. M. Oberlander und Prof. Dr. A. Kollmann. Leipzig, 1905. George Thieme, *Publisher.*

This most complete and scientific work, representing the teachings and practice of two eminent urologists, cannot fail to attract the attention it so justly deserves. To give an adequate review would require several pages, but it may be said that the bacteriology, pathology, symptomatology and treatment of chronic gonorrhea and its many complications are more than thoroughly discussed.

The illustrations are numerous and eight plates, most of which are in color, complete the work, which also has a good index at the end.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. MARCH, 1906. NO. 6

REMARKS ON NEPHROLITHIASIS[1]

By RAMON GUITERAS, M.D., New York.

IT is difficult to know, when one is asked to open a discussion on nephrolithiasis, how thoroughly he should consider the subject; for it is so vast that an entire evening would not suffice to cover it in a painstaking way, and yet omissions of important parts would leave it open for many criticisms in the open discussion to follow. On the other hand, if the surgeon opening the discussion were to take up only certain points which are to-day not well understood by the profession, and were to emphasize the importance of their special consideration, they might not appeal to the gentlemen who were asked to discuss certain parts of the subject, and might therefore not be taken up by them. It appears to me therefore that it would be advisable for anyone who is, in a general way, opening a discussion which is to be followed by special consideration of various parts by others of the Association, to notify each one what he considers to be most important points, that they may be gone into more minutely by the other participants in their remarks.

These ideas, however, have not been carried out by me in the programme of to-day, and therefore my part of the discussion may be of greater length and more of a review of the subject than I would like to have it, as I will take up in a general way the etiology, diagnosis and treatment of the subject.

The *etiology* of nephrolithiasis will not be discussed in detail in this paper, as it involves many an abstruse question in the domain of pathologic metabolism, to encroach upon which lies beyond the intention of the writer. I will, however, consider under this heading the pathological changes caused by renal calculus, that

[1]Read before the meeting of the American Urological Association, December 6, 1905.

we may be better able to grasp the conditions referred to under diagnosis and treatment.

It may be said that there are certain predisposing factors that have been noticed in connection with the occurrence of stone, pre-eminent among which is that of *age;* for it has been conclusively proved that this disease is most often met with in persons in the middle of life's highway—that is, between the ages of twenty and fifty years. Women are more frequently affected than men.

Country and race have some influence upon the development of stone, as warm countries seem to favor it. For example, renal calculi are very common in India. Renal stones are generally stated to be more frequent among the Anglo-Saxons than among the Latin races, especially the Spanish and Spanish-Americans. I think, however, that such conclusions are due to the fact that better statistics and more complete reports on this subject have been published in Anglo-Saxon literature than elsewhere. Personally, I have found stone more common in this country among Italians than in any other race.

There are *two varieties* of stone, *primary and secondary.* The primary stones are formed by the precipitation of substances formed in the kidney without any previous pathological changes in the parenchyma, the stroma, the pelvis or the calcyces.

The secondary stones are the result of pathological processes in these localities and are formed when certain salts are precipitated, owing to the decomposition of the urine. Of course, a calculus may be originally primary, and by its presence so irritate the surrounding tissues that lesions develop which give rise to secondary calculous deposits over the primary calculus.

Of the *primary variety* of calculi we have those formed in acid urine and those formed in alkaline urine. The varieties developing in acid urine, consist of one or more of the following substances: uric acid, urates, calcium oxalate, cystin and xanthin. Those formed from alkaline urine consist of calcium carbonate, acid phosphates of calcium, or basic phosphate of calcium.

Secondary calculi are precipitated from alkaline urine rendered so by ammoniacal decomposition, due to some local infection or inflammation. They consist of phosphate of ammonium, phosphate of magnesium, or of phosphate of ammonium and magnesium.

Calculi vary greatly in *number* from one to over two hundred, and in size from grains of sand to masses weighing five pounds. The usual *weight* of a calculus is from half an ounce to two ounces.

Stones are more often found in the right kidney than in the left, while the frequency of stones occurring in both kidneys is variously estimated at from five to fifty per cent.

The *effects of renal calculi* must be considered in connection with the causes and pathology, as a knowledge of the secondary changes in the kidney, the pelvis and the ureter, as well as in other parts affected by renal stones is of importance to the surgeon. The effects of primary calculi may be conveniently grouped under two headings, following the classification of Albarran, Morris, and other writers on the subject, as the aseptic changes, and the secondary or septic changes.

The aseptic changes of primary calculi begin with a secondary nephritis of calculous origin (nephrite diathesique of Albarran). This is nephritic inflammation, beginning in the renal epithelium, later involving the interstitial framework of the organ, and, according to Albarran, is always present in calculous kidneys. When the calculi have reached a considerable size and have remained in the kidneys for a long time, especially if they cause obstruction of the ureter, other lesions may become associated with this nephritis. The first of these is atrophy, which is the result of the interstitial nephritis; in other cases the mechanical obstruction produced by the stone gives rise to a hydronephrosis, and finally sometimes the perirenal fat hypertrophies to such an extent that it forms a large lipomatous tumor within which the atrophied and shrunken kidney is enclosed.

The septic lesions of primary calculi are secondary to the aseptic changes. The source of the sepsis is usually an ascending affection from the urethra and bladder (Tuffier), or the bacteria may reach the kidney through the blood or the lymph. The predisposing factors to septic infection which exist in calculous kidney are the traumatic effects of the stones, the calculous nephritis, the urinary retention which they cause, and the capillary congestion of the organ. The results of infection in calculous kidneys are: pyelonephritis, pyonephrosis and perinephritis.

The pyelonephritis of renal calculi is characterized by a septic diffuse sclerous nephritis, which was described by Albarran.

It has been noted, however, that when the sclerotic processes (which precede the pyelonephritis as results of the secondary aseptic nephritis, of which we have spoken) are sufficiently far advanced, the kidney itself seems better able to resist the invasion of bacteria.

The kidney affected with pyonephrosis as the result of infection and of calculous obstruction of the ureter, usually reaches a considerable size, and often presents a series of loculi filled with purulent material, and containing calculi which are difficult to dislodge from their cavities on account of adhesions. The abscess cavity may burst and the contents burrow in different directions.

The perirenal fatty capsule is often thickened and the seat of the fibrous changes in the presence of renal calculi and infection. If the latter be virulent, there arises a true perinephritis and adhesions may bind the kidney to the surrounding organs—a fact of importance to be remembered when operating in such cases, as in some instances adhesions exist between the kidney and vena cava. The perinephritis may, of course, suppurate; the pus may burrow in various directions, and may empty through fistulous openings.

The opposite kidney is often the seat of compensatory hypertrophy, in order to make up for the loss of renal tissue occasioned by the presence of stones, and for the atrophic changes in the renal parenchyma of the calculous organ. In other cases the opposite kidney may be the seat of secondary nephritis, due to the excessive strain, and to the great amount of uric acid, oxalates, and phosphates and the like (as the case may be), that are eliminated through it; and, finally, it may be the seat of the same forms of calculi as on the opposite side.

Suppression of urine results when the pelvic orifices of the ureters are occluded by stones. One kidney may thus be incapacitated and then the other; or both may be put out of work altogether. If the stones become impacted in the ureter further down on their way to the bladder, they may cause ulceration, ureteritis or periureteritis, with the formation of fibrous tissue occluding the canal; or they may perforate into the retroperitoneal or peritoneal cavities, or into the intestine.

Diagnosis.—Under this heading we will take up the consideration of the subjective and objective symptoms, embracing the

history and the examination, together with the differentiation from other conditions.

In considering the clinical features of nephrolithiasis, we must take into account, first, that although most patients come to us with *symptoms,* there is a considerable proportion of cases in which the presence of stones remains unaccompanied by clinical signs. In such cases the stone either remains in the kidney in such a way that it cannot do damage, or is so small that it passes through the ureter into the bladder and is passed out in the urine, or else remains in the bladder as a nucleus for a vesical calculi. Bruce Clark found that in thirteen out of twenty-four autopsies on persons in whose kidneys calculi were present, there had been no symptoms whatever referable to nephrolithiasis. The fact is, the symptoms are not always in proportion to the extent of the disease, and I have often been surprised to find how few symptoms a patient will have when his kidneys have been nearly destroyed by the morbid process.

A second clinical group of cases is one in which the existence of stone is not suspected, because the train of symptoms does not point to any affection of the kidney, but rather to the trouble in the bladder, the uterus, the ovaries or the testicles. In such cases the symptoms are reflex in their origin, as will be seen from what follows.

In a third group of cases, noted particularly by Morris, there is great mental distress and a febrile movement, but no renal colic occurs.

In the majority of cases there is pain in the lumbar region corresponding to the affected side, or in that side of the abdomen, although there may be a general abdominal pain. This pain often runs down into the groin, or the testes of the affected side. It is of varying degrees of intensity, from a dull ache to the excruciating, sharp, cutting pain of renal colic. It may be continuous, but generally follows exercise or jolting, although cases have been reported when it occurred at night.

It is renal colic, however, which usually causes the patient to consult a physician in cases of stone in the kidney, especially if it be associated with or followed by hematuria. It occurs when a freely movable stone of a certain size begins to engage in the mouth of the ureter, or descend along this canal. The forces

which propel a stone along the ureter in such cases are said to be threefold, viz.; the pressure of pent-up urine behind; the worm-like contraction of the ureter under the irritation produced by a foreign body, and the alternating positive and negative pressure of the act of vomiting which often accompanies the attack of colic.

The clinical picture of a patient in the throes of renal colic is not easily forgotten when once seen. The pallid, anxious face thrown into an expression of the most excruciating suffering, and covered with cold sweat; the characteristic posture of the body with flexed trunk and thighs, restlessly moving from one position to another in the agony of the paroxysm—these are sufficiently typical of renal colic to direct our attention to the probable presence of a stone engaged in the mouth of the ureter or passing down the canal.

The pain in renal colic is the central symptom of the syndrome. Its intensity is said to exceed that of any other pain known to mankind. It is acute, paroxysmal, has its chief seat in the loin or in the side of the abdomen, and radiates along the ureter toward the testicles or the labia majora, or occasionally into the thigh, or even into the opposite side of the abdomen.

A chill frequently precedes the access of pain, and during the attack the patient may faint or have convulsions. Nausea, vomiting and retching often complicate matters during the attack, and painful and frequent passages of urine tinged with blood, or with blood clots, commonly accompany the seizure. The paroxysm usually lasts from two to three hours, and, as a rule, terminates more or less abruptly, the patient feeling relieved and falling asleep from exhaustion.

In some cases the colicky pains are not so violent and represent a milder form of paroxysm, characterized by tenderness over the course of the ureter, and not accompanied by a sharply localized pain, but merely by a diffuse pain over the abdomen.

It is the cases in which the stone remains in the kidney or pelvis without giving rise to attacks of renal colic that present the greatest difficulty in diagnosis. These cases of renal calculus are characterized by the following cardinal symptoms: Pain, referable to the kidney, or some other organ in reflex relation to it, aggravated by motion, by jolts and jars and lessened by rest; hematuria and pyuria.

Reflex pains or referred pains are often met with in nephrolithiasis and frequently mislead the diagnostician. In such cases the renal region may be free from pain. The pain may be seated in the lumbar spines or may be felt in the sciatic nerve or the lumbar sensory nerves, as in lumbar sciatic neuritis. Guyon, who has studied the reflex pains of nephrolithiasis in detail, classifies them as follows: (1) The renorenal reflex. Pain in the opposite, supposedly healthy kidney. Morris, in speaking of renorenal reflex says that the pain in the opposite kidney is of an aching character, not spasmodic or colicky; is transient and occurs as an accompaniment of pain on the affected side. (2) The renovesical reflex, accompanied by pain in the vesical neck, and by frequent and painful micturation. (3) The renoureteral reflex. The pain is felt along the course of the ureter, which is found to be tender on pressure by rectum. (4) The reno-ovarian or renouterine reflex and their analogue, the renotesticular reflex are very misleading and not at all uncommon. (5) The gastrointestinal reflex consists of the phenomenon of *nervous dyspepsia,* accounted for by the connection of the vagus with the renal plexus. In rare cases there are attacks of intestinal colic.

If pain be not the reason why a patient consults a physician for this disease, it may be the presence of blood in the urine. This is one of the most frequent symptoms of renal calculi, and Morris found it to be present in 41 out of 103 operated cases of stone. It must be said, however, that the amount of blood passed is usually scanty, and often only detectable on microscopic examination. It is aggravated by movement and by prolonged standing and lessened by rest in bed, and is due both to congestion and to injury of the tissues by attrition on the part of the stone. Oxalic calculi being rougher than the others, are more apt to cause hematuria.

If the subjective symptoms recounted by the patient sound to us like those of renal calculus, and they concur with the opinions of the different urologists that I have mentioned, the time has come for a physical examination of the patient, and a laboratory examination of his urine.

The best method of palpating a kidney is by placing the tips of the fingers of one hand between the last rib and the external border of the sacro-lumbar muscle and to press upward and inward

while making counter-pressure with the other hand over the front of the abdomen.

In this way we determine the presence of tenderness and mobility, as well as the size of the organ, which are important points inasmuch as an inflamed kidney, especially if it contains a foreign body, is very apt to be enlarged and tender and firmly attached by inflammatory adhesions. A normal kidney cannot, as a rule, be felt, and is not tender to the touch, while a fairly normal calculous kidney, with a small stone present, can often not be outlined.

It is said that palpation will, in certain cases, reveal the presence of stones if they are of sufficient size. This may be true, but I believe it more probable that the enlarged kidney itself is felt, and that stones could not be detected through the hard walls in some cases, or cushions of urine and pus in others.

The phonendoscope, combined with percussion over the kidney, is said to be of value in defining the outline of the organ, but it is not absolutely trustworthy in proving the presence of calculi by the change in the accompanying percussion note.

Examination of the urine.—The examination of the urine of patients with renal stones is a subject of vast importance, which lies beyond the scope of this paper. It is always advisable to have urinary examinations performed by a pathologist or bacteriologist, and not to trust to one's own examination, or to that of an interne, in doubtful cases.

The first thing that may catch the eye of the examiner in the gross examination of the urine is the presence of blood mixed with the urine, and giving it a smoky, brownish appearance, or, frequently, ureter casts, consisting of elongated blood clots.

As a result of pyelitis, which usually occurs in the course of nephrolithiasis and may be slight, the urine contains minute quantities of pus; or the pus may be abundant, the urine having that offensive odor and cloudy precipitate which are characteristic of advanced pyelonephritis.

The reaction is generally acid, except in cases of phosphatic calculi or advanced pyelitis; the specific gravity varies with the amount of diluents taken; the color is usually darker than normal; and, if hematuria be present, blood is found mixed with the urine, giving it a smoky, brownish or porter-like color. The urine often

shows a sediment varying in color from whitish to dark brown or red. The chemical examination usually shows the presence of albumin and of an excess of uric acid and urates, or of phosphates or of oxalates, as the case may be. When pyelitis is present especially, phosphates appear in excess and are deposited in the sediment.

Microscopic examination may show the presence of blood, pus, epithelium from the tubules, the renal pelvis, the ureter or the bladder; casts (hyaline, granular, epithelial, blood, pus or mixed) and bacteria, and often of small concretions of crystals or masses of crystaline sediment, such as those of calcium oxalate, triple phosphates, uric acid and urates, which point to the nature of the stone in the kidney.

When urine of this kind is found in a patient suffering from pains or colic in the region of the kidney, the pains coming usually during the day after exercise, and associated, perhaps, with frequency of urination, one may strongly suspect stone in the kidney on the side where the pain is felt, especially if there are no tubercle bacilli in the urine, or signs of tuberculosis in other organs.

Various diseases of the bladder, such as stone, tubercle, tumor, alone or associated with cystitis; congestion or cystitis due to stricture or prostatic hypertrophy; and cystitis from urethral extension give rise to frequency of urination, hematuria, pyuria, and pain in the abdomen or back. In these cases pyuria and hematuria are purely vesicle, but the epithelia in the urine will be found to be vesical, and there will be no kidney elements present. A urethral and rectal examination, associated with visual exploration of the bladder by means of an examining cystoscope, will usually clear up the diagnosis.

There are cases, however, in which both the kidneys and the bladder are involved, as in the following instances: (1) Stone in the bladder and the kidney, septic cystitis and nephritis. (2) Stone in the kidney with septic nephritis and cystitis from other causes. (3) Stone in the ureter, pyelonephritis; stone in the bladder and cystitis. (4) Stone in the kidney and no symptoms other than a slight aseptic nephritis and bladder congestion from obstruction or other causes.

If our symptoms, physical and urinary examinations point to renal involvement, and our bladder is normal, we must then cathe-

terize the ureters to see if one or both are involved, and to determine by the examination of the individual urines and the injection of methylene blue the degree of inflammation and the comparative functional activity of each organ. In case the bladder is involved, we should try first by active treatment of this viscus to cure the cystitis before ureteral catheterization; but in case the vesical inflammation proves to be obstinate, and we feel that our kidney tissues are suffering more from the delay than from the danger of infection during the manoeuvres of catheterization, we should proceed to the ureteral catheterization after the bladder has been well washed and filled with an antiseptic solution.

It is needless to say that in taking the urine from each kidney, if we can interpret our findings, we will be able to tell the degree of involvement of each organ, if one is diseased and the other healthy, or if both are diseased and the comparative degree of destruction of renal tissue in each. We cannot, however, say that a stone is present, and we must resort to other methods of diagnosis before this can be stated positively.

In case we can catheterize but one ureter, we should collect the urine from that side and leave a soft rubber catheter in the bladder to collect the urine from the other side. If the bladder is aseptic we can then tell the difference in the condition of the respective kidneys accurately; but if the bladder is septic and the other kidney is aseptically inflamed or degenerated it will be difficult to determine accurately its condition.

When one ureter can neither be catheterized nor seen, and the urine coming from the ureteral and bladder catheters are the same, it will be difficult to say whether both kidneys are involved to the same degree, or whether there is some urine leaking down by the side of the ureteral catheter in the ureter of one side, or an absence or obstruction of the ureter and kidney of the other.

As you all know, however, in almost all cases both ureters can be catheterized, and the one secreting more pathological urine has the more diseased kidney on that side.

Having decided that the kidney on one side is involved, alone or to a greater degree than the other, we must make a hasty review of the other renal conditions and submit the patient to some further examinations before submitting him to operative procedures.

Stone in the kidney is more apt to be confounded with tuberculosis or tumor of that organ than with any other renal disease. The principal points of differentiation lie in the history. On the side of calculus there may be the presence of gout, rheumatism, or lithemia in the individual or in the family, while in that of tuberculosis there may be a tuberculous history in the patient or his family. Tuberculosis of the kidney usually comes on more rapidly and the patient is more cachectic; the hematuria and the frequency of urination often take place at night as well as by day, while the pain is not so acute, and neither the pain nor the bleeding is so much influenced by exercise or movements. In renal tuberculosis there may be an involvment of the genitro-urinary tract elsewhere, as in the bladder, prostate, or testes, and tubercle bacilli will sooner or later be found in the urine, or can be determined by guinea-pig or rabbit inoculations.

In cases of tumor of the kidney the malignancy of the growth is expressed by the cachexia and loss of weight which accompany such cases. In such cases the hemorrhages are much more abundant, occur with increasing frequency, and are not necessarily associated with moving or jolting. The organ is usually larger and more clearly outlined as a tumor; the urine may contain characteristic tumor cells, and is not so apt to contain crystals or pus. The pain, not so severe, is always in the back and loins. A varicocele is often associated with it, especially on the left side.

In movable kidney there is a dull ache in this region, or even renal colic; hematuria is always absent or slight; pyuria does not so often develop, and nephritis is not so commonly associated with movable kidney as with calculus. The former condition is generally found on the right side and most frequently in women. It is not so frequently accompanied by enlargement, and when it is, the induration is not so marked, while the kidney may be felt to be movable and easily replaced.

Other conditions likely to be mistaken for stone are a group of neuralgias, which may be either parietal, like sciatica or lumbago, intercostal, or inguinal or else visceral, *i. e.,* renal. The existence of renal neuralgia cannot be denied. It occurs chiefly in neurasthenia, and is also caused by the use of certain irritant drugs, such as cantharides. According to Raynaud and Albarran, a visceral crisis of locomotor ataxia may be seated in the kidney

and manifested by neuralgic pain. It is probable that as our knowledge of abdominal diseases increases it will be found that visceral adhesions and displacements are responsible for many of these neuralgias. Malaria, gout and hysteria have also been accused of causing renal neuralgia. Certain forms of nephritis may also give rise to attacks exactly similar to those of true renal colic, and may be accompanied by hematuria, so that they may be very puzzling. The pain, however, is not aggravated by motion, as in stone. Nephrotomy is here justifiable for the sake of diagnosis and also recommended as a cure of the hemorrhagic or nephralgic nephritis.

A number of other abdominal conditions, such as cholelithiasis, ulcer of the stomach, appendicitis, and the like, have been confounded with renal calculi, the resemblance of the symptoms of which is very interesting, but will be omitted for lack of time.

When we feel reasonably sure that we have renal calculus to deal with, and also that it is on a certain side, from the examination already outlined, it remains for us to prove, as far as possible, that we are right by all the diagnostic means at our command and also to ascertain if there is another kidney present and, if so its condition.

There are, then, but two other methods at our disposal, radiography and an exploratory incision.

If by radiography we succeed in seeing a shadow over one kidney, we can feel reasonably sure that the kidney on that side is involved, even though the pain were in the opposite loin, providing it agrees with the kidney secreting the more pathological urine.

If radiography shows nothing on either side, then an exploratory operation should be done on the side from which the worse urine comes, having obtained urine from both kidneys by ureteral catheterization; or else an exploratory incision down to the kidney on the side corresponding to the ureter that we were not able to catheterize, for the sake of ascertaining the presence of a kidney there and inspecting it. At other times when we are in doubt as to the condition of the two organs, when the incision is made over the diseased kidney the peritoneum can be opened and the hand inserted into the cavity to determine the presence and condition of the other kidney by palpation. I have only

once in fifteen years' experience in urinary surgery opened the peritoneal cavity with the object of determining the presence of the second kidney. This was in a patient who was running a septic temperature, and in whom an enlarged kidney could be felt on one side in whose bladder neither ureter could be seen on account of a hemorrhagic cystitis.

Treatment.—The treatment of nephrolithiasis is operation, and the variety of operation will depend on the condition found, for although we can often picture in our minds in a fairly accurate way prior to our operation the condition that we will find, we can never foretell with a certainty the actual appearance of the kidney.

Operative interference should be divided into four stages:

1. The exploratory incision down to the kidney and its external examination. 2. The exploratory incision into the kidney and its internal exploration. 3. The immediate radical operation. 4. The remote radical operation.

The operations on the kidney in this condition are, pyelotomy, nephrotomy, nephrostomy, and nephrectomy. The varieties of operations on the kidney, especially so far as the incisions are concerned, are too numerous to be considered in other than a general way. They may be divided into two principal classes, the extraperitoneal and transperitoneal. There are three varieties of incisions, vertical, oblique, and transverse, which can be modified or combined to suit the case.

I shall not consider the transperitoneal operation, as it opens the peritoneal cavity and exposes it and its contents to the danger of infection and traumatism.

The extraperitoneal operation, then, is the one of choice, and we will consider this only.

The position of the patient can be either on the face, back or side. If he is lying face downward, the pillow or sandbag should be under the abdomen, and the incision should be vertical along the outer border of the erector spinae muscle from the twelfth rib down. This incision in nephrolithiasis should be only for exploration of the kidney or for a nephrotomy in an aseptic case of stone. In case more room were required, it would be necessary to curve the incision toward the anterior superior spinous process of the ilium.

If the patient is lying on his side, the pillow should be under the healthy side, so as to push up the loin in the region of the diseased kidney and give more room for the incision. The incision may be vertical from the twelfth rib down the outer border of the sacrolumbalis muscle and then curving toward the anterior superior spine of the ilium. This incision gives us far more room than a similar one when the patient is lying on his face, and, in fact, more than any other extraperitoneal incision. Various other cuts are made with the patient on his side, such as the transverse, oblique; straight and oblique with transverse additional incisions, but none is so generally useful as the curved one just described.

The anterior incision is made with the patient on his back and a pillow or block underneath him. It extends along the outer border of the rectus muscle, with perhaps transverse incisions extending out from it laterally, to give more space. It is rarely used.

The consideration of the various incisions having been disposed of, let us take up the question of exploration of the kidney. Having cut down upon it, we remove it from its fatty capsule and free the ureter from the vessels of the pelvis. We note the appearance of the kidney. Indented, irregular, nodular kidneys are very liable to contain stone, and kidneys that are large with pus cavities, or in a state of pyonephrosis, also frequently contain stone. We should then palpate the ureter, and press our finger up into the calyces of the kidney. If no stone can be felt and we feel that one is probably present, we must continue our search. Needling the kidney for stone is advocated by many surgeons, but personally it has never given me any results. If much pus is present, it can be aspirated out, when perhaps stones can be detected through the collapsed walls, especially as the kidney is much diminished in size by this procedure.

If not successful, we must open the kidney, and then the question comes up as to choice of route, whether we should cut through the parenchyma or through the ureteral dilatation into the pelvis. Most surgeons cut through the parenchyma, as they in this way can obtain a better view of the pelvis and the calyces. Others cut into the ureter close to the kidney, insert the finger and palpate with its end the interior of the pelvis and calyces.

Each of these procedures has its advantages and disadvantages. In nephrotomy the interior of the kidney can be more clearly seen and examined, but the hemorrhage is greater, a certain amount of kidney tissue is destroyed by the operation, and the healthy parenchyma is exposed to fresh infection. In the case of pyelotomy we cannot inspect the interior of the pelvis so well, palpation is usually not so satisfactory, and we are more liable to have a urinary fistula; but, on the other hand, we have less hemorrhage, the kidney is not so much damaged or exposed so much to infection.

I think that it may here be said that in a case of calculous pyonephrosis in which there has been a great destruction of parenchyma, we should open through the kidney proper, whereas in more obscure or doubtful cases of calculi either course can be taken.

In case pyelotomy is resorted to through a ureteral incision, the wound can be closed immediately afterward, and a drain inserted down to the closed incision to take care of any urinary leakage that may occur.

In case of nephrotomy in an assumed aseptic case, the same procedure can be resorted to. If, however, any pus is found to be present on microscopical examination of the urine, a tube should be inserted into the pelvis of the kidney for drainage, after which the kidney can be closed up to the tube, or if there is much hemorrhage packing may be inserted about it.

Nephrostomy.—If there is much suppuration and it is difficult to drain the organ after the stone has been removed, it can be brought into the incision and the sides of the renal incision secured to those of the lumbar incision. In this way the drainage can be better controlled, as well as hemorrhage, by being able to pack it more securely.

After nephrotomy or nephrostomy the ureter should always be catheterized from above to see if there is a calculus obstructing the ureter.

Nephrectomy.—If the parenchyma is involved and abscesses are present, or if the kidney is but a sclerosed mass of tissue, or nothing more than a suppurating sac containing stones, then a nephrectomy may be performed instead of a nephrotomy and the organ removed.

There are arguments for and against both these procedures, but the condition of the individual is the main factor to be considered, and the patient's life must never be sacrificed for the sake of performing one operation that is considered more radical than another.

Nephrectomy is a much more dangerous operation than nephrotomy, as there are more adhesions to be broken up, and there is therefore more danger of breaking into the peritoneal cavity, the colon or duodenum. In the first instance, a fatal peritonitis may ensue, while in the other case an intestinal fistula would result. I have cut through the peritoneum accidentally in several cases. Another reason why nephrectomy is more dangerous is because so much extra work is thrown suddenly upon the other kidney, which has perhaps been incapacitated somewhat by the anesthetic.

Treatment of the Pedicle.—The pedicle varies in different kidneys. Sometimes the ureter can be separated with ease from the rest of the pedicle and the ligature passed between the vessels, while at other times they are all three en masse. The ureter can usually be separated, and after clamping the pedicle, a blunt pointed needle, carrying a ligature, can be passed through it and the ligature tied in a double loop on the other side. Later, if necessary, another ligature may be applied over the entire pedicle. Occasionally, the ligature does not hold well, but slips and then there is a bad hemorrhage. In such cases clamps must be immediately put on the pedicle, and the hemorrhage arrested.

In two cases operated upon by me, clamps had to be used and left in situ for four days. In one of these a vessel of the pedicle was transfixed, and in the other the ligature had slipped. The safest material for ligatures is braided silk.

The *prognosis* of operations for renal calculi is always serious, when we remember the risk of anuria and of septic complications, and also the effects of nephrolithiasis upon the parenchyma of the kidneys. The results of operations collected by Morris show that early operation is advisable and that nephrotomy is the operation of choice, giving the smallest mortality. Legueu gave a mortality of 5 per cent. in his series of nephrotomies, and Morris still reduced this figure to 2.9 per cent. A long-standing or permanent fistula occurred in his cases in only

6 per cent. after nephrolithotomy, nephrotomy, and nephrectomy for stone.

Results of Operations.—In a collection of statistics made by Morris from the operations published in America and England between 1883 and 1893 there were: (1) 115 nephrotomies with 103 recoveries and 12 deaths—13.8 per cent.; (2) 32 nephrectomies with 25 recoveries and 7 deaths—21.8 per cent. The results vary greatly according to the presence or absence of septic complications in the kidney.

The *after treatment* of patients who have passed through an operation for stone in the kidney is very important, as upon this may depend the ultimate result of the operation.

The best position for such a patient is on the back and with pillows arranged in such a way that there is no pressure upon the wound. This detail is especially important in cases where drainage is used.

The dressing of such wounds does not differ from ordinary operative wounds of the abdominal cavity. In septic cases drainage should be maintained according to the indications, until the fistula heals. For this purpose, dry gauze wicks placed in the pelvis of the kidney are necessary. In ordinary aseptic nephrotomies the gauze should be inserted down to, but not into, the kidney. A binder is placed over the gauze pad in the loin.

The immediate after-treatment concerns itself with moderating the shock, and does not present any special peculiarities. The danger of shock being over, that of anuria is to be foreseen and prevented as much as possible by all the means at our command. These include the administration of bland fluids; at first hot water, then milk and alkaline mineral waters, saline injections and infusions; hot packs; diuretics; diaphoretics; purgatives, and the use of pilocarpine subcutaneously. Retention of urine should be prevented by passing the catheter as often as necessary, to be sure that the bladder is empty.

The bowels should be moved by salines on the second day after the operation, aided perhaps by enemas of soapsuds. The dressing may be left undisturbed until the third day if the temperature remains normal, and if there is no excessive discharge from the wound. Otherwise it should be renewed sooner or more often according to the amount of discharge and the general con-

dition of the patient. Perirenal suppuration and the formation of pockets of pus may take place, requiring opening and draining until healed.

The duration of the after treatment is usually two weeks, but this period is often prolonged to four or six weeks by suppurative complications. When the wound has finally closed, an abdominal belt or some other means of support should be worn to diminish the danger of hernia, particularly in cases in which an extensive abdominal lumbar incision has been made.

75 West 55th Street.

URETERAL CATHETERISM IN NEPHROLITHIASIS.[1]

By Frederic Bierhoff, M.D., New York.

In accepting the kind invitation of our Chairman to discuss, or present to you, the value of ureteral catheterism in nephrolithiasis, I did so with the full realization of the fact that the ureter catheter, in cases of this sort, can only be of use in giving us corroborative evidence.

That it is of use in the diagnosis of the presence or absence of stone in the kidney, such authorities as Küster, Wagner, Casper, etc., are agreed. There are certain changes in the urine, in cases of nephrolithiasis which are constantly found, and it is by means of the ureter catheter that we are enabled to locate the side involved.

The gathering of separate specimens for chemical and microscopical analysis and examination is, therefore, the chief function of the ureter catheter in these cases.

Of secondary importance, to my mind, are the manipulations which bring about the passage and the escape of small stones, or gravel, from the kidney or ureter, or the obtaining of scratch marks, on the wax-coated catheter, as proposed by Kelly, or my own pelvic distention test.

It is an admitted fact that the presence of a calculus at any

[1] A discussion on Nephrolithiasis before the American Urological Association, December 6, 1905.

part of the renal pelvis brings about symptoms pointing to a mechanical irritation of the pelvic mucous membrane by the concrement, which are unmistakable when the urine is examined by an expert urinologist. We invariably find blood corpuscles in greater or smaller number, epithelial cells from the renal pelvis, calyces, or upper part of the ureter, pus cells in varying number, and crystals of the urinary salts, or, even crystal conglomerates. At times, when a renal colic is followed by hematuria, the cystoscope will reveal the source of the bleeding to us. Where, however, a macroscopic bleeding is not present, as, for instance, during the periods of rest, the urinary sediment will, almost invariably, when examined under the microscope, reveal the presence of a slight, constant admixture of blood.

It is during the periods of rest that the ureter catheter, when carefully employed, gives us the information necessary to a correct diagnosis of the presence of a stone, and by a comparison of the urines obtained from the two kidneys, reveals to us the involved side.

It is not, however, sufficient to examine the urine obtained by means of the ureter catheter from both kidneys separately for pelvic epithelia, pus, blood cells and crystals, but it is also necessary to obtain the specific gravity of the two urines, for it is usually found that the urine from the affected kidney is of a lower specific gravity than that from the normal kidney, and, in addition, we usually find a trace of albumen in the urine from the affected side.

In addition to the microscopic and chemical examination and comparison of the urines from the two sides, we are enabled, through the employment of the ureter catheter, to locate an obstruction in the ureter; furthermore, to enable gravel or calculus-fragments, or small calculi, caught behind ureteral strictures, or flaps, to escape into the bladder.

By means of the phonendoscope, when combined with the metal cored ureter sound, we may, at times, determine the presence of calculus. By the employmnet of Kelly's wax-coated ureter catheter, we are, at times, also enabled to get valuable corroborative evidence, through finding scratch marks upon the wax-coating.

Just how valuable this method may be, when employed with

other cystoscopes than the Pawlik-Kelly cystoscope, I am not prepared to say.

A further use of the ureter catheter in the determination of the presence or absence of renal calculus, is in the test which was first proposed by me in the issue of the "Medical News," of October 11, 1902, which I termed the "pelvic distention" test. The test is employed as follows:

A catheter is inserted into the ureter of the suspected side, and passed up the ureter until its eye lies within the pelvic orifice. (It is necessary to employ as large a catheter as will comfortably enter the ureteral orifice.) After having assured ourselves, through the nature of the flow of urine, that the eye of the catheter lies within the renal pelvis, we begin to distend the pelvis by injecting sterilized boric acid solution gently, up to such a point that the patient complains of pain in the renal region. This quantity usually amounts to about 30 c.c. The fluid is now allowed to flow off, and the manoeuvre is repeated, until, in all, 250 to 300 c.c. have been employed. In the presence of a calculus, the manoeuvre is followed, within twenty-four hours, by a distinct hematuria, at times so pronounced as to be clearly visible to the naked eye.

The urine should not, however, be examined for the presence of blood until twelve to twenty-four hours have elapsed, so that the mild bleeding resulting from the unavoidable, slight traumatism by the catheter, shall have had a chance to cease. Blood found in the urine after this test, has invariably revealed to me the presence of a renal calculus, even where the X-ray had given a negative result in the hands of experts, and in no case in which a negative result was obtained by means of the pelvic distention test, did either the X-ray or an operation reveal the presence of a stone.

In all, the test has been employed by me, up to the present, in seven cases. In the first, a distinct hemorrhage occurred, so pronounced as to be macroscopic. The X-ray showed the presence of a stone. Operation confirmed the diagnosis.

In the second instance, the pelvic distention test showed the presence of stone. The X-ray showed shadows, so light and indistinct that the X-ray operator declined to make a positive diagnosis of renal calculus. Operation confirmed the findings of the distention test.

In the third case, repeated applications of the pelvic distention test were followed by no bleeding, and the radiograph was negative.

In the fourth case, the pelvic distention test resulted negatively, the X-ray resulted negatively, and the hematuria from which the patient suffered was later discovered to be due solely to a vesical ulcer.

In the fifth case, the test was employed on a patient reported as case No. 1, some time after the stone had been removed from the kidney. The pelvic distention test resulted negatively. Subsequent operation showed the kidney and pelvis to be free of calculi. In this case, the X-ray was not employed, but reliance was placed upon the pelvic distention test.

In the sixth case, the test gave a positive result. The X-ray examination was purposely omitted. The patient was operated upon by Dr. Holdt—who had kindly referred her to me—and a calculus removed from the involved kidney.

In the seventh case, the test resulted positively. Three subsequent X-ray examinations, made by an expert, resulted negatively. The operation revealed the presence of calculi.

I believe that the hematuria which results from the pelvic distention test in such cases as are due to the presence of a calculus, is due to the dislodgment and movement of the calculus by the stream of fluid, and that, as a result of this dislodgment, slight traumatisms of the pelvic membrane are caused by the stone, with subsequent bleeding. In such cases as do not present a stone, the fluid simply acts in the manner that the ordinary pelvic lavage does.

The final, and possibly, most infrequent use of the ureter catheter, in cases of nephrolithiasis, is to bring about the dislodgment of a calculus, which, by obstructing the renal outlet, brings about a condition of calculous anuria.

It will be seen, from my few remarks, that, although the use of the urether catheter has ample justification in the attempt to diagnose and locate a calculus in the kidney or ureter, it is to be employed as only one of the means necessary to the making of an absolute diagnosis, and that the information which it gives us is, in the main, corroborative.

MICROSCOPIC URINALYSIS IN NEPHROLITHIASIS

By Louis Heitzmann, M.D., New York.

THE clinicians have told us that there is not a single clinical symptom which is absolutely positive of the presence of a calculus in the kidney substance or pelvis of the kidney; even the X-ray is not to be relied upon. The next question is whether microscopic urinalysis will reveal the existence of a stone. The answer is yes, but unfortunately not a hearty yes. It cannot be relied upon in every case since, although we can suspect a calculus, we cannot positively tell its presence every time.

As is well known, the most common variety of stone is uric acid, and next in frequency calcium oxalate; both may occur alone or in combination with each other or the urates. Phosphatic stones are much less frequent in the kidney than in the bladder. The gross aspect of the urinary sediment does not always help us in forming an opinion as to the variety of salts it contains, and although the microscope will invariably reveal the presence of an excess of salts, the diagnosis of a stone cannot be made from the mere appearance of even enormous amounts of salts. Cloudy precipitation and offensive odor are not diagnostic of any lesion or any form of calculus.

Uric acid, the presence of which is frequently, but not always revealed by the appearance of a brick dust sediment, is found in so many different varieties under the microscope, that a certain form seems to always be indicative of a stone. This peculiar form is not the frequently seen lozenge crystal, but a rosette formation consisting of needles radiating from the centre toward the periphery. These are sometimes small, at other times large, and are usually associated in the same case with variously-sized spicules, needles and even stellate masses, together with irregular plates. When these different formations are found, we can diagnose the presence of a uric acid stone. As regards calcium oxalate, we have a fairly characteristic picture. When we find irregular amorphous masses of peculiar refraction,

together with the octahedral formations, we can suspect calcium oxalate concretions; with these, round or oval concentrically striated crystals of a high refraction are not infrequently found when mulberry or hempseed calculi of calcium oxalate exist.

When the diagnosis of a stone is once made, its location is easy, as the different epithelia seen in urine can be readily diagnosed. Although even yet not generally admitted, anyone who takes care to thoroughly examine a urinary sediment under the microscope with a proper magnifying power, that is, about 400 diameters, can satisfy himself of the different forms of epithelia, and cannot fail to find that the epithelia in the different parts of the genitro urinary tract are more or less characteristic. In every case there may be some epithelia which we cannot locate positively, but the majority of them are characteristic enough, and will help us to locate the lesion.

The epithelia from the different portions of the genito-urinary tract vary both in shape and size; the shapes, however, alone are not sufficiently distinctive for a diagnosis, but the sizes are different in the various organs. Epithelia from the uriniferous tubules are the smallest found in urine. Presence or absence of casts is not diagnostic for the presence or absence of a nephritis, and a large number of cases of nephritis never, at any time, show true tubular casts in the urine. In the majority of cases of nephritis, pyelitis or pyelo-nephritis, due to a calculus, true casts are not found. On the other hand, casts are frequently diagnosed as present in the urine of persons in perfect health, in whom no other evidences whatever of an inflammation of the kidney are seen.

Suppurative nephritis, pyelitis and pyo-nephrosis are not rarely caused by calculi. In these cases, casts may or may not be present, but the characteristic from the uriniferous tubules, partly cuboidal and partly columnar are constantly seen, together with evidences of destruction of tissue. The diagnosis of a suppurative process of any kind cannot be made without the evidence of destruction as shown by the appearance of connective tissue shreds in the urine, which vary in size, but are perfectly characteristic and can readily be distinguished from mucous threads. The latter are seen in every normal urine, but are increased in pathological processes.

Inflammation, suppuration and even ulceration of the ureter, not rarely caused by concretions or stones can also readily be diagnosed. The epithelia from the ureter are distinctly larger than those from the uriniferous tubules. Epithelia from the pelvis of the kidney are partly round or oval, partly irregular, kidney, bean, or pear-shaped, and larger than those from the ureter, so that the location of the calculus will offer no difficulties whatever.

GYNECOLOGICAL CONDITIONS SIMULATING NEPHROLITHIASIS

By Augustin H. Goelet, M.D., New York

In presenting that part of the subject assigned me, I find myself confronted with the question: What constitutes gynecological conditions. At the present time, it is by no means strictly defined. Do they signify everything pertaining to women or everything the gynecologist chooses to consider his field? It is certainly true that gynecology to-day is no longer what we thought it fifteen or twenty years ago; and the "passing of gynecology" is no longer a prophecy but an established fact. In proof thereof, the gynecologist of to-day is found doing many general surgical operations, in justifiable retaliation, if you choose to consider it so, for the too liberal encroachment upon his field by the general surgeon. I know at least one gynecologist, for years a prominent teacher in that branch, who has extended his field to the prostate. Shall we consider disease of that organ a gynecological condition?

Let me say in defense of the gynecologist if he needs any defense that his field should not be too much restricted. Its strict limitation would confine him to conditions involving the vagina, uterus, tubes and ovaries, as they are the only organs possessed by woman and not by man. But if he is permitted to include the bladder because it is situated in the pelvis, and because of its intimate relation to the other pelvic organs, he should also be permitted to include the ureters and kidneys, because they are very important parts of the genito-urinary apparatus. Since

abdominal tumors of all kinds almost always have an important bearing upon the pelvic organs, they should also be included in his field. Thus the spleen, pancreas and liver are his legitimate field also. Shall I stop here? If permitted to continue, I will say his field is what he is properly prepared for and what he chooses to make it.

If I had selected the title of this part of the subject, I would have made it "Gynecological Conditions that Nephrolithiasis Simulates," for nephrolithiasis more frequently produces symptoms simulating gynecological conditions than the reverse. Very naturally, therefore, errors in the diagnosis of these cases will be made more frequently by the gynecologist, for they would go first to him. But these two branches, gynecology and genito-urinary surgery, are so closely allied and related that they should go together. In view of this, I would suggest that since gynecology no longer exists as a distinct specialty, the gynecologist should be a genito-urinary specialist, and genito-urinary specialists may be designated genito-urinary surgeons, male or female as preferred.

To judge from my own experience on the operating table, nephrolithiasis is rare in women, for in 209 nephropexies, I have never found stone in either the kidney, pelvis or upper ureter, and I make it a rule to examine carefully every case operated on. These 209 nephropexies were done on 161 patients, in 48 both kidneys being anchored at the same time. Furthermore, I have never been called upon to operate for stone in either the kidney or ureter in woman, though I have removed them from the bladder a number of times. Nephrolithiasis is certainly less frequent in women than in men. One author states, but without giving his authority, that the relative frequency in males and females is 20 to 1.

Tuffier states that in a collection of 203 operations for renal calculus, 94 were men and 109 women. In the same number of operations (203) collected by Henry Morris in ten years, between 1883 and 1893, there were 124 males and 76 females. Adding these two series of operations together, in a total of 406, there were 218 males operated for stone in the kidney and 185 females. Therefore the disproportion does not appear to be so great, but this is only a record of cases operated on.

Undoubtedly nephrolithiasis often escapes recognition in women, which is a possible explanation of the apparent infrequency. In view of the symptoms it produces in common with female pelvic diseases, or rather the symptoms it produces that are directly referable to the pelvic organs which may be coincidently diseased, this is surprising. But it is difficult to believe that the careful diagnostitian of gynecological conditions will commit such an error, for he should not limit his examination to one set of organs. In any event, the kidneys should always be included in his examination, which should never be considered complete without careful microscopic examination of the urine.

If symptoms alone are depended upon for the diagnosis, then errors must frequently occur. Pain and bladder irritation are the two symptoms that most frequently cause confusion. Pain in the loin or back is so often encountered in women with pelvic disease that it may lead to the assumption of such disease without attention being directed to the kidney as a possible cause. This is often observed in women with prolapse of the kidney, many of whom I find have been treated for months for uterine or ovarine trouble without benefit, the displaced kidney being the cause of the symptoms as shown by subsequent operation. The character and seat of the pain produced by nephrolithiasis resembles in many respects that produced by pelvic disorders. It is dull, aching or dragging, often extending down into the pelvis and radiating down the thighs. The pain may even be most pronounced in the region of the ovary and the ovarian region may be sensitive to pressure. Digital exploration through the vagina may reveal extreme tenderness with also some enlargement of the ovary, which is not uncommon in both nphrolithiasis and prolapse of the kidney, as I have pointed out elsewhere. The pain is sometimes referred also to the uterus and to the labia and the urethral orifice. Like the pain caused by disorders of the pelvic organs, that produced by nephrolithiasis is brought on or aggravated by exercising or by prolonged standing and is relieved by rest in the recumbent position.

Bladder irritation so often encountered in pelvic disorders, is likewise a misleading symptom, because it is also produced by stone in the kidney. Patients have been submitted to cystoscopic examination, and have even been treated for cystitis, and the error

has not been detected until someone has diagnosed stone in the kidney, removed it, and thus cured the supposed cystitis. There is, however, a marked difference between the bladder irritation produced by irritation in the kidney and that caused by pelvic conditions. In the former, the bladder irritation is more pronounced during the day, when the patient is exercising, and subsides at night or while the patient is quiet or reclining, whereas when it is due to uterine disorders such as a misplaced uterus or the pressure of a tumor, it is almost always more pronounced during the night, a common complaint of these patients being that they are obliged to get up frequently during the night to void urine. This would not, however, be a rule if there were no exceptions.

Thus it will be seen that any or all diseased conditions involving the pelvic organs may simulate nephrolithiasis and if the symptoms alone are considered, there is a chance of error for both the genito-urinary surgeon and the gynecologist. Nephrolithiasis not infrequently produces no symptoms referable to the kidney, and all the symptoms may indicate, strikingly, disease of some one of the pelvic organs: bladder, uterus, tubes, or ovaries, and unless one is versed in gynecological diagnosis by vaginal palpation, an error might readily occur, more especially since it is rare to find all the pelvic organs in women free from disease. Then too these organs may be involved independently, and at the same time there may be stone in the kidney.

It is reported by Henry Morris that a vesico-vaginal fistula was maintained in a patient for ten years because the symptoms pointed to the bladder only and there were none directing attention to the kidney. The patient was finally cured by removal of a renal calculus and the fistula being closed, there was no return of the bladder symptoms.

Another case is reported where both ovaries were removed without result, but a cure was subsequently effected by removal of a stone from the kidney. I have reported a similar case. A patient for whom I had advised double nephropexy had both ovaries removed by another surgeon, who either did not discover the displaced kidneys or ignored them. No relief followed. Two years later I anchored both kidneys, which effected a cure, all the symptoms being permanently relieved.

Henry Morris also reports the case of a patient who had been treated for eight years for displacement of the uterus. Her symptoms disappeared completely after he operated on the kidney, in which he found two small abscesses in which were calculous masses.

It is recorded that ovarian tumors have been mistaken for a kidney enlarged by the pressure of stone and the error was discovered only at the time of operation. It is difficult to comprehend how a careful diagnostitian can make such an error, for an ovarian cyst springs from the pelvis, and its attachment there should be detected, while the calculous kidney springs from above and is attached there. The difference in the consistence of the two masses should be quite apparent. The calculous kidney when much enlarged forms a hard, immovable, solid tumor. The ovarian cyst, being filled with fluid, is softer, more yielding and movable. The history of the case should throw additional light on the subject, which, with the above, should decide the character of the tumor.

It is quite possible also that the nausea and vomiting sometimes induced by the irritation of stone in the kidney may be mistaken for symptoms of pregnancy, more especially as pain in the back and loin as well as pain in the pelvis is frequently complained of by women when pregnant. But the question of pregnancy can readily be disposed of in the negative or affirmative by one accustomed to the diagnosis of this condition.

It has seemed to me sufficient to mention the chances of error in the diagnosis of the two conditions under consideration without giving the points in differential diagnosis which would be quite unnecessary for this audience and the time allowed would not permit it.

NEPHRO-LITHOTOMY FROM THE STANDPOINT OF THE PROVINCIAL SURGEON.

By Oliver C. Smith, M.D., Hartford, Conn.

Mr. President and Members of the American Urological Association:

Knowing as you do the genial nature of our respected president, you will not be surprised at his having invited a provincial surgeon with limited experience to take part in this discussion.

To you genito-urinary surgeons of the metropolis who are operating upon kidneys daily, a discussion of the technique by one who has operated but infrequently, could be of little interest. I might quote the stereotyped remark of a certain member of our local society. After he has listened to a learned discussion from some man of national reputation, our brother usually rises with the remark: "I fear, Mr. President, I can add but little to the paper," and he is usually taken seriously, for no one has imagined for a moment that he could. Being familiar with the extreme good nature of our president, I propose to take the latitude of digressing from the branch of the subject which has been assigned me, and speak for a moment upon what seems to me the most important factor in renal surgery as it is practiced by those outside of the large medical centers.

A working diagnosis in surgical diseases of the kidney, and especially in nephrolithiasis, presents more complications and difficulties, requires more skill, time, patience and elaborate technique and paraphernalia than almost any other field.

The provincial surgeon reads with enthusiasm the reports of the metropolitan surgeon who has performed large numbers of nephrotomies, nephrectomies and nephropexies, and feels it encumbent upon him to include major renal surgery in his repertoire. He has a patient with hematuria and pyuria with renal pain, and after a cursory examination, concludes that an operation is in order. Others are operating upon such cases—why not he? He has viewed the subject from before the footlights, through the glamor and dazzle surrounding a successful surgical pro-

cedure, but he has not gone behind the scenes and witnessed the tedious work which should precede all renal surgery, except that performed in imperative emergencies. He has not considered the great importance of accurate urinary separation and the scientific, chemical and microscopical examination of the secretion from each kidney. He has not learned by bitter experience that the clinical signs and symptoms may mislead one into operating upon the better of the two kidneys. He has not kept in touch with the efforts of segregation; with the work of Tuchmann, Silberman, Wier, Fenwick, Neumann, Guyon, Cathelin, Harris and Luys. He has not witnessed the painstaking and timetaking efforts in this direction, nor experienced now and then the delights of success, but too often the chagrin of failure. He has heard of the cystoscope, and if progressive has purchased an outfit from a concern at Rochester, and has distended the bladder with air and tried in vain to discover the ureteral openings, but more than likely he is unfamiliar with cystoscopy. He has not followed the efforts of Simon and Pawlik, of Kelly and Rose, of Morris and Nitze, of Brenner and Casper, or of Otis and Brown. If he has worked out this problem and has mastered the cystoscope and ureteral catheter, all of which is out of reach of the men who are not confining themselves closely to this specialty, he will have been dismayed by the constant fire of criticism and warning from the pessimist in this direction, who maintains that the ureteral catheter is accountable for no end of damage by transmission of infection to the ureters and kidney. If he has succeeded in successfully separating the urines, he must now be an expert urinologist and microscopist. If he is looking for evidence of renal calculi, he must be drilled in the detection of renal cells and calculus crystals. If he is looking for tubercle bacilli, he must be willing to examine specimen after specimen, and failing to find the organism, must centrifugalize his specimen and inoculate a guinea-pig. Nor is this all. He must be a student of the work of Koranyi, Koeffe, Lindemann, Kümmell, Ogston, Backman and of Fridenthal, who have brought practical cryoscopy up to its present state of perfection. If fortunate and progressive, he may possess an X-ray machine. He flatters himself that he is doing good work with his flouroscope. He dreams of successfully skiographing renal calculi, and then comes the rude awakening. His plates contain

nothing that is intelligible. He finds shadows which might be taken for stones, occurring where they should not be, and a misty cloud of nothingness where he had hoped to discover the calculus, and then if he will study Dr. Lewis Gregory Cole's latest articles, he will find that instead of his mica plate machine, he must have a twelve-inch coil and a Wehnelt interrupter with a heavy platinum point, and the tube a heavy anode 8″ bulb made by Gunlach. He must learn of the fallacies which may decoy and deceive him, such as fecal concretions, defects in the plate, calcified appendicae epiplociae, calcareous nodules, tuberculous deposits, vein stones, sesamoid bones and suspender buckles.

He must be a surgical pathologist of no mean attainments, for few conditions in surgery will tax a man's judgment more keenly than the surgical diseases of the kidney. He has succeeded at operation in bringing the kidney into the field. He has stripped the capsule, has used his exploring needle, has incised the pelvis—he may have found several stones, or one, or none at all. He may find calcareous deposits, hemorrhagic infarcts, septic thrombi, tubercular deposits, or a neoplasm, and the crucial question comes to him with awful earnestness—shall he lay this kidney open from the convex border to the pelvis? shall he remove the stones and drain the foci? shall he open the peritoneal cavity and determine with the exploring hand if a second kidney exists, and if so what is its condition? or shall he remove the kidney?

If he is a man of delicate conscience, the conviction will come over him with tremendous force, that he should not have engaged in this serious and complicated business until he had mastered its rudiments and served at the feet of the masters.

Two years ago, before our Connecticut State Society, I earnestly advocated that one or two physicians in each city and town, acquire the necessary skill and knowledge and equipment to conduct these various diagnostic procedures, and urged upon the general profession to support men who would devote themselves to this scientific line of work.

The surgeon must learn to be liberal to the man who devotes his time and energies to this all important preliminary field. Because such is not always the case, it is difficult to convince young men that such work is to their advantage. Their goal is the operating table and the emoluments that are supposed to accom-

pany it. The drudgery of the laboratory, of the cystoscope, the ureteral catheter, the X-ray and the cryoscope offer few inducements, and are rarely carried out in the smaller communities.

You of the large medical centers must be aware of the powerful influence you wield over the men of lesser opportunities, and you will perhaps pardon me for suggesting the importance in your writings and your addresses of emphasizing the necessity of careful, skillful and scientific work in establishing as nearly as possible, a correct diagnosis in these kidney lesions, rather than devoting more time to the elaboration of the operative technique and recital of alluring statistics.

THE MORTALITY IN OPERATIONS FOR RENAL CALCULUS.

By Hugh Cabot, M.D., Boston.

I HAVE accepted the invitation of your President to be here this evening and discuss some aspects of the mortality attending operations for stone in the kidney, because I feel that much may be done, particularly by an association of this kind, to improve existing conditions.

In dealing with the mortality of operations for stone in the kidney, we may consider it from two points of view. We may deal either with the death rate occurring in the hands of a few selected operators, whose skill, experience in selecting their cases, and reputation enables them to do their work under the most favorable circumstances, or we may consider the proportion of cases which die as the result of operation, taking into consideration all the cases operated upon, whether under favorable or unfavorable conditions. It is this double point of view which has given statistics their rather unsavory reputation, but it seems to me that we are telling but half the truth if we consider only what we may call the necessary mortality. It would be difficult to estimate what proportion of the cases operated upon are in the hands of those thoroughly familiar with the subject, but it will not be denied that a very large number of cases are operated upon by specialists in other lines of work, by the general surgeon, and even by the

general practitioner, and we shall really get a more correct idea of the present condition of the surgery of the kidney if we consider what results *are* obtained rather than what results may be obtained.

I was interested a year ago in collecting the cases recently operated upon at one of the large Boston hospitals, where they came under the care of a number of surgeons, all of them general surgeons, and all of them men of recognized ability. The skill here shown is probably equal to the average skill shown throughout the country, and the mortality is probably about the average mortality. It is, therefore, interesting to compare these results with those of the more special operators.

Mr. Morris collected 243 cases of nephrolithotomy and nephrotomy by special operators, showing a mortality of 7.8 per cent.; 34 cases of nephrolithotomy of his own showed a mortality of 2.9 per cent.; and he expressed the opinion that the necessary mortality ought not to exceed 3 per cent. The mortality of the 33 cases in my collection was 6, or 18 per cent., six times that of Mr. Morris' cases. A further examination of these 6 fatal cases shows that in one-half of them, death was not directly due to stone in the kidney, but to complications which had resulted from this condition and which might have been prevented by an earlier diagnosis. In two of the cases, death was due to septic absorption from large peri- and para-nephritic abscesses, which in one case had perforated both the diaphragm and the large intestine. In another case it was due to the existence of large "elephant" calculi in both kidneys, a condition which must have existed for years. In short, half of this mortality was due to the fact that the operations were done upon neglected cases and it is to these that attention should be more sharply drawn. The high mortality in these cases cannot be reduced by the operating surgeon and improvement must come in more accurate diagnosis and in the earlier investigation of doubtful symptoms. There is a wide-spread tendency, particularly among general practitioners, to treat symptoms and not diseases—in short, to dodge the responsibility of accurate diagnosis. It is our duty to urge upon all who see these cases early, that the best interests of the patient demand a full and careful investigation, that it is not sufficient to relieve him of his symptoms, but that it is necessary to prove, as far as such proof can be obtained, that he either has or has not a

stone in his kidney. We must impress our medical brethren with the fact that the responsibility cannot be shifted to the future, that the question of the cause of renal pain or of renal symptoms is one which demands an answer, and that the failure to give such an answer is likely to expose the patient to future risks, the extent of which cannot be estimated. It is doubtless true that the specialist can do much, by improving methods of diagnosis, to lower the mortality, but he can do so only with the complete co-operation of the general practitioner and by teaching him to study his cases with such care that, should special methods of diagnosis be necessary, he will either apply them himself or ask the aid of those who are proficient in such delicate manipulations. In a word, the mortality of stone in the kidney is to-day, if we consider all the cases, much higher than is necessary and improvement must come as a result of more accurate observation and study by those into whose hands these patients primarily come.

REMARKS ON RENAL CALCULUS.

By Edgar Garceau, M.D., Boston, Mass.

In photography of the kidney by means of the X-ray, we have a most valuable aid in the diagnosis of calculus, perhaps the most valuable yet discovered. It should not be forgotten that both tuberculosis and certain tumors of the kidney will give shadows which may be mistaken for stone. This is well illustrated by the following case: The patient was a woman twenty-nine years old, who complained of pain in the left hypochondriac and iliac regions for some months. As she was pregnant at the time, she thought the pain was natural to that condition and paid no attention to it. After the birth of the child, the pain grew worse, she had to urinate frequently, and she was confined to bed more or less. The examination of the separated urines showed a small amount of blood on the left side, together with a few epithelial cells of various sizes. The urine from the right kidney seemed normal, and it flowed in a good stream; the urine from the left side was very scanty. An X-ray photograph was taken and showed that there were several shadows on the plate suggesting

stones. At the operation a very large kidney was found riddled with the typical growth known as hypernephroma. There were no stones, and the shadows had been cast on the plate by the separate islets of cancerous tissue.

In cases of suspected calculus it is well to remember that, besides the kidney stone, there may be another one impacted in the ureter in some part of its course. Such a condition, if not recognized, may be the explanation of failure to relieve after a nephrotomy. It is in these cases that the X-ray may be of extreme value, and it should be the rule to photograph not only the kidney, but the whole course of the ureter as well. A positive double picture was the deciding point for nephrectomy as against nephrotomy in one of my cases.

Among those conditions giving rise to mistakes in diagnosis may be mentioned neuralgias of the lumbar region. If such neuralgias are accompanied by a ureteritis or a pyelitis the diagnosis is well-nigh impossible.

An exceedingly rare condition simulating renal stone is hysteria, giving rise to temporary anuria. Hysterical hematuria has been reported, but the cases are so few that one does not look for this as a symptom of hysteria. Cases, however, of hysterical anuria are not so uncommon as to excuse one from ignorance of the possibility of their being met with. Usually there is vicarious vomiting in hysterical suppression, the vomitus containing urea. With a history of pain in the lumbar region, vomiting and suppression suggest calculus rather than hysteria. A careful and critical study of the case is required before arriving at a diagnosis. Hysteria is suggested by finding other symptoms of hysteria, such as anaesthesias, contractions of muscles, etc. The character of the suppression is fairly typical in hysteria, being of an intermittent type rather than continued as is the case in calculous disease: in the former we may find suppression lasting two or three days, to be followed by a period during which there may be a small amount of urine voided, and then a gradual return to normal conditions, only to be succeeded by another attack of total suppression at the end of a few weeks or months; but in calculous anuria there is usually but one attack, sudden and severe, which goes on to a fatal termination within a week or two unless there is prompt surgical relief.

The methods of separating the urines in cases of calculus merits some attention. The microscopic blood observed in these cases is of extreme value in helping to make a correct diagnosis, and the best method of detecting this blood is the one that should be employed. The old ureteral catheters are not only dangerous as regards possible infection of a sound kidney, but they are valueless in fine diagnosis, because, even in the female, when they can be introduced under the eye, they may give rise to adventitious blood on account of the unavoidable lacerations of the ureteral wall, with the sharp tip of the instrument. The Harris instrument is not much better, because, in spite of the greatest care, we may produce slight lacerations of the bladder wall with the instrument and so give rise to microscopic hemorrhage. The Luys instrument is less open to this objection than the Harris instrument; nevertheless, even in skilled hands, it is possible to cause appreciable hemorrhage with this instrument. With the patient in the dorsal position, with the shoulders raised as advised by Luys himself, the abdominal contents are pressing directly down on the sharp tip of the instrument, and a slight hemorrhage may readily happen. In the female these objections may be overcome by the use of Kelly's cystoscope with the oblique tip. With this instrument, having the patient in the knee-chest position, it is possible to collect the urine as it drops uncontaminated from the mouth of each ureter in turn. In this way we get the urine exactly as it is excreted by the kidney. A point to be observed while collecting this urine, is that on the affected side the urine flows with less freedom than it does on the sound side. This is merely presumptive evidence of diseased conditions and is seen in a great variety of kidney lesions.

The treatment of ureteral stones is sometimes difficult and their extraction is often attended with considerable danger. Time is an element not always sufficiently considered, especially in cases in which the patient has been exhausted by a long period of useless waiting in the hope that the stone will be passed per vias naturales.

The following case illustrates a new method of operating for low stone: Mrs. M. L., thirty-four years old, delivered of a child a few weeks before, had been suffering for a week the most excruciating pains in the vain endeavor to pass a large stone impacted in the lower end of the left ureter. She was in a desperate

condition and a long operation was out of the question. On vaginal examination the stone could be just felt with the tip of the examining finger. Removal by simple incision through the vaginal wall would have been fraught with considerable difficulty on account of the distance of the stone from the vaginal outlet, especially in the event of a hemorrhage, which seemed not unlikely to happen as the patient had just been delivered of a child and the parts were in a congested state. It was thought that if the stone could be pushed down into the vagina and kept there while the vagina was being incised, the stone would serve as a guide upon which to cut. This was tried by pressing down through the abdominal walls, but it was not satisfactory; the stone slipped. The thought then occurred to me to incise the anterior cul-de-sac, push back the peritoneum between the bladder and the uterus as far as the broad ligament, then evert the broad ligament backwards with the tip of the finger, catch the stone behind the broad ligament with the tip of the finger crooked at the last joint, force it downwards towards the vaginal outlet, cut upon it with a very small incision, and finally squeeze it out. Hemorrhage could be easily controlled at any stage of the operation by pressure with the finger. The steps were carried out as planned without the least difficulty. With appropriate retractors, the vagina was exposed and the anterior cul-de-sac was opened, the peritoneum pushed back, and the broad ligament everted. The stone was found with ease and was pushed down towards the vaginal outlet and was delivered through a very small incision. Silver sutures were immediately taken, and healing took place by primary intention, there being no resulting fistula. The ureter remained pervious as demonstrated later by ureteral catheterization.

The stone was delivered in five minutes and the whole operation took only ten minutes.

At the time the operation was performed, I was not aware that Doyen had originated an almost similar operation for the removal of ureteral stones. Doyen, however, in his operation, incises the anterior cul-de-sac, exposes the ureter in the cul-de-sac, and finishes the operation by removing the stone *through* the cul-de-sac, and suturing the ureteral wall. This operation must take a good deal of time on account of the technical difficulties, and a fistula must be more serious in the anterior cul-de-sac than in the

vagina, should one result. The advantages of the operation as performed upon my patient are obvious. The technique is simple. Hemorrhage is under perfect control. It is very rapid. I feel certain that very high stones can be pushed down and brought within reach. If fistula results, the consequences will not be as serious as they may be when the sacral, the rectal, or the Doyen method is employed, and the operations for fistula are easier through the vagina than through the other routes mentioned. The ureteral and vaginal walls can be sutured *en masse* with success. As the ureter is always dilated in these cases, this suturing is less difficult than it appears on first sight. If the ureter leaks subsequently, the leakage will take place between the stitches and no harm will result. Of all the advantages gained, that with reference to time is the most important.

DISCUSSION.

Dr. W. K. Otis. Important as it is that we should definitely determine the presence and location of calculi in the upper urinary tract, we have at present no means applicable to *all cases* by which this end may be attained, no method of diagnosis which is without possible fallacy, and although recent discoveries have added greatly to the facility and certainty with which we may appreciate the presence or absence of stone, none of them is infallible.

As these different methods have been considered at length, I shall merely run over the most prominent with reference to this point. Pain is probably the most prominent symptom in renal calculus, and at all events is the one which the patient considers the most important, and yet the pain, no matter how characteristic, may be caused by disease in the bladder, by certain diseases of the kidney, by disease in adjacent organs or on the other hand, the presence of calculus in the kidney may cause painful symptoms referable to the bladder alone, *or pain may be entirely absent.*

Hematuria may be entirely absent or the presence of blood may be due to some other lesion unconnected with stone, and the same is true of pyuria and the microscopical findings in the urine.

The passage of the wax coated ureteral bougie will frequently give a positive result, but there is the danger of the wax being accidentally scratched during the introduction, but more especially that the catheter will pass by the stone, even when the latter is located in the ureter itself, without giving any indication of its presence, and I have seen cases in which this has occurred, where at one sitting, it was impossible to touch the stone which was readily felt at another time, well down in the ureter, a position which it had occupied all along.

With the coming of the X-ray, surgeons had every reason to feel that at last the important problem of exact diagnosis of stone in the kidney had been solved

and this method has certainly done a great deal to aid us in making a positive diagnosis, at all events it has enabled us to shift a part of the responsibility on to the shoulders of the skiagrapher, and if after operation one fails to find a stone, he can always point triumphantly to the "shadow" on the plate.

Unfortunately the X-ray gives us the least information in just those cases where information is so important, I refer to the fat patients, to whom an operation is more important because it is much more difficult and the chances of recovery are not so favorable, and it is in these cases that the X-ray is absolutely useless. We expect definite information from the X-ray, and to see a photographer, holding up a plate at various angles and in different lights and wondering if there is a shadow on the plate or not, and if there is a shadow whether it is a stone in the ureter or not, is simply maddening to the surgeon.

Moreover when a clear and certain shadow is present, and appears in a number of plates, it yet remains an uncertainty as to whether the shadow is not due to phleboliths, or a diseased condition of the arteries or to some foreign body in the intestines, or to something else, for at any rate I have seen a number of cases in which stones were positively located by the X-ray which were absent on operation, so that neither the positive or negative findings of the X-ray can be positively relied upon.

Lastly, the kidney may be exposed in the loin and carefully needled, the pelvis opened—and the kidney split in halves without revealing the presence of stone in its substance.

Dr. Ayres. If the X-ray shows a shadow, and there seems to be some question of the shadow being cast by a calculus in the ureter, a catheter may be passed and then a stylet passed through the catheter; the picture then taken may show the shadow at some distance from the shadow of the stylet and therefore some distance from the ureter. In regard to the wax-tipped catheter in the male, I have used it on probably fifteen cases, and in only one patient have I gotten a scratch. The scratch was obtained at six inches, and I have passed the wax-tipped catheter on this patient twelve times and obtained the scratch only three times. Dr. Heitzman made the diagnosis of calculus in the ureter.

Dr. R. T. Morris. Are there any constant differences between the symptoms of nephrolithiasis and of appendicitis, aside from the cases in which positive testimony is offered by the character of the urine? I think so. In acute appendicitis, we have my double A, B, C, diagnosis (*i. e.*, Acuteness of Attack. Board Belly. Colic and Constipation.) In nephrolithiasis with acute manifestations, the board belly is usually absent unless a calculus is engaged in the ureter, and constipation is not such a constant feature as it is in appendicitis. The attack is not so definitely acute as it is in appendicitis. The degree of shock is greater than it is in appendicitis, for the reason that the great renal sympathetic nerves are in such close connection with the solar plexus, that more profound general disturbance follows acute irritation of the kidney than it does of irritation of the lumbar plexus from an infected appendix.

In chronic cases are there any constant differences between the symptoms of nephrolithiasis and of appendicitis? I think so. In chronic appendicitis we shall find the right lumbar plexus always distinctly tender on finger point pressure, while this feature does not belong to nephrolithiasis. Press upon this plexus an inch to the right of the navel, and one will get pretty important testimony, of negative or of positive character.

In a case of chronic appendicitis there is almost always more or less protective spasm of the muscles of the right abdominal wall when we make palpation. In

chronic nephrolithiasis, there is little if any tendency to this protective muscular spasm.

I have avoided the temptation to describe more elaborate differences between the symptoms of the two conditions under discussion, in order to concentrate attention upon the points made.

Dr. CARL BECK. I always had a predilection for renal surgery, because my first surgical teacher, Gustav Simon of Heidelberg, performed the first nephrectomy (1869), and was virtually the father of modern renal surgery. He was the one who introduced the ingenious ideas of Marion Sims in Germany. I am sorry the question of renal skiagraphy was treated in so lukewarm a manner by the very men who are justly regarded as experts in this field. If Otis speaks of two or three years ago, I agree with him, but I disagree as to the present state of skiagraphy. I am convinced that with a few exceptions, the diagnosis of nephrolithiasis can always be made by the X-ray. Oxalate of lime calculi are by far the most frequent. They lead to surgical interference more frequently than the other varieties, because they produce more suffering. Skiagraphy of to-day will show the smallest stone. I am sorry I was not prepared to bring along some of my work, but I refer as proofs of my statement to some of my recent publications on the subject. I have by the aid of the diaphragm found the stone in all of my cases. It is true we all make mistakes, but there is a difference between justifiable and unjustifiable mistakes. We must demand that every surgeon be his own skiagrapher. I have made a great many poor skiagraphs, but the difference between myself and some other colleague is that I know when I have made a poor one and I am not guided by it. I will keep on and try to obtain a better one, and I take ten if necessary. In an exact science we must not guess. We require the X-ray absolutely to know exactly, and we can rely on what it tells us, provided the skiagraph is good. We must not tax our power of imagination. If we desire to do this, we can do it without the Roentgen method.

Dr. KEYES. Dr. Heitzmann gave us some interesting remarks on the urine, but he did not touch on one point. Does stone in the kidney or ureter cause microscopic blood to appear after exercise?

Dr. HEITZMANN. When Dr. Keyes speaks of microscopic blood, he probably means red blood corpuscles found with the microscope. These corpuscles are present under the microscope in practically every inflammation to a greater or less degree and seen even in cases of hyperemia, so that their presence is of no special significance. After exercise the blood corpuscles may be temporarily increased, but not necessarily to an appreciable amount.

Dr. DEIKS. I want to say that I sympathize with Dr. Beck's remarks. The X-ray has now become a specialty, and the man who is doing skiagraphy is in a position to obtain results. If the man who uses it therapeutically, endeavors to get skiagraphs, he has a field to give special attention. There are no two tubes alike. A certain tube in a certain apparatus will give brilliant results and not in another, and vice versa. You may have to take six, eight or ten before you can get good results. In regard to the medical aspect, I have had considerable experience along these lines, but I do not want to take up your time.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. APRIL, 1906. NO. 7

A CONTRIBUTION TO THE STUDY OF RUPTURE OF THE BLADDER.

By DR. E. LOUMEAU, Bordeaux, France.

RUPTURES of the bladder may be divided, from the etiological standpoint, into three classes. Sometimes they follow a traumatism, accidental or surgical; sometimes they take place spontaneously on account of the pathologic change of the vesical walls; and lastly they may arise from the two preceding mechanisms and occur upon the occasion of an insignificant traumatism, in subjects having a bladder which has been pathologically affected for some time. Then again, this accident may occur without any external cause in patients possessing a bladder having undergone changes in its structure or relationship on account of a former traumatism, which may date back for a more or less lengthy period.

Thus, we have traumatic, pathologic and mixed ruptures of the bladder, relative to which I have no pretension of entering into a detailed study, for that matter perfectly well known at the present time, but of which I merely desire to relate a few cases which I have observed each of which come under one of the three principal varieties above mentioned.

The first case is that of a man 57 years of age, who, for several years had had nephritic colic and who came to consult me in October, 1903. He complained of suffering during micturition, the acuity of which, as well as the frequency of the desire to empty the bladder, was exaggerated by fatigue and excessive movement. In the night all the pain stopped, but not the pollakiuria, which, for some months obliged him to get up five or six times in a night. Three weeks ago after being exposed to cold, the

patient was seized with complete retention, the bladder being emptied with a large catheter. Catheterization was extremely painful and gave rise to hematuria, which lasted for a week. .

When I saw the patient for the first time, just after a trip on a railroad train of several hours, I found a large well colored and built subject who passed in my presence some rose colored urine, which gave rise to considerable stinging at the end of micturition. Catheterization done with a metallic olive bougie No. 20 (Charrière) showed in the first place that there was no urethral stricture and after it penetrated into the bladder a large hard and smooth calculus was at once discovered just behind the neck, in all probability composed of uric acid. Rectal palpation, which was at once undertaken, showed a marked turgescence of the hemorrhoidal veins and, below the bladder, a distinct lobulated projection, which was renitent, evidently being merely the prostate in a state of congestion.

Lithotrity was at once proposed and accepted, but it was postponed by the patient for a short time on account of the necessity of arranging certain family affairs before submitting to the operation.

About two weeks later, November 16, I was called by telephone to the country, some distance from Bordeaux, to do an immediate laparotomy. I left at once, and arriving at my destination learned that the patient was the same person who had consulted me two weeks previously for the vesical calculus and who had agreed to submit to lithotrity, but two days previously he had undergone the operation at home by his physician, who, for that matter, was well up in everyday surgery and who called me himself at the request of his patient. Lithotrity had been laborious and the calculus was crushed into about two hundred pieces, four of which had a diameter above 4 cm., the fragments being removed with the aspirator; then a sound à demeure was placed in the urethra. But as soon as the patient came out of the anesthetic he complained unceasingly of an intolerable feeling of painful tension in the lower abdomen, a sensation which did not disappear, while the catheter did not give exit to any urine, in spite of repeated vesical irrigations which were given, so that it had to be withdrawn a few hours after the operation. The abdomen swelled more and more, giving rise to an increasing

anxiety with an inextinguishable thirst that was not overcome by the incessant absorption of liquids, which were perfectly well tolerated by the patient and did not give rise to vomiting.

At the time I arrived at the patient's house, at about half past three in the afternoon, I found him in extreme agitation, the abdomen greatly distended and very painful, with a copper colored edema of the entire posterior lateral walls of the abdomen. His face was pinched and covered with cold perspiration, the pulse was small, about 136 a minute; the temperature was 39° C. The patient had neither vomited nor rendered a single drop of urine since the operation, which had been done forty-eight hours previously. The diagnosis, unfortunately only too evident, was septic peritonitis following an intra-peritoneal rupture of the bladder produced during lithotrity. On account of the gravity of the septic accidents, which would carry off the patient very shortly, there seemed to be little hope that immediate laparotomy would accomplish much. However, the patient's family having been warned of the immediate dangers of the situation, I opened the abdomen without delay, under chloroform narcosis. As soon as the bladder had been exposed it appeared in the field of operation having a dead leaf color, while its tissues which were very soft, tore upon the slightest manipulation. After having opened it in the median line, it was found empty and in the left wall was an irregular opening about the size of the end of the little finger; then behind, in the small pelvis, there was a large quantity of decomposed urine mixed with altered blood. I endeavored to remove this liquid with gauze sponges, after which the cavity was irrigated with very hot water. The rent in the bladder was then closed with catgut, while the organ was left freely opened in the median line, stitched to the abdominal incision, and a large drainage tube surrounded with gauze was placed in the peritoneal cavity on the left and brought out just above the pubis. Hypodermic administration of salt solution, caffeine and ether were then given, and the patient warmly enveloped was transported to his bed. In spite of every effort he died within a few hours from the progress of the septicemia, which had in no way been influenced by the too tardy interference.

My second case was a lady 59 years of age, whom I was asked to see two months ago by my distinguished confrère, Dr.

Durand, Physician to the Bordeaux Hospitals. She had always enjoyed excellent health and neither in her hereditary nor personal antecedents was there anything to note until May, 1905. At this time she commenced to suffer in the lower abdomen, which was painful and somewhat distended in the right iliac fossa. Then vomiting set in and there was a slight rise in temperature, which confirmed the diagnosis of appendicitis. Rest in bed, diet and the local application of ice resulted in a rapid recovery from all the symptoms, but for several weeks the patient continued to present nonequivocal symptoms of localized peritonitis in the right iliac fossa, which finally disappeared gradually.

In June she left for Poitou, where she intended to remain a month and up to this time the patient, who had never experienced anything abnormal in the urinary apparatus was taken towards the 20th of June with spontaneous hematuria, which recurred for several days following, at the same time being accompanied with a frequent desire to urinate, which resulted in the painful expulsion of some small phosphatic débris. In July she passed a rough, whitish calculus, the size of a bean. On July 14th a vaginal examination was made, which revealed the presence of a deep-seated induration over the anterior vaginal wall, which, given the antecedent lithiasis already mentioned, was attributed to a vesical calculus. This diagnosis was not long in being confirmed, at least partially, by a direct examination, which Dr. Durand asked me to perform on the 11th of September.

I found the patient pale and thin, passing her urine almost continually, the latter being both bloody and puriform, the act being extremely painful. By vaginal examination I was able to discover the presence of a very hard infiltration, very sensitive to pressure, occupying the two upper thirds of the vaginal wall and appearing to be due to a deep-seated infiltration propagated from the bladder, primarily the seat of the trouble, and secondarily involving the vagina. Combined abdominal and vaginal examination only increased the pain without revealing any appreciable tumefaction in the cavity of the bladder, on account of the fat abdominal walls. Nothing could be found in the uterus, adnexa, iliac fossae, nor in either kidney. There was no suspicious lymphatic enlargement in the groins, nor could I perceive any enlarged pelvic glands by deep abdominal palpation.

A metallic explorer introduced into the bladder at once hit

against a rough stony mass giving rise to the characteristic sound which could only be obtained by a phosphatic calculus.

The diagnosis was not doubtful. It was only too evidently a malignant neoplasm involving and infiltrating the lower vesical wall which had become ulcerated, complicated with cystitis and secondary phosphatic calculi. The present condition did not appear to have any connection with the former attack of appendicitis already referred to and which at the time of my examination had already disappeared leaving no trace, unless, a thing which appeared hardly probable, one was dealing at this time with an acute pericystitis, which had extended to the peritoneal serosa and had developed under the influence of the already existing, but still latent, vesical tumor which had not given rise to any symptomatic manifestations. In case this latter hypothesis were correct, but which, I repeat, appeared to me much less admissible, the pelvic peritonitis had only become accentuated and more marked, instead of progressively disappearing as it had done here.

I proposed immediate removal of the calculus by lithotrity, which only kept up the cystitis and the patient's sufferings, but I refused any interference upon the vesical growth. However, in case of intolerable pain, one might be forced to perform a cystotomy in order to give relief.

After crushing I withdrew several fragments of calculus contained in the bladder by means of a pair of clamps introduced through the meatus, the total mass representing the size of a large walnut. An abundant irrigation of warm water was given after the removal of the stone. Sitz baths were ordered, with suppositories of opium and belladonna, urotropin and a milk diet with the hope of diminishing the vesical infection as well as the frequency in the desire and the pain during micturition.

At the end of eight days the patient was seized with a permanent incontinence of urine which put an end to her desire to pass urine and to all her sufferings. The urine, however, did not cease to be bloody, thick and fetid. The destruction of the sphincter by the extension of the malignant ulceration was not capable of attenuating the urinary infection as it did the painful manifestations, which had disappeared for good.

On the eleventh of October, the patient who for several weeks had been relieved of all pain on account of the incontinence

with continual evacuation of the urine which she supported with ease, was taken with uncontrollable vomiting of food, bile and mucous, against which all classical treatment was powerless. After one week of this intolerable situation, which had greatly undermined the patient, who had become unrecognizable on account of loss of flesh, a sudden pain occurred in the lower abdomen with an awful acuity which caused the unfortunate woman to continually cry out. The vomiting became incessant and more severe, the matter being greenish and poraceous, the face became pinched, the integuments cold, while the horrible suffering was not calmed by suppositories given frequently during the day, nor by morphine. Finally, after twelve hours of torture, the like of which I have never seen, the patient fell back exhausted on her bed and died.

A very acute peritonitis from perforation had complicated the truly alarming progress of the vesical neoplasm, which, during several weeks had given evidence of its centrifugal development through the bladder walls to the peritoneal serosa.

The third case that I am desirous of recording is that of a female 44 years of age, whom I presented cured before the Society of Medicine and Surgery of Bordeaux on October 27, 1905. The patient was sent to me from Perigord two months previously with serious septicemia, the result of a septic urinary phlegmon in the cavity of Retzius, following an extra-peritoneal rupture of the bladder. At the age of fourteen, the patient while still a child—since she did not have her menstruation until her seventeenth year—was the victim of a blow on the lower abdomen from the shaft of a wagon, the traumatism being inflicted just above the symphysis pubis, a little to the right. A violent pain was immediately felt, which obliged the child to stop walking for a time and has never disappeared since. The pain was aggravated by fatigue and the many pregnancies which followed later and one in which the abdomen became unusually large, gave rise during the two latter months of pregnancy to such dragging sensations in the hypogastric region that the patient was obliged to give up all work and even remain seated or lying down with the body bent forward. Beside this, attacks of complete retention of urine or vesical paresis, occurred on several occasions, especially following a voluntary continence of urine when somewhat prolonged.

On August 20, 1905, there was an acute retention which lasted eighteen hours and necessitated catheterization, which did not result in complete satisfaction on the patient's part. From this time on there was frequent desire to pass water, but there was no change in the urine, which had always remained absolutely limpid. On August 23rd after effort in vomiting, which lasted all the day and continued the following night, efforts which were prolonged by the administration of castor oil, the patient was suddenly seized with a sensation of something rupturing internally at the point in the hypogastrium the seat of the former traumatism and which had never ceased to cause suffering since the date of its receipt. At the same time she was taken with an imperious desire to pass water, which gave her the presentiment that this time she would void a large quantity of urine. She passed, in point of fact, more than half a potful, but, as it was in the night and as the vessel was immediately emptied, she was not able to identify the nature of the liquid voided. Whatever it may have been, the fact remains that from this time, the urine, which before had always been perfectly clear, became bloody, then a dirty red and extremely nauseous. On the other hand, the desire to urinate became frequent and the act painful, while the lower abdomen was appreciably distended and tender but no vomiting occurred. However, on account of the aggravation of the local symptoms and the progressive change for the worse in the patient's general condition, she was brought to me on September 4, 1905.

Upon examination she was found delirious, very thin, skin dry, clay colored and hot, the face pinched and an expression showing that she suffered much, the urine chocolate colored with the most repulsive fetid odor. The lower limbs, the perineum and the abdomen up to the waist were edematous. The lower abdomen was very distended showing a median forward projection, oval in shape, resembling a seven months pregnant uterus which extended up to the umbilicus; the integuments covering it were rosy in color and edematous, having an erysipelatous aspect. By catheterization with a soft rubber male catheter, the instrument being inserted to the extent of 30 centimeters, a pyogenic and bloody liquid made its exit, which came away in quite a considerable amount without giving any relief to the suffering of the patient and made no change in the abdominal swelling.

Believing that I was dealing with a septic urinary infiltration in the prevesical cavity, produced by a rupture of the bladder, giving rise to a general septicemia, which would very soon kill the patient, I immediately made a long hypogastric incision under chloroform. I was thus able to remove about 2 litres of a fluid having the same character as that drawn by the catheter, along with numerous clots mixed with purulent necrotic débris. The cavity thus evacuated, and without attempting to search for the vesical perforation, a large drain was introduced under the abdominal wall and a strip of gauze along with it, after which the wound was covered with a thick layer of absorbent cotton.

The postoperative result was of a remarkable simplicity. The next day the temperature fell below 38° C. and never rose above this again. The edema rapidly disappeared and the incision closed by granulation. At the end of a few weeks the patient passed all the urine by the urethra. On October 25th cystoscopic examination showed that the vesical mucosa was normal throughout its entire extent, excepting at one point in the anterior wall, a little to the right of the median line, where there existed a small rosy cicatrix, the size of a millet seed, evidently resulting from the spontaneous obliteration of the vesical rupture which had completely healed. As I have already said, on the 27th of October I showed this patient at the Society in absolutely perfect health, passing her urine normally.

As to the pathogenesis of this case of rupture of the bladder, which is not the most curious side of the patient's history, it appears to me due to the breaking away under the strain of vomiting, of a segment of the bladder, which had been bound with fibrous adhesions to the abdominal wall. These adhesions had without doubt succeeded the formation of a prevesical hematoma produced by the contusion which the patient received thirty years previously, the result being a circumscribed and localized pericystitis at the site of the traumatic focus.

Such are the three cases of bladder rupture that I have been desirous of recording in this note and which are sufficiently instructive in themselves for me to dispense with any very long comments.

The first, which was an instance of traumatic rupture, but of an operative surgical nature, shows that lithotrity may in hands inexperienced in this marvelous and ordinarily inoffensive opera-

tion, produce a laceration of the bladder and, on account of not having repaired the accidental lesion, resulted in a peritoneal infection which was rapidly mortal. This is, without any doubt, a very rare mishap, which in no way militates against lithotrity itself, which is, and it cannot be too often repeated, one of the most brilliant and surest conquests of urinary surgery. But this unfortunate complication proves at least that, in order to be performed with security it should only be undertaken by an experienced surgeon, otherwise it should give way to cystotomy, which is much more within the reach of an inexperienced operator.

The second case, which is an example quite typical of pathologic, spontaneous perforation of the bladder, shows the very rapid and invading evolution and perforation of a vesical cancer, susceptible of bringing about a hyper-acute peritonitis by an intraperitoneal rupture.

And lastly, the third case, is an example of mixed rupture of the bladder, spontaneous in appearance and, in reality produced by a double mechanism very easy of appreciation. A hypogastric traumatism received many years back resulted in a contusion of the bladder with a prevesical hematoma, following which fibrous adhesions resulted between the bladder and the abdominal wall. These adhesions caused the constant pain and very disagreeable dragging sensation during several pregnancies as well as the paretic disturbances of the bladder which were a hindrance to physiological evacuation of the organ. These adhesions under the influence of violent and repeated movements finally broke away from the walls of the bladder at their point of implantation on the organ, from which resulted a tear in the latter with all the consequences that were given in the history of the case. This rupture consequently had the straining effort of vomiting as a determining cause, but it also and above all had as a very important predisposing cause the prevesical adhesions resulting from the traumatism received in early years.

From all this one may conclude that a contusion of the hypogastrium, very simple in appearance, may to a certain extent be held responsible for a perforation of the bladder occurring thirty years later. Independently of this notion, which is not without some practical utility, the present case appears to me to be a document of a certain value for a chapter absolutely unexplored up to the present of contusions of the bladder.

CONSERVATIVE SURGICAL TREATMENT FOR CERTAIN CASES OF ENLARGED PROSTATE.

By Follen Cabot, M. D.

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THE method I advocate here for what may be termed perilous or emergency cases suffering with prostatic hypertrophy is not a new one. It is akin to nephrotomy followed by a nephrectomy.

The plan is first to do a cystotomy, preferably by the perineal route. Sterile water to be used for local anaesthesia. This whole operation should not occupy more than five minutes. We have in this manner usually obtained good drainage, with practically no shock. Good bladder drainage is the crying need of prostatic cases. The patient is thus placed in a position of bladder rest and he should improve in every way. In a week or ten days if his condition warrants it a prostatectomy may be performed by the perineal or supra-pubic route. The preliminary cystotomy will have enabled the trained surgical finger to determine this important question.

Before describing the class of cases which to my mind should be treated by this two-stage method of operation, I will quote the opinions of two surgeons who have had very large experience with prostatic cases. Howard Lilienthal says he believes thoroughly in this two-stage method of handling certain of these difficult cases. He says he never does an emergency prostatectomy. Eugene Fuller on the other hand believes such a method absolutely unsafe and never uses it. Both of these surgeons have had exceptionally good results. I firmly believe there is room for this two-stage method and shall now define the class of cases where in my opinion it should be the method of choice.

In an appreciable percentage of patients suffering from the effects of enlarged prostate the vital organs have been so damaged that even moderate surgical shock is quickly followed by death.

I have divided these cases into two groups. In the first group I include all individuals whose vitality has been so reduced by years of mechanical obstruction to normal urinary drainage that the limit of resistance has been reached. These men are worn out and tottering on the brink. No severe operation could be successful until they are in better condition and put in some shape to withstand the surgical shock. In suitable cases of this division very able men, among them Orville Horwitz, use the Bottini operation with excellent results. In many cases the prostatic obstruction is too large or unsuited to this procedure. The main argument brought forward by those employing the Bottini method is that in selected cases it accomplishes the purpose of prostatectomy by providing good urinary drainage, without so seriously menacing the patient's life as a complete removal of the prostate would. I have so far had no personal experience with the Bottini operation but in skilled hands it undoubtedly has a distinct place in prostatic surgery.

In the second group of cases I include all those who after prolonged prostatic disease suddenly become totally unable to urinate. In other words an emergency arises which must be immediately met if the patient's life is to be saved. The catheter has been tried and from one cause or another found useless or unsafe. The man's general condition is in most instances very bad and severe surgical shock seems sure to be attended with a fatal outcome. In deciding what is best to do in cases belonging to these two groups good judgment is of the utmost importance. In no other class of individuals is the surgeon's judgment and skill more severely tried. A consideration of the past history of the case with a study of his present crisis, his vital organs and his resistive power must all be carefully weighed. An opinion as to the best method for relief must be quickly given and then rapidly acted upon. Is he able to endure a prostatectomy? In my opinion the answer to the question for these two groups of patients is emphatically, no. As a rule the vitality is too low and while a patient might pull through the chances are against him. It is not fair in my opinion to put him to the severest test. He has complications usually affecting the kidneys or arterial system, as a consequence of the prolonged prostatic obstruction. What he needs is free urinary drainage, rest and the building up of his

exhausted vitality. His damaged organs need rest before additional strain is put upon them. The prime and immediate need can usually be best attained through a quick perineal cystotomy with sterile water anaesthesia. This should require not more than five minutes. If for some reason this route cannot be selected the suprapubic route should be substituted. This point can readily be determined by the use of a urethral instrument. If the patient's condition is so feeble that he cannot endure this slight shock he certainly would not have survived a prostatectomy. The drainage resulting from this method is usually perfect and the urgent situation is quickly met and temporarily solved. The man is now put to bed, given freely of water; the necessary stimulants are prescribed and the enfeebled damaged organs given a chance to rest and improve. Irrigation used according to the state of the bladder. The urine is measured and thoroughly studied.

The use of calomel and urinary antiseptics to be employed as indicated. The patient should not lie in one position but better be propped up in bed a day or two and then put into a reclining chair. By the aid of the finger at the time of the cystotomy the size and position of the prostate has been accurately determined. By this means the operative route can be readily decided. In the course of a week or perhaps longer, if the condition has improved, a complete prostatectomy can be carried out. By this method the patient has received two little shocks instead of one big one. The second operation should be done with more celerity than it could have been without the previous cystotomy. In a prostate of average size and consistency the time for its enucleation should not be more than 15 minutes. The route will depend upon the position of the enlargement, its size and consistency. The perineal route in my opinion is the one of choice; it is less productive of shock and convalescence is more rapid. In operating by either route I now use *continuous hot irrigation through the penile urethra.* If much haemorrhage ensues adrenalin chloride can be effectively used by the same channel. The advantages of this method of irrigation are that we can use it continuously without interfering with the manipulation of the hands about the wound, and it tends to markedly lessen haemorrhage and so decrease the shock. At the end of the operation and before the patient leaves the table he receives 15 minims of

adrenal chloride subcutaneously, also an enema of hot saline solution and brandy.

At the best these two groups of prostate sufferers are perilous cases. I therefore urge a trial of the method which I have successfully used a few times. In my opinion it should be resorted to more frequently than has been the case with prostate surgery in the past.

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INJURIES TO THE VENA CAVA DURING NEPHRECTOMY.

By Dr. Isidore Sagols,

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A STUDY of the various recorded cases of injury to the vena cava during nephrectomy shows that the lesions of this vessel are due to several causes. Anatomically, the right kidney and vena cava are contiguous and this relationship is rendered more intimate by the development of renal neoplasms. From the changes that it gives rise to in the neighborhood, the pathologic development of these tumors shows how the operative conditions change, how the difficulties of the interference increase and how possible it is to injure the vessel.

In a few words I will review the topographical anatomy, which will distinctly establish the relationship of the organs situated in this region, after which will be given those cases which have so far been reported in literature, including notes of two cases which were kindly given me respectively by Dr. Heresco, chief of the genito-urinary service of the Filantropia Hospital and Dr. Houzel. We will then consider the pathologic anatomy, as well as certain operative conditions, and will endeavor to explain the manner of production of these injuries.

Formed by the union of the primary iliac veins, the inferior vena cava commences on the right side of the vertebral column, at the level of the disc separating the fourth and fifth lumbar vertebrae, or a little lower at the fifth vertebra, slightly below the

end of the aorta (Poirier). From this point it travels vertically upward along the vertebral column to about the twelfth dorsal vertebra; at this level it becomes deflected to the right in order to reach the posterior border of the liver. Of the course followed by the inferior vena cava beyond this point I shall say nothing; that portion situated below the diaphragm is of interest to us only, for the simple reason that we are to study injuries to this vessel during operative interferences for the removal of the kidney.

The inferior vena cava has a greater calibre than the aorta and consequently it is the largest vessel of the body. At its origin its diameter is 20 mm., 30 mm. above the renal veins and 34 mm. above the supra-hepatic veins. On account of these dimensions wounds of this vessel were formerly considered mortal and operative lesions of this vessel are to be considered the most dreaded complication arising during nephrectomy.

The vena cava is the common trunk into which all the veins of the sub-diaphragmatic portion of the body enter.

Its intra-abdominal relations may be summed up as follows: in front it is in relation to the posterior border of the mesentery, to the third portion of the duodenum, the head of the pancreas, the portal vein and posterior border of the liver. Inwardly it accompanies the abdominal aorta, from which it is separated by only a few lymphnodes. I would particularly insist on the presence of these lymphatic glands along the internal aspect of the vena cava, firstly, because they are always involved in renal neoplasms and their removal is often a difficult matter on account of the possibility of injuring the vena cava; and secondly, because these enlarged glands, by the resistance they offer to the progress of the neoplastic process, may easily compress the large venous trunk, thus reducing its calibre and preparing an increase in the collateral circulation. Outwardly, the vein is in relationship with the psoas muscle on the right side, the ureter and the internal border of the right kidney and suprarenal capsule. The relationship of the internal border of the kidney and vena cava is intimate and it is readily understood with what facility renal tumors during their development may surround the vessel and contract very tough adhesions with it.

At the level of the hilum of the kidney the vena cava re-

ceives the right renal vein, which is much shorter than the left one; this vein becomes involved at an early date in cases of renal neoplasms. By the renal vein injuries to the vena cava become possible, because wounds of the former at its point of entrance into the vena cava may be considered quite as serious as wounds of the vena cava itself. The hilum of the kidney contains numerous lymphatic glands which are always enlarged in cases of a renal neoplasm, surrounded in the meshes circumscribed by the vessels of the pedicle. When very adherent their removal is most dangerous and is a cause for injury to the vena cava.

The topographical anatomy shows that of all the organs the inferior vena cava is the one presenting the most intimate relationship to the kidney, while pathologic anatomy will show that of all the organs this vessel is the one which will first undergo the influence of the development of a renal tumor. In point of fact every form of renal growth develops slowly, even insidiously, and if hematuria, which should be considered as the alarm signal, does not cause the patient to consult a physician, the neoplasm continues to grow until pain becomes severe and the functional disturbances distinctly evident.

A right-sided renal tumor, which alone interests us, occupies a position which is useful to be familiar with and absolutely necessary to understand. "Lying backwards on a thick layer of muscles and aponeurosis which form a resisting envelope, protected above and below by bony surfaces, the last rib and the iliac crest, it meets in this direction an obstacle to its expansion during its growth" (Guillet). Above, the renal tumor cannot continue its extension because it is prevented by the liver and consequently the growth becomes incased on all sides by very resisting barriers so that a single opening remains, namely the latero-abdominal route; it always extends in this direction, pushing the intestinal coils towards the median line. From this fact a renal growth becomes an abdominal tumor. A neoplastic kidney never forms a lumbar tumor, a fact most important to bear in mind.

It can easily be understood that a neoplastic mass produces during its development more or less intense disturbances in the abdominal viscera. The peritoneum reacts by chronic inflammation and adhesions become established. So long as the renal neoplasm is completely encapsulated, round and distinctly

limited, it only gives rise to phenomena of compression of the vena cave, of which we will have more to say later on.

However, the characteristic of renal tumors is that they become adherent to the neighboring structures very early in their evolution. The adhesions may be such that it is occasionally impossible to separate the wall of the vein from the tumor, a condition which is well illustrated by the case recorded in 1884 by Whitehead, where so little space existed between the inferior vena cava and the kidney, that it became necessary to place the ligature on the neoplasm itself. Much patience is required to break up and cut through all the adhesions and much skill is necessary to bring the operation to a favorable outcome. The slightest roughness, or a too brusque movement given to the tumor, may result in a large rent in the vena cava, because, curiously enough, neoplasms more frequently invade the walls of the vessels and the encephaloid in particular soon breaks through its capsule and involves the vessels of the hilum and from here to the vena cava or directly to the vena cava itself. In order to give an idea of this propagation to the vessels, I would recall Rohrer's statistics; out of 50 cases of renal tumor 12 times there was extension to the inferior vena cava, 9 times to the renal vein and 3 times the mesenteric glands.

This propagation is mentioned in some of the cases here reported (Schede, Manteuffel). These authors found a neoplastic nucleus on the wall of the vena cava and in order to do as radical operation as possible they proceeded to extirpate these foci. In similar cases their conduct is to be imitated and it is absolutely indicated to deliberately wound the vena cava. The pathology of renal neoplasms shows that beside accidental wounds there are others which are absolutely inevitable.

The anatomic relations are, as we have seen, profoundly changed by the development of renal growths, while the difficulties of operation are also increased. All operators, who have wounded the vena cava during nephrectomy, were dealing with voluminous tumors. In point of fact these renal growths are often enormous; the sarcoma removed by Lücke measured 21 centimetres in length, 11½ centimetres in breadth, 9 centimetres thick at its lower pole and from 3½ to 4½ centimetres at its upper half. Schede, Bottini, Houzel and Heresco have all met with

growths the size of a child's head at term, while Manteuffel met with a neoplasm the size of an adult's head. Besides, all these authors mentioned the numerous adhesions present which united the neoplastic mass to the neighboring organs and to the vena cava in particular. No matter whether one is dealing with sarcoma, carcinoma, or pyonephrosis, the right hypochondrium is always completely filled by an extremely adherent tumor, and, under these circumstances, extirpation of the latter is very difficult. Section of the adhesions is arduous on account of the depth in which one works, and occasionally, the ground can only be covered millimetre by millimetre, as in Bottini's case. In Lücke's case the tumor suddenly gave way from a too sudden traction on the part of the surgeon, rolled out of the abdomen on to the floor. A severe hemorrhage of black blood indicated a tear of the vena cava. Houzel also, in delivering a tumor through the abdominal incision, tore the vena cava and immediately a flood of black blood inundated the field of operation. Section of the adhesions is not the only difficulty to overcome, because the lymphatics of the hilum are always involved and their dissection is extremely delicate and full of peril. I should mention in passing, certain neoplastic extensions which arise very frequently in various forms of malignant tumors of the kidney, which may surround the vessels of the hilum and the vena cava and, from the very tough adhesions resulting, they may become a source of injury to the vena cava during operation.

Case 1. (Lücke). In July, 1880, the patient presented himself stating that for some time he had noticed an increase in size of the hypogastric region and had noticed a feeling of hardness on the right side. It was only latterly that he lost flesh, with slight anorexia and pains in the hypogastrium. The patient was pale, but the general condition good. In the right lumbar region a tumor the size of an ostrich's egg could be detected. It appeared to be smooth, painful on pressure and was easily moved upwards, downwards, and towards the median line. The right lumbar region certainly offered less resistance than the left when the patient was standing or lying. Urine normal.

A diagnosis of sarcoma of the kidney was made, but it was difficult to decide whether or not the kidney in which it had developed was a movable one. Operation was decided upon and

a median incision made, beginning just above the umbilicus. As the intestines covered the tumor they were pushed to the left and the peritoneum over the tumor was incised. There was a slight loss of blood and the cut vessels were ligated. The tumor, which was very movable, was enucleated with the fingers, this being accomplished without much loss of blood. The hilum was then sought for and an attempt made to isolate it with the fingers in order to include it in a silk ligature. While the tumor, which was very smooth and slippery, was drawn upward in order to apply the ligature, it suddenly tore away and fell to the ground. Immediately a flood of dark blood filled the abdominal cavity. The wound was immediately packed with gauze sponges and pressure brought to bear with the hand. The pulse and respiration did not change. Compression was continued for a few minutes and then the strips of gauze were cautiously withdrawn one after the other. A cord of tissue several centimetres in length could be felt and after being grasped in clamps the hemorrhage stopped. The abdominal cavity was carefully cleaned and the pedicle and several other strips of tissue were ligated with catgut.

After having waited a sufficient length of time to be convinced that the hemorrahge had definitely stopped, the abdominal cavity was closed. The evening of the operation and the following morning there was no rise in temperature, the abdomen was lax and painless. Two liquid movements. No vomiting. Pulse soft and moderately rapid. In the evening there was no temperature, but the patient was nauseated and had not as yet voided urine. Abdomen soft and painless. During the night there were cold sweats, liquid stools, but no urine in the bladder. On the next morning the temperature was up, pulse small and rapid, frequent nausea, some vomiting, patient's mind clear. Collapse finally took place, accompanied with an increase of watery diarrhoea and intermittent vomiting. The patient died on the fourth day after the operation, although there was not the slightest sign of peritonitis.

Case 2. (Schede). Patient 48 years of age, well and appearing to enjoy flourishing health. At the age of 15 years he had nephritis and during the Autumn of 1887, upon the occasion of a fall, he experienced a violent pain in the right renal

region. On the next day there was hematuria which lasted for eight days, considerably weakening the patient. Dating from this day the hematuria recurred with variable frequency and without appearing to change the general condition of the patient, it had become particularly aggravated for twenty days previous to his coming under observation. Blood and elongated vermiform clots were passed by the urethra, the latter appearing to have been molded in the ureter and, while coming down this canal, they gave rise to a very sharp pain.

Upon examination, a rounded, large and solid tumor was found on the right side behind the ascending colon which could only belong to the right kidney. Operation was advised and accepted. An incision 20 centimetres in length, parallel to the twelfth rib, was made starting from the anterior border of the sacro-lumbar mass of muscles. When the tumor was exposed another incision had to be made in order to resect the twelfth rib which was required by the size of the neoplasm. The peritoneum was then incised and the tumor freed little by little with the hand. After this had been accomplished the pedicle was found so short that the vessels of the hilum could not be ligated separately. It was consequently included in an elastic ligature and the tumor cut away. Examination of the stump showed that there still remained a few bits of tumor and that part of the wall of the vena cava had been included in the ligature. When the peritoneal wound had been closed, detachment of the vessels from the remainder of the tumor was tried and a sufficient bit of the renal artery was isolated so that it could be tied. As to the vein it was no longer isolated.

As Schede did not wish to leave a lateral ligature on the vena cava, the vessel was compressed above and below the point of ligature and the latter being then removed, attempt was made to again free the walls of the vessel. The result was a very severe hemorrhage coming from the left renal vein. With two clamps, whose ends met at the middle of the vessel, the solution of continuity was closed and the hemorrhage stopped. What still remained of the tumor could now be removed and it was then found that there was a rent 20 millimetres in length in the vena cava. This was closed by catgut sutures without difficulty, after which the clamps were removed, the hemorrhage had com-

pletely ceased and a perfect permeability of the vein was noted. The wound was plugged with iodoform gauze and the abdominal incision closed.

For the first few days following the operation everything went well, but the patient began to rapidly decline and suddenly died. Autopsy showed that death was due to an acute fatty degeneration of the heart and other organs, but what is more interesting, was the condition of the inferior vena cava. Upon incision it was found filled with liquid blood, as well as the left renal vein. Opposite the left renal vein, at a point where the right renal vein should enter, a cicatrix was distinctly seen. It was present in the form of an arc, having only a slight convexity, about 2 centimetres in length and formed a projection into the lumen of the vena cava, which slightly obstructed its lumen; this narrowing, although quite marked, did not seem to have hindered the circulation. At the point of cicatrization, both the external and internal layers of the vessel were completely and solidly adherent, the internal layer was intact and nothing would lead one to suppose that a thrombus had formed.

Case 3. (Helferich). The notes of this case were taken on a woman 57 years of age, who, for about a year, had noticed a tumor on the right side of the abdomen, which latterly had rapidly increased in size. The pain was not severe, but at certain times the patient experienced a feeling similar to what might result from pressure or from a heavy body. There was polyuria and from time to time the urine contained much albumen. The patient was frequently seized with desire to vomit and vomiting did occur as soon as pressure was exercised over the tumor. The colon was pushed towards the median line and covered the tumor anteriorly. General condition satisfactory.

On November 3, 1895, the right kidney with the tumor were removed, but during the operation the ascending vena cava was torn, the resulting rent being closed by a ligature. The patient hardly voided a few cubic centimetres of urine after the operation, death occurring two days later.

At the autopsy no metastases could be discovered in the other organs, the left kidney being normal.

Case 4. (von Manteuffel). Patient 49 years of age had been in good health up to September, 1898. At this time he

complained of pains in the right flank; there was anorexia and tendency to constipation. Micturition was free, but the urine dark colored; no hematuria. The patient had lost much weight at this time.

Examination March 12, 1899. The patient was thin, medium size, skin and mucosa pale. Heart and blood vessels in good condition, although many vessels present a slight degree of sclerosis. Pulse 100. Temperature 36.9° C. The end of the nose slightly violet in color. Nothing in the lungs excepting a vesicular murmur. Between the right flank and the anterior superior iliac spine the abdominal wall projects. By palpation, a rounded, hard and smooth tumor can be felt, larger than a child's head. The lower limit of this growth does not reach the anterior superior iliac spine; the upper limit extends to the liver and is not easily mapped out by palpation. Towards the median line the tumor extends down to the vertebral column, its limits being difficult to make out. The same condition in the lumbar region. No ballottement, although the tumor can be moved in every direction and follows the respiratory movements. By percussion it cannot be easily separated from the liver. The convexity of the growth is covered by the colon; to its left there is no resonance. Tumor painful on pressure. No venous stasis, no edema.

Urine slightly cloudy and acid, no albumen nor sugar; traces of indican. Microscopically uric acid crystals, granular casts and renal and bladder epithelial cells are found. Total amount in twenty-four hours 1200 to 1300 cc.; Sp. gr. 1,015.

From its situation, size, form and evolution, the tumor was considered as a renal carcinoma, but, during the operation, the surgeon thought he was dealing with a tumor of the liver.

March 17, 1899. Incision made from the border of the great dorsal, above the twelfth rib and carried in a slight curved direction directly over the tumor up to the external border of the rectus. After incision of the abdominal wall, the fat capsule of the kidney was exposed and was found infiltrated with carcinomatous masses. After having exposed both poles of the kidney the ureter was laid bare, a double ligature applied, after which it was cut away. The renal vessels were then isolated between two ligatures and after ligature of the pedicle the kidney was found

adherent to the vertebral column. From this it resulted that the peritoneum and colon were displaced upwards; the peritoneum was opened and then it was found that the tumor was adherent to the vena cava, presenting a pedicle 6 cm. broad and 1 cm. thick, or, in other words, the pedicle crossed the wall of the vein retaining these dimensions. The tumor sent a prolongation into the lumen of the vein which measured 10 centimetres in length and more than a finger's breadth in thickness. It was decided to extirpate the growth from the vena cava. It was essential to prevent any bit of the tumor becoming detached and carried off in the blood current and in order to obviate this occurrence, a clamp was placed directly under the diaphragm on the vein, just above the prolongations of the growth in the vena cava.

The tumor was then cut away leaving a sufficient amount of the pedicle which remained adherent to the vein. This was then seized and an incision was made in the healthy portion of the walls of the vein around the carcinomatous focus, during which an assistant compressed the vein against the vertebral column. However, when the pedicle was completely removed a gush of blood inundated the wound because compression of the renal vein on the opposite side had been neglected. This was done and the opening in the vena cava sutured. After this, compression being removed, a very trifling leakage was noticed and to control this, the connective tissue was sutured over the sutured opening in the vein. The hemorrhage then stopped and the blood continued its course through the vessel, although, at the point of suture, its calibre had been reduced to almost one-half. Compression of the vena cava had lasted fifteen minutes and the pulse, which had been good up to this time, became poor and hardly perceptible. Two minutes after the clamps had been removed the pulse became stronger and of good quality. The operation was then rapidly finished by the closure of the wound and packing with iodoform gauze. The operation lasted 64 minutes.

The patient recovered so well that by the 16th day he could sit up in bed and on the 18th in a chair, while on the thirty-ninth day after the operation he left the hospital, the urine at this time being perfectly normal.

Case 5. (due to the courtesy of Dr. Houzel). Female, 36 years of age was seen for first time in May, 1900. She had

been well up to December, 1899, at which time she began to complain of her abdomen and cough. A physician rapidly cured the cough, but, as she continued to suffer, had an elevation of the temperature and not being able to urinate, she consulted another physician, who prescribed Epsom salts. After several doses she urinated, but noticed that the urine contained pus and glairy matter. The abdominal pain increased and we saw the patient on May 27, 1900.

She was a small, thin woman with withered skin. Heart and lungs normal. She was septicemic, with a temperature of 40° C., obstinate constipation and complete anorexia.

In the right flank a tumor the size of an adult's head could be found, distinctly fluctuating and projecting towards the lumbar region and passing slightly beyond the median line. A line of resonance separated the growth from the liver, while over it a slight resonance indicated the colon flattened between the abdominal wall and the tumor, which was retroperitoneal and could only arise from the kidney. The urine, which was voided in a normal amount, was full of pus.

Nephrotomy was done on May 30th, about 3 litres of fetid pus being evacuated from the kidney. Drainage. The next day the temperature was normal and the urine did not contain pus. A week later the patient returned to her home under the care of her physician. She returned at the end of April, 1901, in a worse condition than when she left the hospital. She was thinner and cachectic. The drainage tube had not been changed once and gave issue to a very large amount of fetid pus. The tumor had increased in size, filling the entire right flank and reached downwards to the anterior superior iliac spine.

On May 3, 1901, she was anesthetized and it was decided to remove the kidney. When the peritoneum was reached, separation of the tumor with the finger was attempted, but it was so intimately adherent to the appendix and ascending colon that it was ruptured. The intestines were pushed to the side and carefully walled off with gauze. The upper part of the wound was also walled off in order to isolate the liver which appeared in the wound at each respiratory movement. In order to give more working space the incision was carried backwards parallel to the iliac crest and detachment of the deeper parts of the tumor to-

wards the abdominal cavity was continued. Decortication was quite advanced, the ureter had been cut between two clamps, when suddenly traction on the tumor having made it project through the wound, a flood of blood appeared at the bottom. The wounded vessel was seized between the left thumb and index finger and a clamp was applied above and below the opening. After cleaning out the wound it was found that the vena cava had been torn to the extent of a centimetre, the rent being seated on the anterior aspect of the vessel, two fingers breadth below the renal vessels. Suture of the opening in the vein with catgut was very difficult on account of the depth at which it lay in the wound and from the hemorrhage which continued. Finding that this was not sufficient to stop the hemorrhage the vessel was lifted up by two ligatures placed under it and it was then solidly ligated above and below the opening and then the flow of blood completely stopped. The renal vessels were then isolated and tied off separately and with the knife the pyonephrosis was completely removed without the slightest contact with the wound. The ureter was then tied off and the clamps removed. A drain was placed in the lower angle of the wound and the abdomen closed.

The kidney was as large as a child's head at term and was composed of a series of separate pockets containing thick, fetid pus. The after history of the case was uneventful and the patient left the hospital completely cured on May 20th. Other than a slight edema of the limbs, the general condition was perfect.

Seen again on June 15th the venous circulation was found perfect and there was no more edema of the legs. The abdomen was flat and painless. She was again seen at the end of July, 1902 in excellent condition.

Case 6. (Bottini). Female 40 years of age. Affection dates back three years, she having experienced in the spring of 1890 a pain in the right flank for the first time. This pain increased little by little and occurred in such fearful attacks that she was obliged to remain in bed and she entered the hospital April 13th, 1892. The patient was greatly reduced in flesh. Thoracic organs normal. She has been troubled with indigestion for a few months past, occasionally accompanied by attacks of vomiting. Nervous system presents nothing abnormal, although the patient is greatly depressed. Uropoiesis offered no phenomenon which

would justify the diagnosis made. Quantitatively and qualitatively the urine was normal. However, after four days in the hospital a trace of sugar was detected, which disappeared by diet.

In the right hypochondriac region was found a resistant, round body, about the size of a child's head at term, smooth and fibromatous in consistency. Three-quarters of its circumference could be circumscribed, while the fourth appeared fixed, irregular and adherent. The free portion followed the respiratory movements. Pressure was painful. Bimanual examination of the renal region was prevented by the tumor, which was interposed forwards between the hand and the right kidney. Behind, one felt a uniform pastiness which was impossible to outline. Physical exploration gave rise to no sign capable of enlightening the diagnosis.

Operation April 25th. An incision was carried over the tumor into the right hypochondriac region parallel to the median line and two fingers breadths on the outer side of it. The incision measured 12 cm. After the peritoneum was opened the intestines were pushed aside and the tumor was palpated. The tumor was freed forward and on the sides until about two-thirds of the growth was freed, but, in order to reach the deep posterior adhesions, it was necessary to increase the incision 3 cm. downward. Little by little the tumor was freed, when suddenly a flood of blood inundated the field of operation. Large gauze sponges were introduced into the abdominal cavity in order to clean out the wound and then the bleeding vein was seized in an angiotribe and afterwards ligated with a stout ligature. The vena cava had been torn, but at the time it could not be ascertained whether this accident was an accessory occurrence, independent of the extirpation of the tumor or not. A few more applications of the angiotribe were sufficient to isolate the tumor in its entire circumference and it was then removed. It was then possible to explore the field of operation and much to the astonishment of all we found the right kidney in its proper place, only much smaller than normal, the atrophy being certainly due to the pressure that the tumor exercised upon it. It was the peripheral extremity of the vein which had been rent and three or four centimetres higher up one could see the end of the central segment of the vessel

which was also ligated but appeared less swollen than the lower end and formed an enormous turgid swelling of a dark violet color. The portion of the vein between the two ligatures had remained adherent to and was removed with the growth.

Microscopically the tumor proved to be a lympho-sarcoma with small cells contained in a fibrous capsule.

To make a long story short the patient after a long convalescence, during which a secondary abscess was opened, finally recovered and was seen some months after the operation in a very satisfactory condition.

Case 7. (Due to the courtesy of Dr. Heresco). Female 47 years of age. Entered the hospital May 7, 1902, with the diagnosis of right-sided calculous hydronephrosis. Both parents are dead, the mother at the age of 40 from pneumonia, the father dying at 60 from cancer of the liver. Patient has had 11 children. At the age of 7 or 8 she had enlarged glands which suppurated.

Three years previously while pregnant at the fourth month, she fell down a staircase and aborted three weeks later. About eight years ago during the summer she was seized with severe cramps in the abdomen, but after medical treatment the pains suddenly disappeared. One or two weeks afterwards the pains became localized in the right hypochondrium. At this time she felt a lump which disappeared at the same time as the pain.

Five years ago the patient was taken with severe pain in the right hypochondrium and found a large tumefaction, which in the first place was hard, but became soft and fluctuating. An incision was made over the hypochondrium at the level of the umbilicus and a large amount of pus evacuated. The patient was well in two weeks.

A year afterward, at the point where the incision had been made, pains were experienced and another smaller incision gave issue to more pus. After this a fistula resulted, which gave exit to pus for three years. Three months ago the fistula closed and in its place a slight prominence the size of a walnut, soft and fluctuating made its appearance.

Micturition was painless, but imperious. Never any hematuria nor icterus. The fistula again opened and since then the patient has felt better and free from pain in the hypochondrium.

Examination. In the right hypochondrium at the border of the rectus at the level of the umbilicus was found a fistulous tract which allowed the probe to enter three or four centimetres. In the right flank was a tumor which gave rise to ballottement and extended upwards as far as the liver and downwards to a horizontal line passing through the umbilicus. This tumor was smooth.

On May 9th examination of the urine showed the presence of uric acid, a density of 1,020, urea 23.44 gm., traces of albumen, no sugar, no biliary pigments. Abundant deposit, largely composed of pus. No renal elements.

On May 15th catheterization of the ureters was done and an examination of the urine coming from both kidneys was made with the following result. Left kidney: 300 c.cm. marked greenish color, almost transparent, acid. Less amount of sediment. Sp. gr. 1,032. Urea, 16.64 gm. per litre. Chlorides, 18 gm. per litre. Phosphoric acid 2.5 gm. per litre. Albumen. No sugar nor biliary pigments. Microscopically, numerous uric acid crystals colored green. No pus nor blood. Urine from right kidney: 300 c.cm. slightly greenish in color. Cloudy. Acid. Very abundant sediment. Sp. gr. 1,010. Urea. 6.04 gm. per litre. Chlorides 6 gm. per litre. Phosphoric acid 0.872 gm. per litre. Albumen 1.5 gm. per litre. No sugar nor biliary pigments. Microscopically, very large number of pus cells.

Methylen blue was injected and an hour afterwards the urine from the left kidney showed a clear green color; the maximum of intensity of the coloring occurred four hours after the injection, while twenty-four hours later it was hardly colored. The urine from the right kidney gave hardly any coloration six hours afterwards, the maximum of its intensity occurred twelve hours after the injection; the last elimination occurred twenty-four hours afterwards with the same intensity as the preceding. Chromogen appeared 5½ hours after the injection and was hardly perceptible. Duration of the elimination was forty-eight hours.

Operation May 17th. An incision was made in the right hypochondriac region, two centimetres from the outer border of the rectus muscle and parallel to it. The fistula was included in the middle of this incision. The anterior border of the liver covered the tumor, the latter being adherent to the peritoneum,

which was reddish. The growth was freed with difficulty and during the decortication, when the hilum was reached, a vein was torn. The hemorrhage was free and in trying to stop it it was suspected that the vena cava was involved. The vessel was compressed with the fingers, the intestines pushed aside and it was found that it was the vena cava. A ligature was thrown around the vessel above and below the focus of the hemorrhage and the latter was controlled. Separation of the growth was then continued with and nephrectomy accomplished. The wound was thoroughly packed with gauze.

The patient having lost a considerable amount of blood was given a litre of salt solution.

The patient was discharged completely cured on June 10th.

Out of these seven cases there were four where a cure was established (von Manteuffel, Bottini, Houzel, Heresco), one case (Schede) which may be considered as having a successful outcome, because he lived for 17 days, death being due to another cause, and three cases of death. Consequently, in 57% of these cases a cure was obtained. These results are certainly much to the honor of contemporary surgery, but the severe hemorrhage which arises at the time of rupture, the difficulty of applying clamps above and below the wound in the vessel if the tumor is still in the abdomen, the hemorrhage from the left renal vein, are all conditions which diminish the chances of recovery. The prognosis of wounds of the vena cava has always been considered fatal. De la Motte and Dupuytren thought that it was impossible to overcome the hemorrhage arising from these wounds, while at a later date Delorme and Nélaton professed the same teaching and it may be said that the same doctrines were still valid at the commencement of the antiseptic era.

In 1880, Lücke having injured the vena cava ligated the vessel; the patient died of uremia. In 1892, Schede attempted suture of the rent and seventeen days after the operation death occurred from another cause and at autopsy cicatrization of the wound in the vessel was found to have taken place. In 1895, von Manteuffel resected a portion of the wall of the vena cava measuring 9 centimetres in length and 2½ in width on account of a neoplastic focus which had grown into it. The vein was sutured and the patient recovered. In 1893, Bottini performed total

ligature of the vena cava which was followed by recovery and in 1901 and 1902 two cases of total ligature followed by recovery were done respectively by Houzel and Heresco. There are undoubtedly other instances which have escaped our notice. However, we have during the last ten years greatly improved the prognosis of lesions of the vena cava. It is evident that wounds of this vessel will always give rise to a high mortality but we now know that they may be dealt with and the patients recover.

When in presence of a hemorrhage arising from an injury to the vena cava, hemostasis is to be accomplished in the way that circumstances will permit, either by digital compression and, if possible afterwards, by clamping the vein above and below the rent. In order to avoid injuring the walls of the vein, both branches of the clamp should be covered with rubber drainage tube. As soon as the hemorrhage has stopped, the wound should be cleaned out and the lesion examined carefully. It is evident that if resection of the wall of the vein is necessary it should be accomplished between two clamps. Several procedures may be employed, namely, compression, temporary clamping, lateral ligature, suture and total ligature and we will now examine the value of each one of these methods in cases of injury to the vena cava.

Compression cannot be employed. The arrest of the hemorrhage is due to the formation of a thrombus, which obliterates the vein along a certain extent of its course and for a vessel having the calibre of the vena cava an obliteration over such an extent will of necessity prove fatal.

Temporary clamping should be seriously considered and this method has given rise to long discussions between Schede and Niebergall, the first believing in the superiority of suture, the second proclaiming the greater value of clamps left in place for twenty-four hours. It is possible that, in all cases where the clamps may be left in place, where one can watch the patient carefully so as to remove them upon the slightest indication, this procedure gives good results; but in cases of wounds of the vena cava it would be very audacious, not to say imprudent, to leave clamps on.

Another intervention requiring anesthesia will also be neces-

sary; after twenty-four hours the clot is not sufficiently solid to resist coughing or vomiting and is a very serious argument against temporary clamping. There are, in point of fact, cases where, during the extirpation of a tumor, usually instances of renal neoplasms, the wall of the vein has become involved in the process and must be resected. Clamping is then of no use, because the instruments would obturate the lumen of the vessel. For all these reasons temporary clamping should be discarded as a method of treatment.

Lateral ligature has been employed in one case of injury to the vena cava (Helferich), the patient dying forty-eight hours after the operation. This procedure has been rejected by Nélaton, Malgaigne, Langenbeck and Braun on account of the very important fact that it exposes the patient to secondary hemorrhage when the ligature falls off at about the fifth to the seventh day.

The frequency of this accident can be explained by the extreme tension to which the wall of the vein is subjected after lateral ligature. In point of fact, one cannot accomplish lateral ligature so as to insure hemostasis without including a large portion of the walls of the vessel and from this results a very intense traction on the surroundings of the wound; then again catgut may slip very easily and the result is a secondary hemorrhage. An experiment performed in 1895 by Villar and Brachet confirms this. After having exposed the femoral vein in a dog the vessel was pricked with a knife. The tiny opening was seized with a clamp, over which a lateral ligature of fine silk was applied. Five days latter a very severe secondary hemorrhage occurred which would have killed the animal if the wound had not been immediately plugged with gauze. This experiment also showed that blood tension was extremely marked at the level of the ligature. There was a marked stricture of the vessel and the blood current did not appear to be reëstablished at this point.

There are cases where lateral ligature cannot be employed, namely, when the injury extends over more than one-third of the circumference of the vein.

It has been shown that none of the preceding procedures of hemostasis are applicable in the treatment of wounds of the vena cava. Alone, suture of the wound is proper which assures per-

fect permeability of the vessel. It was referred to by Nicaise in 1872 in Gensoul's thesis, where he advises to discard this treatment in wounds of veins. Vinay in his article on "Veins" in Dechambre's Dictionary, relates two cases of suture, one due to Lister, the other to Czerney, and advises having recourse to ligature or forcipressure. Lateral suture was attempted unsuccessfully by Gluck, but in 1881 Hirsch of Vienna successfully accomplished circular lateral suture on the femoral and internal jugular veins, but was unsuccessful on the femoral artery. The animals were killed a month later and he found the vessels were permeable and their calibre only slightly diminished. In 1890 Mayr performed suture of the vein which gave excellent results, while in 1891 Niebergall advised temporary clamping. In 1892 Schede published numerous cases of suture of the veins, one of which being the vena cava and to which allusion has already been made. Rickard in 1892, Romme in 1893, Paul Kay and Tikoff in 1894, Brachet and von Manteuffel in 1895, Murphy in 1897, Kümmel in 1900 and Clermont in 1901, have related numerous instances of suture of the veins followed by recovery. The latter mentioned authority has also published several cases of circular suture of the vena cava in dogs. The animals survived and at the end of a month the vessels were found permeable, but with a distinct narrowing of their calibre at the point of suture. This authority concludes that he has always been able to reëstablish the permeability of the vein and that the true factor of success is asepsis. According to him, an aseptic foreign body projecting into the lumen of a vein does not produce thrombosis, which is the accident to be feared.

As soon as a jet of black blood indicates a wound of a vein no time should be lost in arresting the hemorrhage, either by digital compression applied at each side of the rent, or by a temporary double ligature or elastic clamps. After this has been accomplished suture is done as in any ordinary wound. Schede sutures without paying attention to the disposition of the tunics of the vessel; Mayr considers that the juxtaposition of the different layers of the vessel is indispensable for a successful outcome. We believe that this exact approximation is of no importance, because Tikoff found that cicatrization had taken place in instances where an exact approximation of the tunics of the vessel wall was not

realized. A continuous suture is considered the best by Mayr, Tikoff and Schede. Von Horoch prefers a round needle and fine silk instead of catgut. In order to better assure hemostasis it is better to suture the neighboring structures, such as aponeurosis and muscles, over the sutured vessel.

We have related two cases where suture was attempted and in one of them autopsy seventeen days later showed that cicatrization was complete. In von Manteuffel's case, where resection of the vessel wall followed by suture was done, the patient recovered. If these clinical results are compared with those obtained by experimentation it is to be remarked that suture of the vein is an excellent method of treatment.

Physiological experiments have always been a useful adjuvent and an indispensable auxiliary for both the physician and the surgeon. By showing the effects of such and such mutilation in animals, experimental physiology has given to surgery the extent to which it may proceed with very precise indications.

Ligature has always been the procedure of choice in cases of wounds of veins and by this means a definitive hemostasis is obtained. The question, however, arises up to what point this procedure is applicable in the case of large veins? Should not one fear in the case of the vena cava sudden death of the patient following a sudden interruption of the circulation in such an important vessel which brings back the blood to the heart from more than one-half of the body? In other words, can the inferior vena cava be ligated? Such is the question which physiologists have endeavored to solve experimentally. In 1880 Picard read a short note at the Academy of Science of Paris on the phenomena consecutive to ligature of the inferior vena cava performed above the liver and he says: "The animals always died after this operation, this termination occurred at variable times according to the animal, varying between half an hour to three or four hours.

"The immediate phenomena are those produced by a severe hemorrhage.

"The ultimate results are also similar to those observed in a sudden anemia; they consist, in the first place, in an arrest in the respiration, following which the pressure continues to drop. The number of systols diminishes, likewise their amplitude, and in a minute or two there is a complete secondary arrest of the heart's action.

"The cause of these anemic phenomena is revealed by the study of venous pressure of the infradiaphragmatic vascular system. In point of fact, at the time the ligature is applied and at the same time that tension of the carotids diminishes, one observes an increase of the pressure in the veins of the lower limbs and peritoneal cavity, and this increase persists until death."

These observations show that the blood is less abundant in the upper regions, because it is immobilized in the infradiaphragmatic system after the operation. The nervous centres, the respiratory muscles, heart, and so forth, are consequently exactly in those conditions in which they would have been placed if this immobilized blood had been removed from the organism by a hemorrhage.

It will thus be seen that experimentation absolutely rejects ligature of the inferior vena cava. For that matter it is precisely from this time (1880) that surgeons attempted suture of the vein whenever there was a lesion of this vessel. But suture is not always possible and thus in 1893, Bottini ligated the vena cava in a case where suture of the vessel was unsuccessful. Contrary to all hope, the patient recovered.

This fact passed without hardly being noticed, but it gave rise to interesting studies by Dr. Purpura, who endeavored to explain the discord between clinical observations and the results obtained by physiological experimentation. It is therefore proper to relate these experiments.

Purpura published a very important work on experimental ligature of the inferior vena cava. He tried sudden ligature and slow ligature on dogs. The latter alone resulted in recovery of the animals by giving time for the supplementary circulation to become established and after a very large number of experiments he formulated the following conclusions: (1). In some cases, in dogs, recovery is possible after immediate ligation of the inferior vena cava at any point from the junction of the primary iliac vein up to the liver; death is more apt to occur when the ligature is placed above the point of entrance of the renal vein. (2). Stenosis of the lumen of the vena cava prepares a favorable soil for complete obliteration. (3). The orifice of compensation, if the obliteration is situated just below the renal vein, is assured by the anterior extra spinal vein, the left utero-ovarian and the uterine, and secondly by the inferior mesenteric vein and

those of the abdominal wall. If the obliteration occurs above the entrance of the renal vein, the circuit is reëstablished by the vessels of the renal capsule, by the extra spinal vein, the inferior mesenteric and those of the abdominal wall.

He demonstrated by numerous experiments that the preceding development of a collateral circulation prepares a favorable soil for complete obliteration of the inferior vena cava, and that, *even in certain cases, in dogs and bitches, the animals may recover when a sudden ligature of the inferior vena cava is made.*

Wishing to control these experiments myself I performed with Prof. Forgue a laparotomy on a dog and ligated the inferior vena cava below the entrance of the renal veins. The animal was chloroformed. After a period of weakness which lasted several hours, the animal presented nothing abnormal. There was no edema of the lower limbs and no circulatory disturbances. He ate well and lived for twenty days, but, unfortunately, through some error, an autopsy was not done.

Another dog was submitted to sudden ligature of the vena cava just above the renal veins and as soon as the ligature was tightened, an intense congestion of the kidneys, a diminution of the cardiac impulse and a decrease in the respiratory movements were noted. The animal presented evidences of profound adynamia, but an hour and a half afterwards he was able to stand up. Death occurred rapidly in three hours. We will make no comments on this case and leave it to physiologists to discover the reasons which produced such a rapid death.

If, to these experimental results, we add those obtained clinically, it will be seen that in the four cases where immediate ligature of the inferior vena cava was done, three of the cases survived and recovered. Lücke gives no indication as to where he applied the ligature on the vein in his case. The ligature was placed below the renal veins by Bottini and Houzel, while Heresco does not state at what point the ligature was applied, although it would have been interesting to know. But the important fact is that, out of four cases of ligature of the vena cava there were three recoveries, while physiological experiments could hold out no hope for such a result. There is here a contradiction, perhaps only apparent, but which must be explained. Without doubt, the collateral circulation in dogs is not as developed as in man,

but beside this there are other reasons which allow one to surmise how life has been possible in cases of sudden ligature of the inferior vena cava in man.

In the three cases of total ligature the surgeons were dealing either with a neoplasm of the kidney or an enormous purulent pocket which had developed in the gland itself. It was always noted that the tumor was adherent to the vena cava, and it is very likely that, in all the cases, this vessel was compressed by the neoformed mass. Now, in point of fact, are these not the conditions realized in the case of gradual ligature? The tumor soon commences to press on the walls of the vessel and diminishes its calibre and lumen. The presence of this gradual stenosis is an obstacle to the passage of the blood and a factor in the development of collateral circulation. The complementary veins become more and more dilated as the pressure exercised by the tumor on the large venous trunk becomes greater. The supplementary venous supply will be ready to take up the work of the vena cava as soon as its obliteration is complete. Consequently, ligature of the vessel only continues and achieves the natural obliteration which the constant increase in the size of the tumor would have inevitably brought about.

To sum up, it may be said that in man, anastomoses between the portal circulation and that of the vena cava will be sufficient to assure the return of the blood to the heart after obliteration or ligature of the vena cava. In the female all observers recognize a very great influence and a marked preponderance of the uterine and ovarian venous plexuses, as well as a great importance to the utero-ovarian vein.

These remarks are most instructive if we take into consideration the fact that the three cases of ligature of the vena cava recorded in this paper were in females, that is to say, in persons where a special complementary venous system existed, a system prepared to undergo an increase in size by all the phases of genital life.

In passing I would like to quote the curious remark made by Vimont in his thesis on obliteration of the inferior vena cava: "When the inferior vena cava is obliterated at its lower third, facts tend to prove that the circulation becomes reëstablished by the perietal veins (Sappey, Dumontpallier, Goetz, Meismer,

Kahler, Parisot, and so forth), and in the female by the uterine, utero-ovarian, ureteral and renal veins, that is to say by the visceral veins."

Consequently, in the female, it is not infrequent to see the circulation become reëstablished by the ovarian vessels when the obliteration involves the lower portion of the vena cava. Hallett has related a case where, after obliteration of the cava, the right utero-ovarian vein reëstablished the intercepted circulation. In a case reported by Parisot the left ovarian vein attained the size of a goose's quill, it was tortuous and emptied into the emulgent vein. Kundrat met with a case in which, following old obliterations of the entire inferior vena cava and the right pelvic veins, the left ovarian vein had reached the size of a loop of small intestine.

A very important fact from the surgical standpoint has been acquired, namely, that there are two methods of treatment of injury to the vena cava, namely, suture and total ligature, which have given satisfactory results. The other procedures, namely, compression and lateral ligature, do not merit to be considered, because the inconveniences do not compensate the advantages derived by their use.

As to temporary clamping I cannot recommend it. The removal of the clamps twenty-fours later necessitates a second interference, and after this lapse of time, the clot may break up if the patient vomits or has a coughing spell. Consequently, too much risk is taken if this means of hemostasis is employed.

There now remain suture and ligature, and it is necessary to settle their respective indications. I would remark at once that total ligature is easier of execution than suture, on account of the depth of the wound. It goes without saying that I do not advise ligature in all cases, although experimentally and clinically it would appear devoid of much danger. I would willingly advise total ligature in cases of wounds of the inferior vena cava when the vessel is injured below the point of entrance of the renal veins and in every case where one can apply the upper ligature below the renal veins. But when the opening occurs in the vena cava at the entrance of the renal vein or above it, when the wall of the vein to be resected extends very high up, ligature appears to me absolutely contra-indicated. To ligate the vena

cava above and below the renal veins would be fatal, as physiology shows.

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CORRESPONDENCE.

NEW YORK, Feb. 11th, 1906.

Editor, "The American Journal of Urology," Boston, Mass.

DEAR SIR,—In your valued Journal of October, 1905, an article by Dr. Frank M. Johnson, entitled; "Lavage of the renal pelves in the treatment of lithaemia, pyelitis, forms of nephritis, with notes of illustrative cases," attracted considerable attention.

Knowing Dr. Johnson as I do and admiring his progressive ideas, I approach with some hesitation a criticism of his paper. I would not do it if I did not feel that a signal of warning is necessary. The subject of lavage of the renal pelvis has been recently discussed extensively in the various medical journals and even in the lay press. In the hands of the inexperienced and unprincipled the method is open to many objections. Until the treatment of various kidney lesions by irrigation of the pelvis has become an accepted form of treatment, I firmly believe statements that it will cure chronic parenchymatous nephritis are both misleading and dangerous. From this general statement I exclude certain conditions of the renal pelvis in which Howard Kelly and others, after years of painstaking work have demonstrated pelvic lavage to be of undoubted value. Beyond this point, in my humble opinion, we have not yet found a safe harbor. Dr. Johnson says: "Case after case could be cited in which the diagnosis of sub-acute or chronic parenchymatous nephritis, supported by clinical deductions and by microscopic findings, could be regarded as a certainty and in which internal medicine has proved of little worth. Now, since irrigation of the kidney has been practiced, the picture in these cases is changed. Casts, disintegrating epithelium, and similar elements have disappeared from the urine, a healing process has supplanted an extending inflammation, and restoration to complete health even is made possible." This is certainly a very optimistic view of the situation and I earnestly hope it may become the experience of all careful observers. Until that time however, the burden of proof is on the one who makes the statement, never mind how distinguished he may be. Each minute step in diagnosing the condition as one of chronic parenchymatous nephritis should be given in detail, while the previous history of the patient should be recorded in every way known to careful observers and the condition of the urine studied and tabulated for several months at varying intervals. In other words before pelvic lavage is begun we must obtain a picture of the disease perfect in every part and over which there can be no quibbling

afterward. During the lavage the same care for details should be carried out. After the treatment is completed and the patient considered cured, at least a year better be allowed to elapse, during which time systematic observations should be made, before a complete and final report is published. By the above mode of procedure a report could be made which would meet the most searching investigation. The reports of chronic parenchymatous nephritis disappearing under lavage of the renal pelvis are so astounding that one is temporarily made speechless. The logic of the method is, to my mind, absolutely wrong and I fail to see how it can ever do more than relieve some pathological conditions connected with the ureter and renal pelvis itself. I have yet to find in the literature of the subject authenic reports of cures of chronic parenchymatous nephritis.

I hope Dr. Johnson and all the others who are doing this work will publish fuller accounts of their investigations in this line, but at the same time describing their cases much more in detail step by step. In this manner only shall we obtain that which will be of positive value.

While I am profoundly interested in new methods of treatment connected with the cystoscope I feel that at present we are justified in reporting as cured only some pathological conditions of the ureter and renal pelvis.

Sincerely yours,

FOLLEN CABOT.

129 EAST 31ST STREET.

OBITUARY.

MAX NITZE

On March 1, 1904, notification was received from Hans R. Wossidlo that a celebration had been arranged for March 9th in honor of Nitze, to commemorate the twenty-fifth anniversary of the first public demonstration of the cystoscope.

The committee appointed by the physicians of Germany to take the celebration in hand and to prepare a congratulatory address consisted of Professor Carl Posner, Dr. Hans R. Wossidlo, and Dr. H. Goldschmidt.

This committee honored a member of the Association by delegating to him the invitation of the other members to send their signatures for reproduction in the address. The time available, however, was too short for more than a congratulatory cablegram. On March 9th the following message was sent:

"Professor Max Nitze, Berlin.

"Your colleagues and pupils congratulate themselves and the profession on the twenty-fifth anniversary of the demonstration of the cystoscope. Vivat Magister!"

This cablegram bore the names of some fifty members whose replies could be obtained in time. Their signatures, as well as those which arrived after March 9, 1904, were sent to the committee to be appended to the congratulatory address.

Personally and in correspondence during the past ten years Nitze often expressed the hope of visiting our country. Acting thereon, he was asked to prepare a paper for the American Urological Association. After several letters on the subject had crossed, the date was finally fixed for April 3, 1906, when a special meeting was to be called in his honor. He had given the title of his proposed paper: "Intravesical Removal of Tumors."

On February 18th Nitze cabled: "Verhindert," which, according to the code arranged, meant: "It will be impossible for me to go to New York, as agreed." Three days later the inventor of the modern cystoscope and many ingenious modifications thereof was stricken with apoplexy and died on the same evening.

The loss to science by Nitze's death is incalculable. His wonderful mechanical skill in devising special instruments rendered them so perfect for their purpose that, particularly under his tuition, their effective use for examination and treatment could be readily acquired.

De mortuis nihil nisi-verum: To those who were not intimately acquainted with Nitze he might appear somewhat cold and even unapproachable. Those, however, who were favored with his friendship knew him to be exceedingly frank and unassuming. In quiet evenings, after a hard day's work, Nitze dropped his very stiff "Herr Kollege," and at the most charming little suppers he gave he omitted professional titles in addressing his guests. While not the best of conversationalists, he strove to interest and entertain those with whom he associated. In consequence, most pleasant recollections were carried away by the pupils he had made forget that he was a great man.

Nitze is dead, but his work will live forever after him in the advances in cystoscopy, ureteral catheterism, the diagnosis of renal and bladder diseases, and intravesical operations.

Nitze was but fifty-seven years of age; he seemed a much younger man; his energy and restless striving for advances in urology were in keeping with his youthful appearance.

The American Urological Association loses its first Honorary Member by Nitze's death.

F. C. V.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. MAY, 1906. NO. 8

THE DIAGNOSIS AND TREATMENT OF KIDNEY STONE.

By ARTHUR DEAN BEVAN M.D. and JOSEPH F. SMITH M. D., Chicago.

IN 1880 Henry Morris performed the first nephrolithotomy, the removal of a stone from a useful functionating kidney, one not the seat of destructive suppurative processes.

Before this time the few kidney stone operations were nephrotomies or nephrectomies done on suppurating kidneys the seat of extensive destructive processes.

The diagnosis of kidney stone was, at the time of Morris's first case, extremely difficult and uncertain. The diagnosis of the condition is, to-day, with the aid of newer and more refined means, made with a considerable degree of certainty. The diagnosis was formerly made and the treatment undertaken when the symptoms were extremely grave and the damage done to the urinary organs by the condition was serious and often irreparable. The diagnosis should be and can usually now be made long before the symptoms are extreme and the destructive effects of the disease great. The treatment was formerly expectant unless the symptoms were threatening the life of the patient, and then surgical operation was adopted as a last resort. The treatment to-day should be early removal of the stone as soon as the diagnosis can be established, and if possible before serious injury has occurred to the kidney or ureter. The exception to this rule is of course to be found in the cases where organic lesions in other organs, extreme age, etc., make the surgical procedure distinctly more dangerous than the continuance of the condition.

The etiology of kidney stone is still cloudy. The most probable explanation of stone formation is to be found in the theory of catarrhal inflammation of the renal mucosa of germ origin, usually colon or typhoid as in gall stones. The source of infection is probably from the blood, as a rule. The ascending inflammation from the bladder as a cause of stone formation would seem to be the exception.

In connection with stone formation the very common occurrence of stone in the kidney or bladder after fracture of the spine is an interesting and suggestive fact. In these cases we frequently have colon bacillus cystitis and pyelitis due to the loss of function of the bladder with resulting damming back of the urine, the use of the catheter and subsequent infection. The urinary infarcts and uric acid deposits of the new born must not be overlooked as a factor in the kidney stones of the young; traumatism as a possible factor must be considered. A number of cases with history of traumatism, hematuria and later kidney stone have been reported.

The relationship of other pathological processes in the urinary organs to stone, such as the co-existence of stone and tuberculosis, stone and malignant disease of the kidney, and stone in the kidney associated with tuberculosis or carcinoma of the bladder or prostate is not clearly understood. Such cases are frequently observed. A certain relationship between gouty and allied diatheses, and kidney stone seems established, and in this same connection must be mentioned the existence of the same hereditary tendency to kidney stone as to the diatheses.

From an analysis of our own cases it seems that the most essential and most common cause of kidney stone, without denying other possibilities, is a mild colon infection of the kidney which furnishes both the nucleus and the organic framework and the conditions which favor the deposit of the inorganic substances from the urine which go to form the complete kidney stone.

The division of stones into primary and secondary is of some clinical importance. The primary stones are those developed in a kidney secreting fairly normal urine. The secondary are developed in a kidney containing decomposing urine.

The clinical picture of kidney stone colic is well known and easily recognized. It is due to a plugging up of the ureter with

PLATE I—To Illustrate Article by Dr. Arthur D. Bevan and Dr. Joseph F. Smith.

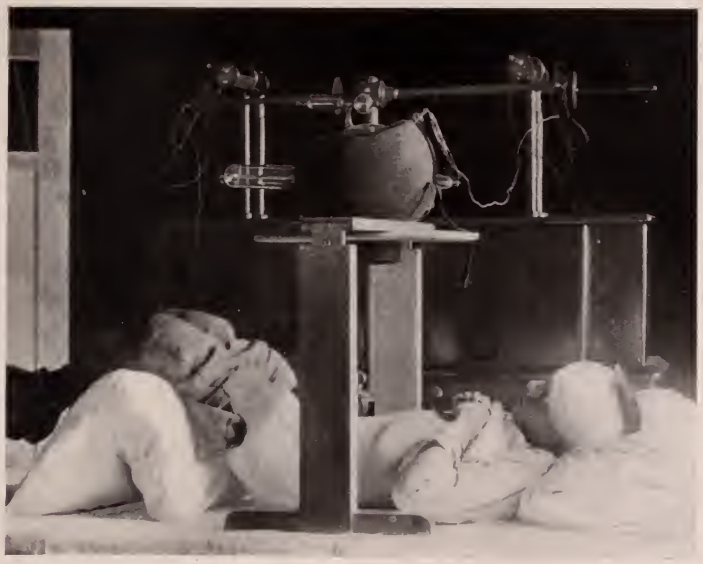

FIG. 1.

FIG. 2.

stone or pus or blood with resulting sudden great increase of intrarenal tension and great pain. Such a renal colic with its sudden onset and sudden relief, with its characteristic pain radiating from the kidney down the ureter and to the genitals with later the passage of a small stone per urethram, make the diagnosis as clear as a mathematical demonstration. Some physicians demand this unmistakable picture before making the diagnosis of stone.

As a matter of fact these cases are as rare as the typical gall stone case with characteristic colic, jaundice and the finding of the stones in the feces are in gall stone work. And if we look for these typical pictures alone we shall overlook as many kidney stones as the old time physicians did who did not make gall stone diagnosis unless jaundice was present.

Without minimizing the value of the gross clinical picture of kidney stone colic, it should be borne in mind that many cases of kidney stone are found and can be diagnosed with symptoms which have little resemblance to this old fashioned picture.

Kidney stone is less common than gall stones but no reliable reports as to their relative frequency of occurrence are at hand.

In some countries 80% of cases occur below the age of 20; apparently in others the majority occur above 40. They are generally found in most statistics to be much more common in male than female. There are some exceptions to this rule, some operators having more female than male cases. The statement found in some text-books that females form but 5% of the cases is entirely erroneous. In Israel's work there were more females than males, and in Kümmell's there were 22 females out of 47 cases. In our own work the females furnish about 25% of the cases.

Kidney stones are found in less than 1% of our post mortems, less than 1/10 as frequent as gall stones which occur in 10% of all post mortems.

CLINICAL COURSE

1. Kidney stone may, like gall stone, remain innocuous for years, give absolutely no symptoms.

2. Kidney stone may give rise to the typical acute colics above described.

3. Kidney stone may give rise to acute attacks resembling gall stone colic or attacks of appendicitis or of acute indigestion or even of ileus.

4. Symptoms of lumbago or sciatica may be present.

5. Symptoms of pyelitis with pus and blood.

6. Gross hemorrhages discovered by the patient with secondary anemia, blood clots in bladder, etc.

7. Calculous anuria.

8. Stone with enlargement of the kidney mistaken for tumor, especially if the condition is associated with hemorrhage.

9. Stone with pus, blood and emaciation, a picture suggestive of tuberculosis.

10. Stone may be found associated with tuberculosis.

11. Stone may be found associated with neoplasm.

DIAGNOSIS

The diagnosis of kidney stone must be made from the following:

(1) A careful analysis of the family history, the personal history, and the gross clinical evidence of the case.

(2) Character of the pain and other symptoms, tenderness over kidney and ureter.

(3) Examination of the centrifuged urine for microscopic amounts of blood, traces of albumen, tubercle bacilli, etc.

(4) Cystoscopic examination to exclude bladder lesions and to ascertain condition of ureteral orifices.

(5) Catheterization of the ureters to determine the presence of two ureters and two functionating kidneys and collecting and examining the separate urines.

(6) Cryoscopic examination of the blood to determine the functional capacity of the kidneys.

(7) Exhaustive X-ray examination to determine the presence of stone in the kidneys, ureter or bladder.

The varieties of stone are:

1. Oxalate and urate stones.
2. Phosphatic and carbonate stones.
3. Cystine, xanthin and indigo stones.

In addition to the general symptoms—temperature, pulse, pain, tenderness and tumor, fixed or movable, information of much value in diagnosis may be obtained by the employment of the following procedures:

(a) Microscopic examination of sediment. The centrifuge and microscope have made it possible for us to determine the presence of small numbers of red blood corpuscles, tubercle bacilli, pus and epithelial cells, etc.

(b) The X-ray skillfully employed is a valuable addition to the field of kidney surgery. Skiagraphs showing good differentiation are capable of showing the presence of stones in the kidney and ureter with a high degree of accuracy, even when the stones are largely composed of uric acid or urates. Skiagraphs that are reliable for diagnostic purposes according to Albers-Schönberg, should possess the following characteristics:

1. The transverse processes of the vertebrae should be distinctly shown.

2. The psoas muscle must be outlined at its outer border so that it may be distinguished from the quadratus lumborum.

3. The last two ribs with their structure should be plainly shown.

Leonard who has done more work with X-ray as a means of diagnosis in renal and ureteral calculi than anyone else in this country, regards the negative finding equally as reliable as the positive, provided negatives of good quality are secured and points out the fact that the plates to be reliable must be of such a quality that " shadows of objects less dense than the least dense calculus " must be shown upon the plate. He has also shown that nearly one-half of all calculi occur in the ureters. In the cases in which the evidence obtained by the skiagraph is negative, it was pointed out by one of the present writers in *Annals of Surgery,* May, 1904, that tuberculosis, hypernephroma, cystic kidney, tumors, etc., may give rise to symptoms not to be differentiated clinically from the picture of stone in the kidney. In two recent cases in which the patient's symptoms, i. e., pain, tenderness, etc., were on one side, the X-ray showed the shadow of a calculus in the opposite ureter which was found and removed by operation. These cases show

that the clinical symptoms may be entirely misleading in regard to the location of the stone when one is present.

In regard to the technic to be employed and the kind of apparatus to be used operators differ widely—so widely in fact that the conclusion may readily be drawn that good results depend more upon the individual skill of the operator than upon the apparatus employed. Some workers employ large coils capable of giving a spark of 15 to 20 inches excited by 110 or 220 volt currents; others employ coils of only 6 to 10 inches spark length excited by low voltage currents. Both methods are capable of producing good results if properly employed. One consideration upon which nearly all operators agree is that the tube employed should be of rather low vacuum in order to secure the necessary differentiation of structures. The length of exposure varies with the kind of apparatus employed and the thickness of the patient from a few seconds to ten minutes or more.

In general it is best to secure a skiagraph of the entire region of the kidneys, ureter and bladder by some such method as that shown in Fig. 1. The patient lies on his back with head elevated and thighs flexed upon the abdomen so as to bring the back as nearly in uniform contact with the plate as possible. In case a suspicious shadow is shown on the plate, one or more additional plates should be made to eliminate the possibility of error due to defective plates, unequal development, etc. In case of doubt as to the character of the shadow the apparatus of Albers-Schönberg, shown in Fig. II., may be employed. This apparatus consisting of a heavy lead cylinder with a diaphragm at the top serves by its weight to compress the area, thereby diminishing the thickness of the parts, and securing immobilization of the intra-abdominal organs. The diaphragm cuts off practically all except parallel rays and the resulting negatives are much more clear and distinct.

The interpretation of the plates requires a considerable amount of intelligent experience. In examining the plates, which are always far more reliable than prints made from them, it is best to examine the plates by strong transmitted light reflected from the sky or some white surface. The suggestion of Kümmell as to the use of opera glasses in the examination of X-ray plates is a good one. The observer stands at a distance of 10 to 12 feet from the plates and observes them with a pair of opera glasses by

transmitted sky light. The field of the glasses cuts off outside objects and gives a very clear view.

(c) The ureteral catheter and segregator are of great value in determining whether one or both kidneys are involved, by collecting the separate urines for examination. The segregator of Harris is easily employed in both male and female patients and often gives the necessary evidence. Catheterization of the ureters, although often more difficult, sometimes impossible, is far more reliable. Recent improvements in instruments for catheterizing the ureters make possible the more general employment of the valuable means of diagnosis. The cystoscope is of great value in differentiating bladder and kidney lesions. In many cases by examination of the ureteral orifices and the character of the urine discharged from them, it is possible to determine which kidney is diseased.

(d) Cryoscopy, though not yet generally employed, is of great value in determining the renal efficiency in kidney diseases. The normal freezing point of human blood is—0.56° C. If there is insufficient elimination of solids by the kidneys, these solids are retained in the blood, lowering its freezing point to —0.60° or lower. The freezing point is determined by withdrawing eight or ten cubic centimeters of blood from a vein with a sterile syringe and freezing it in a vessel surrounded by chopped ice and salt and reading the freezing point upon a thermometer with a specially graduated scale. A high concentration of the blood and a consequent lowering of the freezing point to —0.60° C. indicates a high grade of renal insufficiency, and that operative procedures, especially those involving kidney tissue, are highly dangerous. In renal affections in which the freezing point of the blood is —0.56° C. we may be fairly sure that but one kidney is involved and that renal competency is present.

(e) Inflation of the colon is of great value in distinguishing tumors of the kidney from swellings involving other organs such as the spleen, liver, gall bladder, ovary, etc. The inflated colon should lie in front of the kidney, which is a retro-peritoneal organ, while it will lie behind swellings involving the spleen and liver and will surround swellings of the pelvic organs such as the uterus and ovaries. Although this is a valuable test it is not always to be relied upon because in some cases the colon is dis-

placed by the kidney swelling so that it gives, on inflation, the same relations as would a distended gall bladder.

(f) Finally, exploratory operation must occasionally be resorted to in spite of our newer and more accurate means of diagnosis. It is safe to say that at least 10% of all kidney operations are to be regarded as exploratory. Neoplasms will be found at operation in cases where the diagnosis of tuberculosis or other inflammatory condition has been made, and vice versa. Although it should be the aim of the surgeon to reduce these cases to the fewest possible, there will always remain a certain number of doubtful cases in which exploratory operation must be resorted to as a final means of diagnosis.

TREATMENT

The question of treatment may be discussed under three heads.

(a) The treatment by expectant and bloodless measures. This method of treatment should be limited to those cases (1) in which the rather infrequent attacks are comparatively mild in character and in which the size of the stone as shown by the X-ray is such as to lead to the reasonable hope of a spontaneous passage of the stone; (2) in which other conditions, such as age, lesions in other organs, etc., make the operative removal of the stone more serious than the continuance of the condition; (3) in which a stone of rather small size lies quiescent in the lower portion of the ureter. In these cases glycerine internally, injections of liquid vaseline into the ureter as suggested by Kolischer is the treatment of choice and often gives satisfactory results.

(b) The treatment of calculus anuria is rapid nephrotomy under nitrous oxide or Schleich's infiltration anæsthesia. If necessary double nephrotomy may be done in cases in which both kidneys are involved. Tedious operations for permanent removal of the cause of the obstruction should be postponed until the patient has recovered from the effects of the anuria. Often, of course, when the stone is in the pelvis of the kidney, it can be removed at the primary operation.

The fantastic suggestion that in cases of anuria the operation

of stripping the fibrous capsule from the kidney should be resorted to, seems to have no sound pathological basis and should be severely condemned.

(c) The surgical removal, except in the two classes of cases just enumerated, is to be regarded as the treatment of choice in all cases in which a definite diagnosis of renal calculus can be made. Not only should surgical treatment be advised but it should be insisted upon, and the patient warned of the dangers of delay. A renal calculus of ordinary size, diagnosed early, before suppuration and destruction of renal parenchyma has taken place, can be safely removed with little danger to the kidney function and small probability of recurrence. On the other hand, although kidney stones as well as gallstones may remain innocuous for years, yet almost invariably, sooner or later, infection occurs about the stone, resulting in serious damage to the kidney function. The mortality of nephrolithotomy performed upon a non-suppurating kidney is not more than 3% and the kidney is saved. The mortality of the same procedure after suppuration is over 10% and often nephrectomy is necessary before the suppuration comes to an end. Nephrolithotomy is one of the most satisfactory operations in surgery, and in early uncomplicated cases, easy of execution.

An essential to good work on the kidney is an incision which gives free access to the organ with little danger of post operative hernia, the minimum of damage to the abdominal wall, and the least possible danger of complication, such as peritonitis, etc. The incision which best meets these requirements is one which begins a finger's breadth below the last rib at a point where the erector spinal muscle crosses the rib and extends obliquely downward and outward to a point a finger's breadth above the ilium. For most cases it need not extend beyond the center of the crest. In cases where additional space is needed to remove a large stone or to expose the ureter, the incision can be extended downward a finger's breadth above the crest as far as the internal inguinal ring, dividing if necessary the flat muscles of the abdominal wall in the line of the incision. In cases where smaller incisions will suffice, the external oblique, internal oblique, and tranversalis muscles may be split in the direction of their fibres as in the muscle-splitting

incision for appendicitis. The peritoneum should be pushed forward out of the line of incision and should not be opened in the absence of special indications for opening the cavity. If desired, free exposure of the peritoneal cavity may be made by opening the peritoneum external to the colon and intra-abdominal operations such as removal of the appendix, drainage of pancreatic cysts, etc., can be readily carried out.

This oblique lumbar incision answers best for almost all kidney operations. It meets the essential requirements of avoiding the peritoneum, of giving free access to the kidney, and of carrying little danger of post operative hernia. Three other incisions may be employed with advantage in certain special cases: (1) A less oblique or rather almost a straight incision extending from the last rib to the crest of the ilium along the outer border of the quadratus lumborum muscle can be used in a simple nephrotomy or nephropexy., (2) A median incision for a transperitoneal ureterotomy. (3) A parasacral or vaginal incision for the removal of a stone in the vesical portion of the ureter.

After the incision has been made sufficiently large and extended to the fatty capsule of the kidney, the latter is opened and the kidney freely exposed and brought out of the external wound so that it is under complete control. In the absence of extensive adhesions this can be readily accomplished. If reliable X-ray plates show a single stone in the renal pelvis, the posterior wall of the pelvis should be incised, the stone removed, and the opening in the pelvis closed with a row of catgut Lembert sutures. If the stone is of large size or if it is branched and irregular, occupying the calices, or if the X-ray has not given satisfactory evidence as to the size, location and number of stones present, then instead of opening the renal pelvis, an incision should be made along the convex border of the kidney, a little to one side of the median line and parallel to the long axis of the kidney, splitting the kidney through the calices into the pelvis. The bleeding can be readily controlled by making digital pressure on the renal artery. The stone or stones should be removed, taking great care that no stones or fragments are allowed to remain. Still maintaining digital pressure on the renal artery, the incision in the kidney is closed with good sized interrupted catgut sutures, deeply placed to con-

PLATE II—To Illustrate the Article by Dr. Arthur Dean Bevan and Dr. Joseph F. Smith.

trol hemorrhage. Superficial interrupted catgut sutures are inserted between the deep sutures in order to accurately coapt the edges of the cut fibrous capsule. The kidney is then dropped back, the fatty capsule closed with fine interrupted catgut sutures and the external wound closed with deep buried catgut sutures in the muscles and through and through silkworm gut sutures leaving a space in the middle of the wound for the insertion of a cigarette drain which is carried down to the wound in the kidney to provide drainage for any urinary leakage or oozing that may occur. This drain is removed after 48 hours. In the majority of cases there is little or no tendency to urinary leakage even when the pelvis of the kidney has been opened. In eighteen nephrotomies for stone we have had no deaths. One case died following a nephrectomy for the cure of a suppurating sinus following a nephrotomy for the removal of calculi from a suppurating kidney. This patient had at the time of the first operation an extensive pyelitis and perinephritic abscess and is an excellent argument against delay and in favor of early operation for the removal of renal calculi.

DESCRIPTION OF PLATES.

PLATE I. FIG. 1.—Apparatus arranged for taking a general view of kidney region. Tube inclosed in tube-shield, supported upon a circular lead plate with an opening 3 inches in diameter. To the left is the edge of a lead screen with plate glass window for protection of operator.

FIG. 2. Albers-Schönberg apparatus for making negatives of a small area in doubtful cases.

PLATE II.—Typical X-ray picture showing single stone in the right kidney.

GONORRHOEAL INFECTION OF THE URETHRAL FOLLICLES AND DIVERTICULA.

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AMONG complications of gonorrhoea there are some which frequently are passed by unnoticed, not because they are unknown to physicians, but because they appear at first sight a very simple affair, and especially for the reason that the patient, in many cases, is not greatly disturbed by their presence, and neglects calling his physician's attention to them. I refer to inflammation of the gland follicles of the urethra, glans and prepuce and to acquired or congenital diverticula, which accompanies or follows gonorrhoea.

Many cases of these complications have already been recorded, but it would appear that specialists alone have called attention to these facts. It, however, is to be wished that these complications of gonorrhoea should be constantly borne in mind, because many cases of chronic urethritis are, in point of fact, kept up by a latent infection of an unrecognised diverticulum or a follicle. It is certain that, in these cases, the treatment of chronic gonorrhoea will remain fruitless, because the diseased structure is not directly treated. From this, successive reinoculations of the urethral canal and the eclosion of other more serious complications arise which might have been avoided, if it had been possible, in all cases of gonorrhoea, to make a careful and rigid examination.

As far back as 1860, Diday, in an article published in the *Gazette hebdomadaire de médecine et de chirurgie*, drew attention to a complication of gonorrhoea at that time little known, namely a case of a mucous follicle of the meatus which had become infected and gave issue to a drop of pus through a narrow opening situated on the border of the meatus. A year later in the same journal, Lagneau related the same condition in two patients, the lesions being seated on the side of the frenum, forming two

small rounded and resistant tumors which gave exit to a little pus through a small opening. Borel, in 1880, and Geortiades in 1889, have recorded instances of periurethral fistula which had as an undeniable cause a gonorrhoeal folliculitis. Touton, Jadassohn, Fabry and Feleki have recorded cases of the same nature. In 1894 Audry published a very interesting study of the complications of gonorrhoea which we are now considering, in the *Journal des maladies cutanées et syphilitiques;* in this paper he considers this complication as very frequent, because at the time of writing he had found 9 instances out of 350 patients examined. In 1902 the same authority made a careful histological examination of the walls of a paraurethral abscess which developed during a gonorrhoea. Still more recently, Sellei has published a very complete article on the pathogenesis of gonorrhoeal infection of the paraurethral canals.

Before undertaking the study of the etiology and pathogenesis of these gonorrhoeal complications, it does not appear to me superfluous to give a summary description of the structure of the urethral mucosa, as well as that of the glans and prepuce.

The urethral mucosa is composed of two layers, the first being epithelial in nature and composed of several layers of cells; the superficial ones are cylindrical or cubic, the deeper ones being polygonal. Secondly, a chorion composed of dense connective tissue including numerous elastic fibres which frequently are anastomosed between themselves.

Towards the third month of intrauterine life, epithelial buds develop from the deeper aspect of the epithelium and become imbedded in the chorion. These buds give rise to Méry's and Cooper's glands, to the prostate and to Littré's glands. The latter are submucous and secrete a thin mucus; they are composed of a prismatic epithelium and a membrane; they are disseminated along the entire length of the urethra and their excretory ducts may attain 0.002 to 0.005 mm. in length in the spongy portion. Other follicles are to be found which are nothing more or less than Littré's glands, but only incomplete; in point of fact, they are simple culs-de-sac, rarely subdivided into two or three lobes; their seat is intramucous. Besides Littré's glands and follicles other culs-de-sac may be seen to freely open through the mucosa. Morgagni, who first discovered them, divided them, according to

their dimensions, into foramina and foraminula, and considered that they were seated in the upper lateral portions of the urethra. They are to be found from Guerin's valve down to the membraneous portion of the canal, and they empty into the urethra by a rounded or elliptical orifice after running under the mucosa over the extent of from 6 to 7 mm. In one case recorded by Cruvheiller the duct measured 27 mm. These lacunæ of Morgagni may be considered as simple depressions in the urethral mucosa.

The mucosa of the prepuce continues without any line of demarcation with the skin covering the penis and from the histological standpoint it presents the same structure as the latter. A few slight differences allow one to distinguish one from the other; the epithelial layers are more scanty, while hair and sudoriparous glands are absent. As to the sebaceous glands, to which the formation of the smegma proeputialis has been attributed, and is in reality a simple epithelial desquamation, they certainly exist, but are absolutely rudimentary.

The mucosa of the glans belongs to the dermo-papillary type of polystratified epithelium, with a connective and elastic tissue stroma and comprises the glands discovered by Tyson in 1680 in the orang-outang; he called them odoriferous glands, but they are better known under the name of Tyson's glands. The existence of these glands has been denied by many authorities and defended by many others; Cooper, Littré, Duverney, Burckart, Kolliker admit that they exist, while this is denied by Morgagni, Haller, Valentin, Thomsa, Finter, Bergonzini, Stieda and Sprunck.

It should be added that very frequently the excretory ducts of Tyson's glands, and in certain cases, those of Littré's glands, are considerably hypertrophied in length and thus form true diverticula. But the word diverticulum is especially applied to congenital or acquired canals due to malformation of the meatus and the anterior extremity of the urethra. Janet has described them admirably in his article on the microbic hiding places of the urethra and I feel compelled to give a very short summary of his article. He divides them into paraurethral diverticula and urethral diverticula properly speaking, that is to say, developed in the interior of the urethral canal. The former are congenital

malformations and consist of blind canals, usually seated in the glans, around and just below the meatus. Those seated in the neighborhood of the frenum are composed by the hypertrophied duct of a Tyson's gland. The second are also congenital in origin and are due to the narrowness of the meatus; they are pockets, or lateral folds, which are simply formed by a folding of the urethral mucosa. The lacunæ of Morgagni and Littré's glands are also capable of forming more or less deep diverticula.

These few notions relative to the structure of the urethral mucosa and that of the prepuce and glans having been given, it will be an easier matter to approach the pathogenesis of the complications of gonorrhoea that we have in view.

The etiological study is represented by a single word—gonorrhœa. I will leave aside all types of urethritis which are not due to the gonococcus; they are pathological curiosities, are of very short duration and as yet it is not known whether they can give rise to inflammation of the follicles.

Everybody is willing to admit the gonorrhoeal nature of these inflammatory processes arising in the follicles and diverticula. In two cases Pellizari found the gonococcus in a pure state, while in a third he found it combined with the staphylococcus. In Bockhart's case the staphylococcus alone was found. In the case of a young man, Christiani found Neisser's diplococcus in a pure culture. Fabry bases himself on two cases in order to uphold that the gonococcus alone can give rise to a catarrhal inflammation, and that the ordinary pyogenic bacteria can cause it to become suppurative. Touton says that in some cases the gonococcus is to be incriminated, while in others the saprophytes of the urethra are in play. Staugiale has recorded three cases—in the first one he found the gonococcus alone, in the second it was associated with the staphylococcus albus, while in the third it was combined with staphylococcus aureus. In seven cases related by Thivrier he was always able to find the gonococcus, but he did not look for other pyogenic organisms. And lastly, in the case to be reported in this paper, the examination of the pus coming from a diverticulum, which was made by Dr. Rimbaud, revealed the gonococcus.

One may consequently conclude from all these cases that Neisser's organism should be incriminated; without any doubt

it is frequently associated with other microbic species, but its almost constant presence in the follicles and diverticula of the urethra and glans, proves that it must play the most important part in the etiology of these complications.

It may now be asked at what time during an acute gonorrhoea infection of the follicles and diverticula takes place, and in reply to this I would say that it is at the height of the disease, that is to say, after the first week. It is usually at this time that the complication is noticed by the patient; but, since the inflammation of the urethral canal gives rise to a more intense symptomatology, the attention of the patient is quickly distracted from the former. In rarer cases these complications are discovered a long time after the gonorrhoea, but it is not probable that this is due to a fresh contamination, it is more reasonable to believe that, at the time of the first attack, the follicle or the urethral and periurethral glands were involved, and that the virulence of the gonococcus, hidden in these repairs, becomes exaggerated at a later date.

The inflammatory process of acute gonorrhoea arises in the fossa navicularis and progressively invades the urethral canal downwards. All the urethral glands participate in the inflammation and contribute to the formation of pus. At this time the gonococcus, as well as the ordinary pyogenic bacteria, will be found in the urethral secretions. It is certain that, during this inflammatory participation of the entire glandular system of the urethra, one should find Neisser's diplococcus in the culs-de-sac of these glands, besides the ordinary microbes of suppuration; in point of fact, bacteriological examinations made of the secretions coming from these glands have demonstrated that they contain the gonococcus. Infection of the follicles and glands of the urethra consequently takes place by direct penetration when the gonorrhoeal pus passes over the excretory openings of these glands.

As far as the exourethral glands are concerned, that is to say Tyson's glands and those of the coronary sulcus, the extension of the gonorrhoeal process takes place the same way; these glands become infected by the purulent stagnation taking place on the glans and in the folds of the prepuce.

The extension of the gonorrhoea to the accessory ducts of the glans, meatus and frenum, can be explained by the same mech-

anism, and it is at this à propos that in the large majority of cases the existence of these diverticula is discovered.

One can easily conceive the difficulty experienced in drying up a urethral discharge when it is complicated by an inflammation of the glands and paraurethral ducts. If this extension of gonorrhoea is misunderstood, all therapeutic efforts directed to the urethral canal will not accomplish the end, since this secondary infection, on account of its seat, escapes the influences capable of modifying the urethra. From this arises recurrences of the discharge and chronic gonorrhoea which is stubborn to every form of treatment and discourages both the patient and the physician.

Such is the pathogenesis of inflammation of the follicles and diverticula, but it is only proper to add that occasionally the follicular or diverticular inflammation may be primary, and, in point of fact, quite a number of cases have been reported where this process has arisen before the appearance of the urethritis or even without the occurrence of the latter. Finger, Feleki, Jadassohn, Touton, Reichmann, Horvath and Lanz have even made allusion to cases where the urethra was absolutely healthy; the diverticulum, however, became gonorrhoeal, although the infection did not extend to the canal. In these particular cases, one was perhaps dealing with a revival of a former gonorrhoea which had become localized to those points where the gonococcus had become stationed and was awaiting the occasion to exalt its virulence. However this may be, such cases are quite infrequent and nearly always the follicular, glandular and diverticular complications arise from a concomitant urethritis.

It is especially at the lower aspect of the penis that folliculitis is met with. The lesion presents itself in the form of small hard and rounded tumors which are slightly painful, or not at all so. By palpation they feel like lead shot of various sizes; they are distinctly limited and included in the walls of the organ; in a large majority of cases the skin is not adherent over them; the patient is hardly, if at all, inconvenienced by their presence and it is only by rather hard pressure that these small tumors give rise to any pain. The latter, however, is more intense if a folliculitis is undergoing an evolution towards perifolliculitis; in this case the neighboring tissues are involved, because the in-

flammatory process extends in depth. In these conditions the skin loses its elasticity and mobility. At this time the excretory orifice of the follicle appears to be obliterated and if the process does not regress a small abscess will form; the tumor becomes considerably increased in size, is hard and painful, while the skin is reddened and thin; then fluctuation becomes evident and pus makes its appearance, either through the skin or by way of the urethral canal. The evolution of a folliculitis may even extend further and, if the abscess breaks through the skin, an external blind fistula may result. The opening may take place both into the urethra and through the skin, thus forming a complete fistula. Georgiades relates several examples and in a recent work by Sellei similar cases are alluded to.

The symptomatology of diverticulitis of the meatus as described by Diday has remained classic and I will merely transcribe it here. "If one closely examines the urethral orifice one will occasionally encounter in its neighborhood a lesion very interesting to study. A narrow opening will be seen at one of the borders of the meatus, and if the glans is pressed between the fingers, from behind forwards, a tiny drop of liquid will be seen coming from this opening, possessed of all the physical characters of the co-existing urethral discharge. If this opening is sounded by a fine needle, the instrument will usually penetrate to the depth of from 3 to 6 mm. and in direction nearly parallel to the urethral canal. By questioning and examining the patient you will learn that this lesion occurred at about the same time as the gonorrhoea; that the aspect of the borders of the opening exactly represent those of the meatus itself, both being red, tumefied, painful and shiny, or, on the other hand, pale and indolent, according to whether or not the gonorrhoea is at its acute or chronic period; no urine makes its exit by this small opening; if the patient has had several gonorrhoeas the same accident invariably is reproduced, having the same seat and the same type."

In most cases the pain is slight and the inflammatory phenomena little marked; however Diday pretends that, in other cases, the symptoms may be more severe, and in one instance he met with diverticular gonorrhoea which was more painful than the process in the urethra. "The glans became hot, swollen, tense and extremely tender on pressure, even to friction of the

clothing, and a few days of rest were absolutely necessary in order to cure this process."

The meatus, however, is not the exclusive site of diverticulitis; it has already been stated that this might arise often on each side of the frenum in Tyson's glands. Both cases reported by Lagneau are proofs of this and in each instance the process was represented by small, hard, movable tumors, giving rise to little pain, which opened and gave exit to a little pus through a small whitish orifice in the neighborhood of the frenum. However, suppuration is not the necessary outcome in instances of diverticulitis of the frenum, and quite frequently these small tumors do not go on to abscess formation. They remain for a long time in the same condition, and, if they undergo resolution without inflammatory symptoms, a mild induration will simply remain indefinitely. Sometimes also, under the influence of excess at the table or coitus, the inflammatory process, which has been latent for a long time, lights up afresh, and is then accompanied by all the ordinary symptoms of inflammation.

In the case of the patient which I will now report the tumefaction, which was felt on the under aspect of the glans, was red, somewhat tense and extended by a thin cord, which could be very easily felt by palpation, towards the urethral canal; pressure was not painful, and the patient was little troubled by the lesion. The symptoms were never very acute and operation was only decided on in order to do away with the suppuration which was rebellious to all treatment, and in order to avoid the risk of possible contamination.

L., 28 years of age, entered the Suburban Hospital, service of Prof. Forgue, March 5, 1903. He had had several gonorrhoeas, the last about a year ago. After a month of treatment, when all the acute phenomena had disappeared, there still remained a considerable quantity of pus voided by the meatus. Little by little, a small reddish tumefaction developed at the under aspect of the glans, about 1 centimeter from the meatus and tangent to the left side of the frenum. It slowly became tense. At this time the patient noticed that between this point and the urethra a small cord-like process was perceptible on palpation, slightly tender, and that by pressure upon it a drop of pus appeared at the meatus; on the other hand, all attempts at exploration and cathet-

erization of this supposed diverticulum remained fruitless and it was impossible to make a Bowman's sound introduced into the urethra penetrate in the direction of the cord.

As this condition persisted the patient incised a small projecting tumefaction near the frenum, giving exit to a little pus, but the incision closed rapidly and the flow of pus persisted.

When the patient entered the hospital the presence of an indurated cord, occupying the situation already mentioned, was distinctly felt. The discharge of pus was not abundant, but frequently a drop made its appearance at the meatus. The latter presented an interesting peculiarity, namely that it was very narrow. Diagnosis: Gonorrhoeal diverticulitis.

Operation. Injection of 4 cc. of a 1% solution cocaine on each side of the frenum and in the glans, as well as around the meatus and near the fibrous cord. A Beniqué was placed in the urethra in order to facilitate dissection. An incision 1½ cm. in the median line over the frenum was made, circumscribing the lower end of the indurated cord, at which point no orifice was perceptible; then a very careful and minute dissection of the fibrous cord was made up to the urethra, which was then slightly excised and sutured. Hemostasis. Suture. At the same time the meatus was incised. Dressings; sound à demeure.

The patient left the hospital ten days later, the incision being almost cicatrized. The borders of the meatus were not quite healed, but the discharge of pus had completely ceased.

If, during a gonorrhoea, Littré's glands and the crypts of Morgagni are examined it will at once become evident that their orifices are considerably swollen and more dilated than normally. From the histological point of view it will be seen that the gonococcus has become wedged in between the cylindrical epithelial cells; there is also a leucocytic infiltration which becomes more and more dense as the cohesian of the epithelium diminishes; the cavities of Littré's glands and Morgagni's crypts are encumbered with numerous polynucleated leucocytes, while their orifices are plugged with desquamated epithelial cells. When the gonorrhoea has passed to the chronic stage, the glands considered as invaginations of the mucosa, undergo the same pathologic process, that is to say, as in the case of the urethral mucosa, there is a transformation of the cylindrical epithelium into the pavement form.

This is all that was known relative to the pathology of gonorrhoeal infection of the urethral glans and diverticula. It is only during the last few years that the question has been well studied and among all the authorities who have occupied themselves with pathologic researches along these lines, I would particularly mention the memoir published in 1902 by Audry in the *Journal des maladies cutanées et syphilitiques.*

On the other hand Prof. Bosc was good enough to give me the report of his microscopical examination of the diverticulum excised in the above case: "The little tumor was fixed in a saturated solution of sublimate. Sections carried through the middle part show a duct of fairly large dimensions, one of the extremities becoming ramified and surrounded by irregular cavities, more or less filled by epithelial cells. Nearly all these cavities show digitations communicating with the lumen of the canal, communications which are more or less apparent according to the direction or the depth of the diverticula. However, just at the periphery very minute limited cavities are encountered, which appear to be completely isolated from the rest.

"With a low power the lining epithelial cells lie on a basal membrane which is not distinct and represent the general arrangement of Malpighi's layer with very apparent, but narrow, papillae and with a blood supply similar to that met with in a papilloma. Around the duct and its diverticula is a layer of cells having an embryonal aspect and presenting numerous capillaries. The connective tissue forming the framework of the tumor is composed of fibrous tissue, including numerous dilated vessels, with hypertrophied endothelium and surrounded by a cuff of proliferated epithelial cells.

"With a high power, the principal duct was found composed of an epithelial lining made up of large cells placed in from ten to fifteen superposed lines. The basal cells are prismatic; above are polygonal cells presenting all the characters of Malpighi's cells. Then these cells become swollen, transparent and undergo a colloidal degeneration so that the filaments are no longer apparent. Near the lumen of the canal, the large cells, which have taken on very irregular shapes on account of their compression, become isolated and free. At certain points the degeneration is perhaps more horny than colloid, so that the desquamated

cells appear flatter. The desquamation is extremely marked in the lumen of the duct; the cells are mixed with polynuclear leucocytes, although the latter are few in number. It is easy to follow the passage of these polynuclears through the epithelial cells; they come from the vessels situated in the connective tissue which surrounds the epithelial tract. This connective tissue zone is formed by a tissue with rather lax meshes, in which numerous capillaries are found presenting very hypertrophied endothelial cells. It gives rise to papilliform prolongations which form irregular projections surrounded by large capillaries, so that the general characteristics of the picture are that of a commencing papillomatous proliferation. The meshes of the connective tissue are filled with enormous cells, due to the hypertrophy of the endothelial cells of the connective tissue spaces, as well as plasmazellen and various sized mononuclears. At certain spots quite a number of polynuclears are seen. One of the most interesting points noted is the thickness of the basal membrane, the very active proliferation of the epithelial cells, characterized by the piling up of prismatic cells, their transparent aspect, size, large nucleus, and above all by the very large number of karyokinetic figures, disseminated in the prismatic and polygonal cells.

"The same structure is met with in the diverticulum surrounding the deeper end of the duct. The same layers of prismatic and polygonal epithelial cells exist with horny and colloidal degeneration of the superficial cells and a marked desquamation; at the periphery the same papillomatous formations are encountered, as well as a zone of infiltration of embryonal cells. But, as one goes towards the depth the phenomena of hyperplasia become more marked; the deep epithelial cells have a still greater tendency to infiltrate the connective tissue, so that the papillomatous aspect is still more pronounced; karyokinesis is more pronounced, while the polynuclear infiltration is very limited.

"Just at the periphery, cavities corresponding to the lymphatics, or at least distended connective tissue spaces are seen, in which there are many free large epithelial cells; in the neighborhood of these spaces others may be found which are completely filled by proliferated epithelium closely packed together, without any polynucleosis or mononuclear infiltration in the neighboring connective tissue.

"To sum up, the specimen represented a digitated diverticulum having an epithelial lining of the Malpighian type, representing at the same time evidences of a subacute inflammation of the polynuclear type, and, on the other hand, evidences of karyokinetic epithelial proliferation, with hypertrophy and colloidal degeneration, ending in the increase in the size of the pre-existing digitations and in an infiltration of the neighboring spaces. It is this epithelial proliferation which forms the tumor, while the histological characters met with leads one to believe that it is undergoing an evolution towards epithelioma."

The results of the examination of this diverticulum coincide partially with those obtained by Audry. However, in Prof. Bosc's notes, there is a point which, I believe, has not been pointed out before, namely, a karyokinetic epithelial proliferation indicating the tendency of the new formation to evolute towards epithelioma.

Gonorrhoeal folliculitis and diverticulitis are complications which give rise to others. As I have already said in the preceding pages, and as one may see by going through reported cases, the most frequent complication is abscess; the tumor becomes red, soft and fluctuating, and finally breaks externally. In the more fortunate cases the opening closes and everything ends, but a fistula may follow the abscess, whose obliteration is sometimes very difficult to bring about. In 1894, Feleki admitted the occurrence of fistula having a follicular origin, a fact which would seem to uphold what I have said.

In 1896, Audry called attention to gonorrhoeal infection of Tyson's glands situated in the balano-preputial fold and he questions whether the gonorrhoeal infection of these glands was not propagated to the neighboring lymphatic follicles, giving rise to a lymphatic folliculitis in one case which came under his notice. The process was characterized by "the existence of a small nodule whose size varied from a large pin's head to a small pea;—the small tumor was indolent.

"It presents for that matter, a particular character which allows one to recognize its nature; it appears to extend by a hard cord which, to the feel, has exactly the consistency of uncooked macaroni. This cord starts from the nodule, at which point it attains its maximum size. It extends in diminishing, over an

extent of from 3 to 4 cm., and becomes directed towards the dorsal aspect of the penis; evidently it is a lymphatic cord having a peculiar aspect, becoming attenuated and disappears. It is also very movable and indolent.

"The lesion progresses for several weeks and then ends by progressively disappearing. It cannot be doubted that it is an inflammation of the lymphatic follicles which was first mentioned by Neumann in the coronal sulcus of the dog and which Finger found in man. The infection has its starting point in the follicles and extends for a few centimeters along the lymphatics. The constant association with a frank gonorrhoea would lead naturally to a conclusion that it is due to this and consequently to the gonococcus, although this last point is as yet doubtful."

There is still another complication without doubt rare, but which has been mentioned; I refer to the possible urinary infiltration of a glandular follicle which has been infected by a gonorrhoea. In this particular case the follicle undergoes abscess formation and opens freely into the urethra. During micturition the urine enters into the abscess pocket and infects it.

The diagnosis of gonorrhoeal folliculitis and diverticulitis is, in the majority of cases, an easy matter. There are, however, instances where some hesitancy is permissible. Thus, it is often somewhat difficult to differentiate the nodules formed by inflamed follicles from those encountered on the dorsal aspect of the penis in gouty and diabetic subjects. The seat is the same and the tactile sensation is identical in both. It is only when the patient's antecedents do not reveal the occurrence of gonorrhoea that the arthritic or diabetic nature of these nodules may be suspected.

The mistake of diagnosing a calculus lodged in the urethra for a folliculitis would probably never be made, because the patient's story of the symptoms will show that they were very acute and questioning will easily allow one to recognise the symptomatology of urinary lithiasis. Then again, in the case of a calculus the stream of urine is interrupted and there is urethrorrhagia.

Vegetations of the balano-preputial sulcus are so well-known that it is superfluous to refer to them and they could never be mistaken for inflamed Tyson's glands. It is only on account of their possible coincidence with gonorrhoea that they should be

mentioned, but their aspect is so characteristic that they could never be mistaken for anything else.

It is more difficult, at first sight, to make a diagnosis between a fistula of the penis due to a stricture or a traumatism and fistulous tracts resulting from abscess formation in a follicle or a paraurethral diverticulum. The fistulae resulting from stricture or traumatism are larger and deeper, while the other types are extremely fine and less deep; and still more, the preceding folliculitis would not have escaped the patient's notice.

The prognosis of these gonorrhoeal complications rests upon what has already been said in the preceding pages and without being too pessimistic one should be rather reserved. Without doubt, every instance of inflamed follicles will not result in suppuration and many have a tendency towards induration; but, even in the latter eventuality, one is never sure that the indurated follicle does not contain the gonococcus; the organism may remain quiet for a long time, because in one case inflammatory phenomena reappeared only fifteen years after the gonorrhoea, but more frequently under the influence of a genesic excess or an overindulgence at the table, its virulence becomes exalted and the inflammatory phenomena recommence. It is certain that the patient is constantly menaced by reinfection and, in many cases, the numerous gonorrhoeas that are found in the antecedents of a patient are only the expression of an old secretion which becomes lighted up. Consequently, such a patient is both for himself and others a perpetual source of contagion.

As has already been said, no treatment is asked for by the patient for folliculitis and diverticulitis complicating gonorrhoea and from this fact it frequently happens that a cure is effected by induration and sclerosis. But in other cases a constant suppuration becomes established and it is then that patients ask for treatment, which should be an energetic one.

Several procedures have been advised; for diverticula of the meatus and paraurethral ducts which have become infected by gonorrhoea cauterization with a fine thermocautery point may be resorted to so that the seat of the suppuration is destroyed. If the small excretory duct will not allow the point of the thermocautery to enter Diday's procedure may be resorted to, consisting in the introduction of a needle which is afterwards heated.

Cauterization with nitrate of silver may also be employed and to do this the solution is introduced into the diverticulum on a fine wire. It is first heated and then coated with nitrate of silver and allowed to cool and then the diverticulum is cauterized.

Janet irrigates these cavities by means of a syringe ending in a fine straight or curved needle according to the case, or with Anel's syringe. This procedure merits being mentioned because it is very rational, but it requires special instruments and an address that everyone does not possess. When it is necessary to irrigate a diverticulum which opens into the lumen of the urethral canal it can only be accomplished by the use of the endoscope.

And, lastly, in the large majority of cases it is surgical treatment that should be resorted to, because it is surer in its results and far more rapid. The diverticulum should be excised completely. For a few days following the operation, a permanent catheter should be inserted in order to avoid reinfection of the urethra at the point of incision. Folliculitis usually requires no treatment and induration is the usual manner of termination. However, if the follicle undergoes abscess formation the pus should be evacuated, the cavity cauterized, or preferably excised.

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PRELIMINARY NOTE ON EPIDIDYMOTOMY FOR BLENORRHAGIC EPIDIDYMITIS. BASED ON 65 CASES.[1]

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THE greatest and quickest relief in the treatment of blenorrhagic epididymitis is accomplished by epididymotomy.

Like appendicitis, this affection ought to be considered a surgical one. In its evolution, the morbid process is contained in a close cavity and the septic secretions cannot be drained. In all cases, we have pain, fever, swelling, and a decided leucocytosis from 12,000 to 27,000. Once epididymotomy is performed, it is a surprise to notice its good effects; the pain stops, the fever falls, leucocytosis subsides; there are no relapses, and the cure is obtained rapidly.

In going over the history of this affection as far back as 1838, we find that orchitis and epididymitis,—if not the same disease, at least were subjected to the same treatment.

At that time Ricord said: "That there is no blenorrhagic affection of the organs contained in the scrotum without a swelling of the epididymis." He further demonstrated that it was not the testicle that was primarily affected, and that if it did become involved, it was only by propagation, and to a small extent only, the chief lesion being in the epididymis.

In 1876, Reclus proved that the periepididymitis is greater than the epididymitis itself. To-day, we find the lesions begin by an endo-deferentitis, and are followed by endo-epididymitis, interstitial epididymitis and a predominant periepididymitis.

Of all the parts of the genital appartus that blenorrhagia affects, the epididymis shows us the most constant and the deeper lesions; it is increased in volume two to four times, and in its cavity we find small nodules of the size of a lentil, or of a pea, con-

[1] Read before the Pacific Coast Branch of the American Urological Association, January 16, 1906.

taining a puriforme liquid; these nodules are nothing more than abnormal dilatations of the epididymis, plugged with a mass of various leucocytes imbedded in coagulated serum. The tubes appear permeable. In some of the tubes, the epithelial lining has desquamated, the continuity is broken, and the pus cells have wandered into the adjoining connective tissue. This connective tissue is quite heavily infiltrated with lymphocytes, its blood vessels injected, and some of its fibrillæ forced apart by serum transudate.

The treatment of this affection was identical from 1857, in the time of Curling and Gosselin, with what it was in 1900. It consisted of rest, antiphlogistics, anodynes, refrigeration, compression, tapping of the vaginalis (Velpeau), incision of the testicular albuginea (Vidal de Cassis).

Up to this latter date it was a timid treatment, a disarmed expectation sacrificing to atrophy and sclerosis a muscular apparatus so necessary to the progression of the sperm.

In October, 1903, Baernaman, assistant of Professor Neisser, treated 28 cases of epididymitis by puncture and, in the liquid aspirated he found the gonococcus; he found also that the serum of these patients had often the power of agglutination for the gonococcus. The results after the puncture were cessation of the local pain, disappearance of the sensation of tension, fall of the fever. No accident followed the puncture; the extreme pain was the only objection. No mention is made by him of leucocytosis, at least I have not read it in the translation.

In April, 1905, Belfied of Chicago in an article in the Journal of the American Medical Association, entitled: "Pus Tubes in the Male and Their Surgical Treatment," advocates the incision of the epididymis and its drainage by stitching the cut edges of the cavity to the cut edges of the skin.

Without asking priority for the operation, which has been witnessed by many of my assistants and many doctors in various hospitals, and at dates going as far back as 1897, as shown by the records of the French Hospital, I submit to-day what I consider to be a contribution to the surgery of this affection.

In 1897 I performed my first operation at the French Hospital with the following technic:

I chose the ligamentum scrotalis for the incision. We know that the globus minor of the epididymis adheres to the testicle

by a layer of very thick connective tissue; the globus minor of the epididymis is outside of the vaginalis and the respective relations of the globus minor, of the epididymis, of the inferior pole of the testicle, of the vaginals, and of the scrotum are maintained by the ligamentum scrotalis (Pasteau). It is at this point that there is no danger of wounding the testicle or opening the vaginalis. Seizing firmly the swollen indurated nodule of the globus minor of the epididymis in the left hand, an incision, one inch long, is made downwards into the cavity of the epididymis. At first, the swollen nodules were punctured and the walls of the cavity were stitched to the incised skin; later on, I performed partial epididymectomy,—that is, I extirpated the nodules, hoping that anastomosis among the tubules could be made; but, after a case of double epididymitis operated on in this way had resulted in sterility, I changed my technic, and now I perform an epididymotomy, that is, I open the cavity of the epididymis as before stated, expose the nodules, relieve the tension, puncture the nodules if pus is present, and stitch the walls of the epididymis to the skin. The wound is packed with gauze impregnated with 1/10 icthyol and glycerine and the organ well supported. The wound heals in a week; the patient is able to be up in four to seven days. Compare this with the conservative treatment, the recovery is greatly in favor of the epididymotomy.

The cases treated by epididymotomy are getting on well, as quickly as the cases treated by puncture or by extirpation of nodules; further, the danger of sterility by this method is lessened.

I think that there is a great opening for this operation in the army and navy, as the cessation of pain, fall of the fever and ultimate recovery are more quickly obtained than by any other treatment.

In the last eight years I have operated on 65 cases in the following hospitals:

French Hospital 43, City and County Hospital 19, the U. S. Presidio Hospital 1, the Waldeck Sanatarium 2.

The operation is benign; it ought to be performed as soon as the disease is diagnosticated.

I have found the gonococcus in 1/3 of my cases. I never had any atrophy, hernia, necrosis of the testicle, nor any mortality.

URETHROSCOPY.

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THE visual examination of the urethra by means of instruments introduced therein is by no means a new procedure. Desormeaux, in 1853, while the first to bring urethroscopy to the notice of the profession, was not the first laborer in this field. The instruments put forward at this time were peculiarly cumbersome and impracticable, it being necessary that an oil lamp should be attached to the instrument for the purpose of illuminating the field to be observed. Naturally the procedure was received with no marked favor.

Later, Grünfeld by using an independent light and by means of a head mirror reflecting its rays into the endoscopic tube, brought urethroscopy up to the plane of practicability and gave an impetus to its employment and furtherance by other workers in this field. Various instruments of analogous type appeared, notably those of Antal, Schutze, Casper, Leiter and Otis.

But to Nitze must be accorded the credit for the distinct advance over the older types of instruments which made modern urethroscopy possible,—the placing of the source of light in the instrument near the field to be examined. Oberländer, acting on this principle and working in conjunction with Heynemann, an instrument maker of Leipsic, produced the Nitze-Oberländer instrument, a step which proved creative of modern urethral endoscopy. While this instrument was a great improvement on former urethroscopes, it was, as compared with those of the present day, extremely crude.

The source of light in the Nitze-Oberländer instrument was an unprotected platinum loop heated to incandescence by an electric current. The great heat generated necessitated the attachment to the instrument of an apparatus by means of which a constant flow of cold water could be kept circulating in the

hollow plane upon which the wire rested. This rendered the instrument complex and cumbersome and the unprotected incandescent loop made it necessary that the current should be turned off each time before the cotton swabs used in mopping up secretions and making applications could be used. These objections necessarily detracted much from the value of the instrument.

To overcome the objectionable features of the exposed platinum loop, Lowenhardt, of Breslau, invented a small incandescent lamp to take its place but it, too, proved productive of so much heat that it was impossible to put it to practical use without the addition of a cooling apparatus.

The final and crowning step, in urethroscopy,—the advent of the low tension mignon lamp with a minimum of heat production,—must be credited to America. We believe that this achievement is due to the suggestions of Valentine, of New York, and carried out by Preston, an electrician, of Rochester, though credit has erroneously been given to Koch, of Rochester, and the instrument produced at that time, 1899, bears his name. In this instrument the light-carrier was sheathed in an auxiliary tube placed on the floor of the endoscopic tube and while the urethroscope, taken as a whole, was a marked improvement over those formerly in use, still the projection formed by the auxiliary tube made it awkward of insertion and productive of discomfort to the patient. A urethra which would readily admit a No. 28 sound, Charrière scale, would hardly permit of the introduction of a No. 26 urethroscope while the actual lumen of the endoscopic tube was considerably less.

At the present time there are three distinct types of urethroscopes,—those which have the source of light in the form of the cold lamp within the tube, those which have the light projected into the tube from without and those to which the air-dilating principle has been applied. The Guiteras, Chetwood and Valentine instruments are the best representatives of those having the source of light within the tube. The Otis urethroscope is by far the most satisfactory instrument having the light without the tube.

The Fenwick instrument, as modified by Schall, has in the past had its supporters among those who preferred the air-dilating type of urethroscope but has failed of greater acceptance by reason of the fact that the source of light is outside the tube and

the instrument, as a whole, is cumbersome. The author has devised a urethroscope which he believes obviates the objectionable features of the Fenwick instrument and still retains its advantages. The endoscopic tube conforms to the general lines of the Guiteras tube. At its proximal end it is attachable by means of a bayonet lock to the light-carrier head. The handle of the light-carrier contains a spring making it self-adjustable to any size of tube. The light-carrier head also holds the valve for attachment to the dilating bulbs. An ocular window fits the light-carrier head by a bevel joint. When assembled the instrument is air-tight and readily permits of thorough dilatation of the urethra.

Following the idea of Kollmann, the author has had certain instruments constructed for intra-urethral operative work. These instruments may be used through an operative window which is fitted with a metal adjustable gland containing a rubber gasket, thus assuring an air-tight contact and yet allowing perfect mobility on the part of the operating instrument.

The advantages of urethroscopy under air-dilatation are many. The urethroscopic picture presented by the non-dilating urethroscope is limited to a very small collapsed area at the distal opening of the tube. To obtain a clear understanding of the conditions present it is necessary to spread out the mucosa by manipulation of the tube. This produces a certain amount of trauma and, in a sensitive urethra, causes considerable discomfort. If the operator has to work through a No. 25, French, meatus which has a No. 30, French, urethra beyond, this manipulation must be increased. The difference in calibre is decidedly marked in the bulbous and prostatic portions and the difficulty in obliterating the folds of the urethra is enhanced.

If the urethroscope is brought beyond a point which it is desirable to examine further, it is necessary to replace the obturator before pushing the tube on into the urethra. In a urethra which has a normal calibre of No. 30, French, in the mid-pendulous portion, we expect a prostatic portion of about No. 45, French. The obliteration of the voluminous folds found in this region and a comprehensive examination are impossible without considerable trauma. The prostatic urethra bleeds readily and even a slight amount of bleeding obscures the visual field.

All of the above difficulties encountered in simple urethro-

scopy are obviated by air-dilatation. An extensive mucous surface is brought into view and points in a considerable area may be contrasted. The air balloons up the urethra and the minimum of manipulation is necessary. If the urethroscope is brought beyond a point to which it is desirable to return, the air dilates the urethra beyond the distal extremity of the tube which may be pushed back without difficulty or discomfort.

The endoscopic picture presented under air-dilatation is essentially different from that seen through the ordinary urethroscope. The air obliterates the stellate folds and from a small collapsed area immediately at the distal end of the instrument, the picture widens into a fairly extensive tubular view. Every point on the walls of this tube can be accurately observed without manipulation and different areas may be compared.

The indications for the employment of the urethroscope may be put down as any subacute or chronic urethral lesion. There is absolutely no means other than urethroscopy by which we can obtain a comprehensive working basis in such conditions and it should be considered a *sine qua non* in the diagnosis,—a rule to which the author believes there can be no exceptions.

The number of tubes required varies as the amount of endoscopic work to be done. For all practical purposes Nos. 23, 25, 27, 29 and 31, French, will suffice for a good working urethroscopic outfit. In a series of three hundred measurements made by Kollmann and Oberländer, it was found that about two per cent. would not admit of the use of a No. 23. In ten per cent. it was necessary to use a No. 23 while twenty-five per cent. required a No. 25. In the remaining sixty-three per cent. Nos. 27 and 29 were available. On one patient alone could a No. 31 be used.

The tube selected should be the largest one which will pass comfortably into the urethra. It should be thoroughly sterilized and no method of sterilization is as satisfactory as boiling. The modern urethroscopes can be so sterilized without damage.

The urethra, especially at the first examination, should be cocainized and for this purpose the author has found a one per cent solution of sufficient strength to produce analgesia. He has never seen the slightest toxic effect from a solution of such strength.

There is but one objection to the use of cocaine. It contracts the peripheral blood vessels and the mucosa, as a result, has a slightly anemic appearance. Keeping this in mind, the operator should have no trouble in diagnosis from this cause.

The position the patient should assume during an examination should be that which is comfortable for the patient and which will permit of ease in manipulation on the part of the operator. Personally, for anterior urethroscopy the author prefers the recumbent posture while for posterior work the position advocated by Leiter is admirable.

The glans and prepuce should be thoroughly cleansed by washing with some antiseptic soap and water and the penis isolated from its surrounding parts by means of a sterile towel with a central hole. The urethroscopic lamp is tested to see that it is working satisfactorily and the rheostat is turned to the point where the necessary brilliancy of illumination is obtained. The obturator is inserted and the tube well lubricated. As a lubricant, the author prefers a sterile preparation of Irish moss, of which there are several excellent ones to be had in the convenient collapsible tubes.

The penis is grasped in the left hand and the prepuce retracted. The lips of the meatus are held apart by retracting the glans on each side with the thumb and forefinger of the left hand and the urethroscope is gently inserted until the resistance met with at the anterior layer of the triangular ligament is encountered. If the intention is to confine the examination to the anterior urethra, the operator stops at this point. The obturator is withdrawn and excess secretion is gently mopped up with small pledgets of sterile cotton attached to applicators. These applicators are made of wood or metal. The wooden ones are in every way preferable. Before each examination a number are freshly prepared,—from twenty to thirty,—and each applicator so tipped with its cotton pledget is used but once. This facilitates the examination greatly as it is unnecessary to prepare fresh applicators during the seance. Again, should the applicator be not thoroughly tipped with the cotton, danger of injury to the mucosa from the point of the wooden ones is much less than from those made from metal.

The urethroscope is slowly withdrawn, each successive field

being closely studied. The points to be observed as being of diagnostic value are (1) the central figure and the manner in which the urethra falls into folds, which varies in different parts of the canal. (2) The vascularity of the mucosa. (3) The appearance of the mucosa as to lustre. (4) The appearance of the orifices of the lacunae of Morgagni and the glands of Littré.

The Elasticity:—Beginning at the bulb, the longitudinal folds are quite voluminous in this region, being more marked on the floor, this discrepancy being accounted for by the bulbar cul-de-sac. As we withdraw the instrument, the folds become less voluminous and the endoscopic picture has a stellate appearance with a punctiform central figure reaching its greatest symmetry in the mid-pendulous portion. From this point forward a gradual change takes place, the punctate central figure lengthening out into a vertical slit. The folds become less pronounced until upon reaching the fossa navicularis, there is an entire absence of such radiating folds.

The readiness with which the urethra falls into folds depends upon its elasticity and the size of the endoscopic tube used, it being readily understood that the larger the tube the less pronounced the folds. The elasticity is greatly impaired in diseased conditions of the urethra and, therefore, this folding is of diagnostic importance in determining the extent of disease and the progress of such lesions under treatment. So great may be the infiltration in diseased conditions that the folds may be almost obliterated and we have instead of the normal infundibuliform picture, a large central opening with stiffened walls standing out from the end of the urethroscopic tube.

The Vascularity:—Normally, this differs in degree in different individuals, being more pronounced in type in the well-nourished and those having well developed organs and, conversely, being poorly marked in anemic conditions and small, flaccid genitals.

The region of the glans is poor in blood vessels and the urethra in this neighborhood has an anemic appearance. Beginning at the navicular fossa, the urethra back as far as the bulb is traversed by minute reddish striae of vessels running longitudinally with numerous ramifications on a background of paler

mucosa, which has a slight yellow tinge. Pathological infiltrations markedly modify this vascularity and to the trained observer such changes are readily detected.

Lustre:—In a normal condition, the smooth epithelial surface combined with the natural vascularity and lubrication of the urethra impart to the endoscopic picture a characteristic lustre. Any pathological change in these three elements materially alters this normal brilliancy, and such alterations are of diagnostic importance.

The Appearance of the Lacunae of Morgagni and the Glands of Littré:—On withdrawing the urethroscope from the bulbar region, the endoscopist encounters just within the bulbar cul-de-sac the two openings of the glands of Cowper. On account of the large number and size of the folds in this region, it is difficult to locate these openings with the ordinary urethroscope but this becomes a comparatively easy matter under air-dilatation. The openings are slightly slit-like and at first observation appear as small reddish dots.

As the urethroscope is further withdrawn, there appear on the superior wall a number of punctiform openings,—varying from seven to fourteen,—the mouths of Morgagni's lacunae. Ordinarily it is possible to pass the point of a urethral probe into these openings. The valve of Guerin, located about 0.015 millimeter from the meatus, is the largest of these lacunae. Their mouths are of the same color as the surrounding mucosa and are not raised above the surface.

Normally, the glands of Littré are not visible through the urethroscope though, in a diseased condition, they become distinctly preceptible and this change is, as a rule, permanent.

Posterior Urethroscopy:—Urethroscopy of the posterior urethra is essentially different from that of the anterior and demands a greater degree of skill in manipulation for reasons which readily suggest themselves.

The normal curvature of the urethra makes access to that part posterior to the anterior layer of the triangular ligament difficult. The prostatic mucosa is extremely delicate and exhibits a pronounced tendency to bleeding, which obscures the field, while the greater degree of dilatability of this region requires considerable manipulation for the obliteration of the vol-

uminous folds. It is practically impossible to avoid traumatism, though this is reduced to a minimum in skilled hands, and for this reason it is inadvisable to urethroscope the posterior urethra unless such a procedure is deemed absolutely essential.

To avoid the difficulties detailed above a number of instruments have been devised. The jointed obturator of Oberländer, constructed so as to approximate the normal urethral curve, has not been received with much favor, while the posterior tube of Swinburne, resembling in general a short curved sound, has found much wider acceptance, though it is open to two valid objections:—the fact that with this instrument it is possible to observe only a limited area confined to the floor of the urethra and that manipulation for the purpose of minute observation of the urethroscopic field is too restricted.

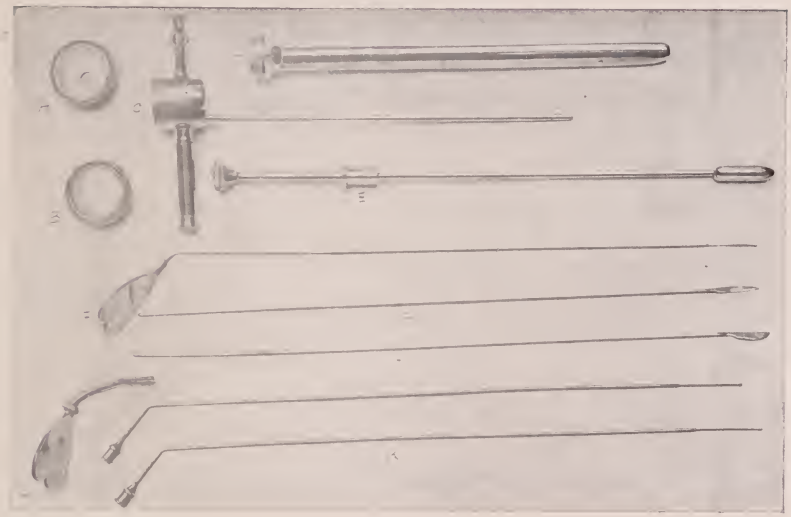
The personal preference of the author is for the straight fifteen centimeter tubes with the air-dilating attachment. It requires no great skill for their introduction with the minimum of trauma and the air-dilating feature obviates the necessity for painful manipulation. It is in this region that the remarkable advantages of air-dilatation present themselves so prominently.

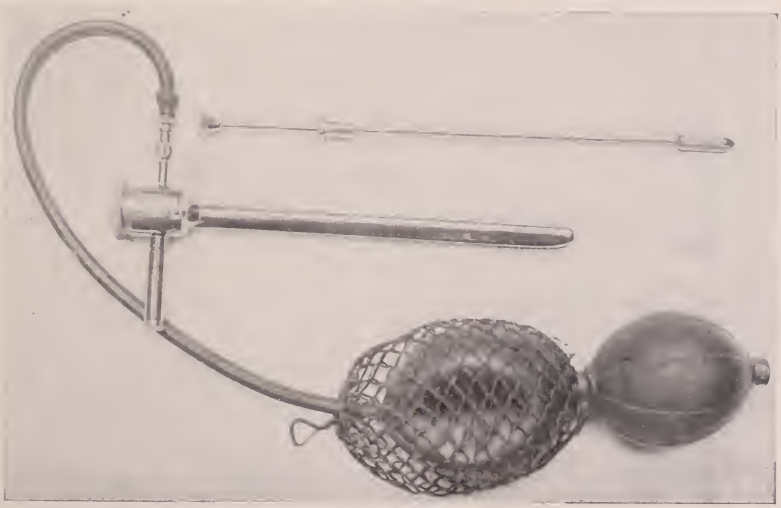
Previous to the introduction of the urethroscope one drachm of two per cent. cocaine solution should be instilled into the posterior urethra and allowed to remain for five minutes, the bladder having been emptied prior to the instillation and the patient urinating again immediately before the urethroscopy.

The urethroscopic tube is inserted as in anterior urethroscopy until the resistance met with at the anterior layer of the triangular ligament is encountered. The external part of the instrument is then depressed with the right hand while the fingers of the left, by pressure over the perineal urethra, elevate the point of the tube from the bulbar cul-de-sac into the membranous urethra. The instrument is then slowly pushed in until it enters the bladder.

The excess secretion is then mopped up and the urethroscope is withdrawn until it enters the prostatic urethra which is readily recognized. If bleeding obscures the field, as it may do even with the most careful manipulation, it is advisable to swab the surface with a solution of suprarenal extract. The resultant blanching of the mucosa must be taken into consideration.

PLATE III—To Illustrate the Article by Dr. Ernest G. Mark.





The points of particular importance to be observed in this region are the general aspect of the mucosa, the verumontanum and the orifices of the prostatic and ejaculatory ducts. It will be noted that the mucosa has a much redder appearance than that of the anterior urethra and has not the peculiar lustre or vascular striations.

The verumontanum varies greatly in different individuals and is also much modified by sexual excesses and disease. In anemic persons whose *vita sexualis* is slight, the verumontanum will be correspondingly poorly developed, and, conversely, in sexually vigorous individuals, the verumontanum will be prominent. Normally it has an extent of from one to two centimetres in the direction of the canal and, in its most prominent part, is of about the size of a lentil, though under the influence of disease and excesses it may assume much larger proportions and become extremely turgescent.

In about the center of the verumontanum will be found the prostatic utricule which has as great variations as the caput gallinaginis. It may be noted as a small depression or as a relatively deep excavation. Its depth has apparently no relation to the size of the verumontanum.

Ordinarily, in a condition of health, it is impossible to see the openings of the prostatic ducts, though in disease they often become distinctly visible, taking on much the same appearance as the orifices of the glands of Littré under similar conditions. The orifices of the prostatic ducts are scattered along the sides of the caput gallinaginis and are from twelve to twenty in number.

The orifices of the ejaculatory ducts are situated forward on the verumontanum on the edges of the prostatic utricule, sometimes being found just within its margins. They are easily seen and are larger than is usually taught, readily admitting the tip of a urethral probe.

In ordinary urethroscopy, the central figure in the prostatic urethra appears as an inverted U, the upward projection being formed by the verumontanum while the superior wall falls around it closely in folds more delicate than those of the penile urethra. In this collapsed condition, a great deal of dexterous manipulation is necessary to examine this region in detail and the

recognition and extent of lesions is rendered extremely difficult. Under air-dilatation the numerous folds are obliterated, the essential manipulation is reduced to a minimum and the different landmarks and lesions are readily identified. There can be no question of its decided advantage in this portion of the canal.

As the instrument is withdrawn, the projection formed by the verumontanum grows gradually less until when the extreme forward portion of the prostatic urethra has been reached, it disappears entirely. The instrument then enters the membranous urethra, the urethroscopic characteristics of which are the great vascularity and the punctiform central figure with numerous delicate radiating folds. It requires no especial description.

THE EFFECT OF UTERINE RETROVERSION ON THE URINARY BLADDER.[1]

By George S. Whiteside, M. D., Portland, Ore.

IT is, of course, well known and has long been recognized, that displacement of the uterus disturbs the normal anatomical contour and position of neighboring organs, particularly the bladder and the rectum, but exactly what these effects are, in relation to the bladder, and how they may occur, is a subject that has not had the attention it should.

In such a brief paper as this, I can do no more than to call attention to a few of the effects and to illustrate by reference to cases.

What are some of the most common effects of retroversion, with or without retroflexion? I say with or without retroflexion because if the whole uterus is retroverted it cannot affect the bladder at all to have a retroflexion also present.

In retroversion the fundus of the uterus is tipped backward against the anterior wall of the rectum. It therefore no longer prevents backward distention of the bladder toward the promontory of the sacrum. Consequently in many of these cases we have more or less dilatation of the bladder in that direction, causing the formation of a saculated portion, or intravesical pouch, behind

[1] Presented at the January meeting of the Pacific Coast Branch of the American Urological Association, January 16, 1906.

the intra-uretral fold, posterior to the trigone. The stretching of the fold of peritoneum between the fundus of the uterus and the fundus of the bladder also favors this same condition. Of eight cases, of which I have notes, of retroversion of the uterus, four had much dilated bladders. One had a capacity of 1000 c.c. All four bladders were much trabeculated. To my mind trabeculation shows either obstruction or else thinning of the bladder wall through atrophy of the detrusor muscle to a greater or less extent. Of the other four of these eight cases, two had bladders of normal size and two were contracted. These latter ought not to be considered in this series, because in both cases the contraction was one due to cystitis of long standing. Consequently, had these bladders not become infected, we do not know whether they would have remained of normal size or become dilated.

When the retroverted uterus falls backward, it usually tips the cervix up against the floor of the bladder. This allows the cervix to press against the inter-ureteric ligament, at the posterior margin of the trigone, and so separate the uretral papillæ by pushing them to either side, and forming more or less of an antero-posterior ridge between them. Of the eight cases cited, seven showed this anatomical change; all the dilation cases, the two otherwise normal bladders and one (the larger of the two) of the contracted bladders. This condition was observed by cystoscopy in these cases. It was therefore impossible to measure exactly the inter-ureteric distance, but it appeared to be from .5 cm. to 1.5 cm. greater than normal.

Another consequence of the pressure of the cervix against the floor of the bladder, and lateral displacement of one or both ureteral papillæ, often is that the pressure is distributed in such a way that it results in gaping or patulency of the ureteric orifice. This was observed on both sides in two cases and on one side in three cases of the eight mentioned. Such a condition renders ascending infection of the kidney quite easy, as is well known.

If, on the other hand, a greater or lesser degree of prolapse is combined with the uterine retroversion we get the condition so familiar to us, known as cystocele, or prolapse of the posterior bladder wall, and sometimes of the bladder floor as well, downward and forward. In many such cases a pocket is formed into which the ureters open, or even if this is not the case, it is a deep

or shallow pocket which is not easily emptied. Some of these conditions are so extreme that the pocket is only connected with the main bladder cavity by a long narrow, slit-shaped canal. In such cases vesical stone is common, and chronic cystitis the rule.

If, instead of prolapse, a decided lateral deviation of the cervix takes place, and especially if such a misplaced cervix is firmly held in its new position by adhesions, it may press upon one or the other ureter, causing more or less obstruction. I have seen one such case. Here the left ureter was almost occluded by pressure of the cervix on the retroverted and right latero-flexed uterus. The left ureter, as a consequence, was dilated to almost the size of the finger and of course back pressure had caused a considerable dilation of the left renal pelvis and calyces.

Where the uterine displacement is caused by traction of adhesions, due to inflammatory disease of the tubes or ovaries, a great variety of deformities of the bladder may result. This is really another subject and too extensive to be more than mentioned in this paper. Zuckerkandle has written several articles calling attention to this matter, but the exact reference has, for the moment, escaped me.

I wish in closing to remark that the one important fact to remember is, that a vaginal examination should always supplement a cystoscopy for the diagnosis of bladder trouble in the female. Such a bimanual examination will often explain conditions which otherwise would be very difficult to understand and interpret correctly. In cases where retroversion exists either pressure or traction will account for all the varieties of anatomical change in the shape or position of the bladder or ureters.

BOOK REVIEWS

Genito-Urinary and Venereal Diseases. By J. William White, M.D., and Edward Martin, M.D. 6th Edition. Philadelphia, 1905. (J. B. Lippincott Co.)

The rapid appearance of the sixth edition of this well-known book is sufficient proof of its excellent qualities. The present volume has been revised in accordance with the most recent doctrines and practice of those eminent in this branch of surgery.

The technique of urologists has not greatly advanced in the past two years, but it certainly has undergone many signal improvements. It has been the aim of the authors to embody all these advances in the present edition and for this purpose many new illustrations have been inserted, while in some instances, particularly the question of prostatic hypertrophy, the sections have been rewritten.

The book is most up-to-date and reliable. Well illustrated, with excellent type and binding, a very practical arrangement of the index, all show much care and taste on the part of the publishers.

The Treatment of Gonorrhœa in the Male. By Charles Leedham Green, M.B., F.R.C.S. New York, 1906. William Wood & Co., Publishers.

In the pages of this very excellent little book, the author has given the profession an up-to-date account of the present views of the pathology and treatment of gonorrhœa in the male, as well as some of the principal complications of this affection.

We have carefully read the book and find that the teachings therein contained are sound. For example, the writer says in speaking of the treatment of acute urethritis: "How frequently the surgeon, armed with one or two favorite injection formulae, prescribes them forthwith to the unfortunate patient, irrespective of the nature of the urethritis, the stage of the disease, the extent of the mucous membrane involved, and the presence or absence of complications! It is little to be wondered at that so blind a shot should so frequently miss," and Mr. Leedham Green is unfortunately only too right.

In the diagnosis of acute posterior urethritis, we are glad to see that Kollmann's five-glass test is given in detail and the author states that "*the best way of determining the presence or absence of posterior urethritis, in case of doubt is to wash the anterior urethra free from all secretion before the patient passes water. If the urine after this contains pus, it must have come from the posterior portion.*"

This book will be found a safe guide to the treatment of gonorrhœa and should be in the hands of every general practitioner.

Essentials of Genito-Urinary and Venereal Diseases. By Starling S. Wilcox, M.D., Professor of Genito-Urinary Diseases and Syphilology, Starling Medical College, Columbus, Ohio. 12mo of 313 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1906. Cloth, $1.00 net.

This little work is a worthy addition to Saunders' Question-Compend Series. In this present work by Dr. Wilcox all genito-urinary and venereal diseases are

fully detailed in the terse language of question and answer, so that the student grasps immediately the point in question. Illustrations are freely used, adding much to the value of the book.

On some points we do not agree with the author. For example, urinary fever is defined as "an acute or chronic febrile movement . . . caused by trauma to some part of the urinary tract," whereas it should be regarded as a mild or severe type of infection, according to the case.

The treatment advised in acute gonorrhœal urethritis is rather complicated, and we think not quite up-to-date, but on the whole the book is good and will be found of much practical value to the student and practitioner.

CORRESPONDENCE.

BOSTON, March 7, 1906.

Editor "THE AMERICAN JOURNAL OF UROLOGY," Boston, Mass.:

Dear Sir: The criticism of Dr. Follen Cabot of New York, concerning a recent article of mine on "Lavage of the renal pelves, in the treatment of lithaemia, pyelitis, forms of nephritis, with notes of illustrative cases," is certainly a most just, considerate, and timely one.

Every statement made by Dr. Cabot is perfectly true. It has been my desire in each and every instance to follow out minutely each step in the diagnosis, treatment, history, clinical aspect, etc., and also in each and every operation to guard against every risk that is liable to spring up. Time enough has not yet elapsed in order to prove the real value of the procedure. My deductions are based utterly upon the improvement made, the disappearing of many symptoms for which relief was sought, and the gain made in the whole physical picture of each case.

I would emphasize the fact that where the invasion proved to be ascending in character, the best results have been obtained. Internal treatment, the diet and environment, all play their part, and all are of the very highest importance.

Lavage is really an addenda to the usual measures, and it appears to me that it gives great promise as to its efficacy. It is my intention at a later date to give a statement of tabulated cases in detail, so that results can be better understood.

Until a greater length of time has elapsed it would be difficult for me to report cases as positively cured.

Meantime, watching each and every patient as carefully as possible, I find that gains are made that appear as if permanent results might ensue for the better. I am greatly indebted to Dr. Cabot for his wishes regarding more minute details.

Cordially yours,

F. M. JOHNSON.

43 TREEMONT STAEET.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. JUNE, 1906. NO. 9

THE OPERATIVE TREATMENT OF PROSTATIC HYPERTROPHY.[1]

By WILLIAM N. WISHARD, A. M., M. D., Indianapolis, Indiana.

THE emphasis laid upon various methods of surgical relief for hypertrophied prostate by different writers in the past few years presents a diversity of views which is somewhat confusing, but out of it all has come the evolution of certain well recognized facts which afford an abundant warrant for radical interference and give an encouraging outlook to the possibilities of prostatic surgery.

In accepting your kind invitation to open the discussion on this subject this evening I shall only endeavor to briefly summarize the practical points that have seemed of especial importance in my personal experience, which has been limited to a little over one hundred operations in which either perineal or suprapubic incision has been utilized for enucleation, dilatation, division or cauterization of prostatic obstruction.

If I omit the elaboration of operative technique and analysis of cases, except incidentally, and in addition venture to call attention to some points of pre-operative and post-operative management I trust I shall still be within proper limitations.

It is assumed that the surgery of prostatic hypertrophy does not include other and possibly inoperable forms of prostatic diseases, or that if the latter exist, their relation as complications is recognized. While pus, infection, carcinoma and sclerosis may complicate prostatic adenoma, it is ordinarily possible to measurably determine their independence or co-existence.

In view of the improvement in operative results, it is more

[1] Read before the American Urological Association at its meeting held on February 7, 1906, in New York.

and more a question of careful diagnosis in endeavoring to eliminate that class of cases fairly to be regarded as inoperable. While we have well recognized conditions, often making clear the question as to whether a case is an operable one or not, in the final analysis, careful study of individual cases and the personal experience and judgment of the surgical attendant count for much. A thickened and contracted bladder, damaged ureters and kidneys, and arterio-sclerosis do not necessarily contra-indicate radical operation upon the prostate. It is more a question as to the extent of these complications than the mere fact of their existence. Neither has it yet been demonstrated that slight enlargement of the prostate and symptoms of a mild character necessarily become grave, although undoubtedly they generally do.

The diagnosis of mechanical as well as other conditions is made in two stages. First: the pre-operative diagnosis; second: the information elicited at the time of the operation.

Pre-operative diagnosis involves chiefly the general condition of the patient; the degree and character of damage to bladder and kidneys as indicated by the condition of the urine; amount of residual urine; and such evidence of local conditions as may be obtained by rectal, urethral, and bladder exploration and inspection, including the use of the cystoscope.

Judicious preparatory treatment has much to do in determining the degree of permanent damage the kidneys have suffered, and consequently has a diagnostic relation to the choice of operative procedure. For example, it is my belief that if the very considerable number of operations which have been performed on the prostate in the last few years had been preceded, where possible, by patient systematic catheter drainage by the urethra that the death rate would have been somewhat lower. As a pre-operative measure of both diagnostic and therapeutic value, I believe that where possible all cases showing any material modification of the urine should preferably be given systematic drainage before operating. It is not always possible to have the catheter worn in the urethra constantly, even for a few days prior to the operation, but it is usually possible to secure drainage in this way during the night and for a few hours, at least, during the day. In a number of my own cases so treated,

a very marked improvement in the condition of the urine has occurred, particularly noticeable in the diminished amount of pus and epithelial debris and in the improvement in specific gravity, per cent. of urea, and reaction. Corresponding relief of bladder irritability has usually followed. If it has been worn and no improvement in the condition of the urine has occurred, a reasonable inference is, that the case involves greater surgical risk. Where the urine improves under drainage and irrigation there is usually corresponding improvement in the patient's general health and we are more safely left to consider local conditions.

Other preliminary treatment should not omit urinary antiseptics and free drinking of water and the employment of salines and tonics.

Formerly the length of the urethra was thought to have greater bearing upon the position, size, and shape of the prostatic growth and was supposed to imply an intravesical displacement and elevation of the vesical orifice with corresponding elongation of the prostatic urethra. Apparent increase in the length of the urethra, as shown by catheter measurement from the meatus to the point where urine is obtained, does not always signify a real increase in length, and on the other hand measurement by catheter will sometimes indicate a urethra of normal length when there is in fact a considerable elevation of the vesical orifice within the bladder.

Demonstration of these facts can often be made by measurement prior to operation and subsequent investigations at the time the bladder is opened. Nevertheless, the catheter is of value in its diagnostic relation to the choice of operation. Where its repeated use for measuring indicates a greater or less fluctuation in the apparent length of the urethra the evidence obtained is, of course, not so reliable as where it shows a tolerably constant and uniform result.

My cases have not indicated that the amount of residual urine has very great significance as to the size, shape, or position of the growth. A very small growth about the vesical orifice or just below it within the prostatic urethra may produce complete retention, whereas, in another case a massive hypertrophy as felt by rectal examination may produce no residual urine and

occasion no functional disturbance of the bladder. Where there is a congestive element added to the permanent hypertrophy the amount of residual urine is prone to be variable and its quantity will also vary owing to whether the catheter is used when the rectum is loaded or empty.

As to the significance of rectal examination in relation to operative procedure, my cases have usually shown that a large rectal tumor implied increased difficulty in reaching the bladder through the perineal opening. On the other hand, some have shown that considerable elongation of the prostatic urethra and difficult access to the bladder through the perineum are associated with a comparatively small rectal tumor.

In several cases a very different condition of affairs has been discovered upon exploring the prostatic urethra and bladder, than was anticipated prior to operation. In one case where very little enlargement was indicated by rectal examination, it was concluded that the growth was probably intra-vesical, perhaps being located about the vesical orifice, and a suprapubic opening was made. Conjoined examination by the rectum and bladder failed to disclose any marked enlargement of the prostate within the bladder or below it, until the finger was passed from the bladder into the prostatic urethra, where a pedunculated growth larger than an ordinary olive was found attached to the left side of the prostatic urethra near the lower end of the left lobe. The vesical orifice was somewhat contracted and the prostatic urethra below this point was considerably dilated at the point where the growth was located. It was easily detached by the finger and should have been removed through a perineal opening. Its capacity for producing obstructive dysuria was very apparent, yet it had not modified the length of the urethra or produced marked evidence of enlargement by rectal examination and when the bladder was opened above, its presence was not determined by conjoined suprapubic and rectal examination until the finger was passed down into the prostatic urethra.

The cystoscope would have been of very little use in such a case and the catheter, the finger in the rectum and all ordinary diagnostic resources were useless until the bladder was opened. Wider operative experience and opportunity to examine the size, shape, and position of the intravesical and intra-urethral growths

has led to a more general recognition of the fact that neither the perineal or suprapubic route can be constantly and universally relied upon. Generally speaking my earlier cases were followed by better after-results as to bladder function where a suprapubic or a conjoined suprapubic and perineal opening had been made. I have, however, made the suprapubic opening in some instances only after failure to satisfactorily reach the growth through the perineum. Fully four-fifths of my cases have been operated by the perineal route for the double reason that I have regarded it as less dangerous and have found it more easily and quickly performed. Its results have in the past few years compared very favorably with the suprapubic method and an increasing proportion of cases have been reserved for it as larger personal experience has increased my confidence in its more general applicability. The majority of the perineal operations have been simple median openings with lateral incision from within the prostatic urethra. The intra-urethral incision has varied owing to the apparent size, shape, and position of the growth after digital examination. In some cases with a large, smooth, uniform mass extending from the vesical orifice to the lower end of the prostate an incision has been made near the center of this mass throughout its length on either side of the urethral wall, and finger enucleation employed. In others, after a median perineal section, a small incision has been made over the lower end of the growth from within the urethra and enucleation accomplished with but little sacrifice of urethral mucous membrane.

The technique, with some modifications, has been much the same as that in the description of "A New Method of Removing the Lateral Lobes of the Prostate by a Median Perineal Incision," a paper which I presented to the Association of Genito-Urinary Surgeons in 1892, and referred to briefly in connection with a paper read before the same body in 1891. (See *Journal Cutaneous and Genito-Urinary Diseases,* February and December, 1892.) I was not aware at that time that Gouley had suggested this method in 1873, or that anyone had attempted to execute it. Its performance resulted from the apparent ease with which the lateral lobes could be removed as indicated by a careful examination of the prostatic urethra while I was operating for stone through a median perineal incision. Various modi-

fications of this method of finger enucleation have in the past few years been practiced.

In other cases where the temptation to direct attack from within the canal has seemed invited, yet, where the growth has been of considerable size as indicated by rectal examination, a modification of Young's technique has been employed by making an inverted Y and the prostatic capsule opened at the side of the urethra near its apex, but the capsule has not been opened until after the median perineal opening has been utilized for examining the prostatic urethra and vesical orifice and as far as possible the intra-vesical growth, where such has existed. Various retractors have been used, and have aided as a rule in dragging the prostate down. Counter-pressure over the bladder has alone answered in several cases.

Extra-urethral methods seem ideal in suitable cases, but universal application of this or of any other method can scarcely be made, particularly where it seems quite well established that many cases of real prostatic obstruction involve little or no lateral or median hypertrophy and produce symptoms chiefly because of a little thickening of, and contraction about the vesical orifice, or through some other perversion of bladder function not involving enlargement of the prostate as generally understood. These cases, nevertheless, present a change in the prostate productive of symptoms and necessitating operative relief, and their exact character is difficult to determine until direct digital examination of the prostatic urethra and vesical orifice has been made. While the cystoscope contributes materially to a knowledge of existing conditions, its limitations are many. The tendency to provoke bleeding and the difficulty in manipulating it where the growth has attained much size have lessened its practical value in my personal experience.

It will be conceded that next to the question of mortality comes the question of immediate and ultimate functional relief to the bladder and avoidance of complications associated with and following an operation.

To avoid hemorrhage in perineal enucleation, particularly, where the quantity of prostatic tissue removed has been large, the gauze packing which has been used in my operations has in some instances apparently contributed to the development of epi-

didymitis. In one case it seemed to threaten the production of recto-urethral fistula, which complication was fortunately averted by prompt removal of the packing. The necessity for very full packing has been lessened in my experience by a little more deliberation in doing the enucleation. More care in gradually detaching prostatic tissue and slowly twisting it off with forceps after finger detachment, has manifestly lessened bleeding. Packing should be removed within a day or two at most after its introduction. To avoid bleeding in removing the packing I have been in the habit of injecting two or three ounces of sterile oil into the bladder and around the drainage tube. It softens the packing so as to make its removal easy.

In averting the development of epididymitis not only the avoidance of over-packing deserves consideration, but also the adaptation of the most perfect support possible for the external genitals.

Continuous irrigation for several hours by the use of a fountain syringe and a medium and a large catheter is always used.

Urinary incontinence has followed in but three of the cases I have operated upon by perineal enucleation and two of these three cases lasted but a few weeks. One of the three has persisted periodically since the patient got up from the operation, about nine months since. These cases were much benefited by the passage of full-sized sounds. Recently periodical dilatation as a routine after-treatment has been employed for several weeks following convalescence with good results, a Kollmann's dilator being used for this purpose, as it has seemed effective and is less painful than a solid steel sound.

In this connection it should be noted that in some cases of perineal enucleation there has been a very evident tendency to contraction of the urethra, although no incontinence occurred. In one case operated upon in September, 1904, where a very large prostate was removed through the perineum, decided narrowing of the prostatic urethra followed in two or three months with return of cystitis and partial retention of urine. Immediately after recovery from the operation the patient's symptoms had been completely relieved until the occurrence of this traumatic narrowing. In this case, within five months following the prostatectomy a soft stone had formed in the bladder and a

severe cystitis developed. Nine months following the removal of the prostate a median perineal incision was made for the removal of the stone and very pronounced cicatricial narrowing of the prostatic urethra was found, involving considerable difficulty in its dilatation to a sufficient extent to admit the index finger. Dilatation in this case has been followed by restoration of bladder function.

It may be argued in this case that extra-urethral enucleation would not have been followed by stricture. Perhaps this may be, as this was a massive prostate which could have been easily attacked through a trans-perineal opening and entering the capsule outside the urethra. Such an opening can, however, scarcely insure against opening into the urethra from within the capsule where an unusually dense and adherent mass has to be dealt with. However, extra-urethral access to the lower end of the capsule according to the technique of Young and others is surgically ideal in suitable cases.

Perineal fistula has occasionally been an annoying after-consequence, but it has not permanently persisted in any case. Its prompt relief has usually followed where the opening has been curetted or cicatricial tissue excised and where granulation has been stimulated by nitrate of silver or carbolic acid and the perineum frequently shaved and a dry gauze dressing worn. This has been in some instances supplemented by keeping a catheter in the natural channel or inserting it at regular intervals to avoid contact of urine with the fistula.

Although in cases recovering from the immediate effect of the operation, vesical sclerosis and atony have impaired the ultimate result with some patients who had seemed suitable for operation, an improvement has usually followed in the local and general condition and has therefore as a rule justified its performance.

The statistical evidence of lower death rate where complete removal has occurred as compared with partial removal and other palliative operations makes it a matter of some question as to how far anything but complete removal should be employed. Still there are cases in which some immediate operative measures must be employed and where but slight power to sustain the shock of any procedure exists.

The existing preference for enucleation has developed so strongly within the past three or four years, that we may be in danger of under-estimating the real value of some of the milder operative procedures. One would scarcely choose to do a primary enucleation in a case with a history of more or less prolonged prostatic obstruction culminating in sudden and complete retention, where catheterization proves impossible, and where no opportunity for careful diagnosis as to renal and other complications can be attempted, and yet where incision with bladder drainage can easily be done under local anaesthesia and involves but little shock. In a number of cases I have successfully and more or less permanently relieved the prostatic obstruction by the use of my method of applying the galvano cautery through a median perineal opening where the opening has been primarily made under local anaesthesia for the relief of that class of cases of sudden complete retention above referred to. I have also repeatedly used the cautery in a similar manner where I have had more deliberate opportunity to decide upon a method of procedure and where the demand existed for extreme care in the avoidance of radical measures.

It is important to recognize the mechanical object of all operative measures in dealing with prostatic obstruction and this object is, chiefly, to restore as far as possible the original position of the vesical orifice and to make both the vesical orifice and the prostatic urethra as nearly normally permeable and free from thickening or obstruction as is possible. Even extensive enucleation of adenomatous growths does not always accomplish this important end. Thickened mucous and muscular tissue must be dealt with, particularly at the vesical orifice. In favorably influencing this obstructive factor the use of the cautery by a method which I have adopted helpfully supplements enucleation.

Dr. Rilus Eastman has reported a case where after enucleation evidences of obstructive cystitis persisted and where he reopened the bladder through a median perineal incision and used my method of cauterization about the vesical orifice and a most satisfactory result followed. I have had a similar experience and have also repeatedly used this method as a part of my prostatic operations immediately, or in some instances within a few days, following enucleation. In this relation it is not de-

sirable to burn a deep series of grooves as in the cases where the cautery alone is relied upon, but to modify vascular supply and diminish thickening by light direct application of a free hand cautery (such as the rhinologists use), applied directly to the vesical orifice. This is easily accomplished through the diagnostic tube of my instrument. If this method of comparatively superficial application of the cautery, particularly about the vesical orifice, more frequently accompanied enucleation it is my belief that ultimate results would be more satisfactory. Contrary to the views expressed by many, I believe the real benefit of galvano cauterization applies to the softer growths rather than the sclerotic forms, and that the establishment of a deep groove is not always essential, but that the shrinkage of thickened tissue about the vesical orifice by light direct cauterization is often desirable to the accomplishment of the more perfect mechanical and functional results. In determining the necessity for supplemental cauterization I have chiefly relied upon the information elicited by digital examination and by the use of the diagnostic tube of my prostatic incisor.

This method of using the cautery consists in utilizing a perineal opening which has been dilated to sufficient size to admit the index finger and the insertion of my prostatic incisor into the bladder. The instrument consists of a diagnostic tube, forty-two millimetres in circumference and measuring six and one-half inches in length (without the obturator), and a movable cautery. This tube has an oblique distal end which carries a small incandescent light. On the other end of the tube fits a diagnostic window and near it is a nipple for air dilatation and also connecting points for lighting the lamp.

After inspection is made of the inside of the bladder the cautery is inserted and the cautery knife exposed to any desired length by a device on the outer end of the instrument. The cautery knife can be drawn down into the prostatic tissue to any desired distance. The bladder, meanwhile, is distended with air and aid in locating the position of the cautery knife is secured by a small diagnostic window near the outer end through which the cautery and vesical orifice can be observed. Where bleeding is profuse the end of the diagnostic tube can be inserted slightly beyond the vesical orifice and a soft catheter inserted directly through the diagnostic tube into the bladder. Prolonged irriga-

tion can then be used and when the fluid returns clear the catheter is removed, the diagnostic window is placed in position and the bladder distended with air. Patient effort will ordinarily be rewarded by an excellent view as the instrument is now drawn down into the prostatic urethra. In cases where bleeding makes inspection difficult or impossible the hollow metal sleeve can be used over the cautery shaft. This sleeve is made like an ordinary steel sound with but slight curvature at the end. It has an opening near the end and opposite the cautery through which the latter can be manipulated. To its outer end is attached a small nipple for air dilatation. Previous digital examination aids in accurate location of the cautery knife. In addition to the adjustable cautery above referred to, I frequently use a free hand cautery passed through the diagnostic tube and applied with the operative area under direct observation. I occasionally use cautery incision alone and my instrument will make any incision which can be made by the Bottini instrument, or by proper adjustment of the movable cautery blade will make light superficial cauterization. It has the advantage of giving direct inspection of the inside of the bladder and prostatic urethra and allowing subsequent digital examination of the incision.

So far as I am aware, the first application of the cautery through a median perineal opening with the operative area under direct observation was made by myself in June, 1890. (See notes on Surgery of the Prostate, *Journal of Cutaneous and Genito-Urinary Diseases,* March, 1892.) One of the earlier models of the instrument here presented was reported in the *Journal of Cutaneous and Genito-Urinary Diseases,* June, 1902, and the first model of this instrument had been shown to the Indianapolis Medical Society the year preceding. The instrument has resulted from the success attending the use of the cautery by direct application in my earlier cases above referred to. The application of the cautery by this method has commended itself to me because of the difficulty of knowing when and how far cautery incision should be made without having first made a perineal opening through which to obtain digital and ocular examination as to the size, shape, and position of the growth. In addition, perineal opening affords excellent drainage subsequent to operation. However successful the Bottini method may be, it seems to involve an element of uncertainty, and does not afford an opportunity for the

direct examination of the growth which is secured by the method I have suggested.

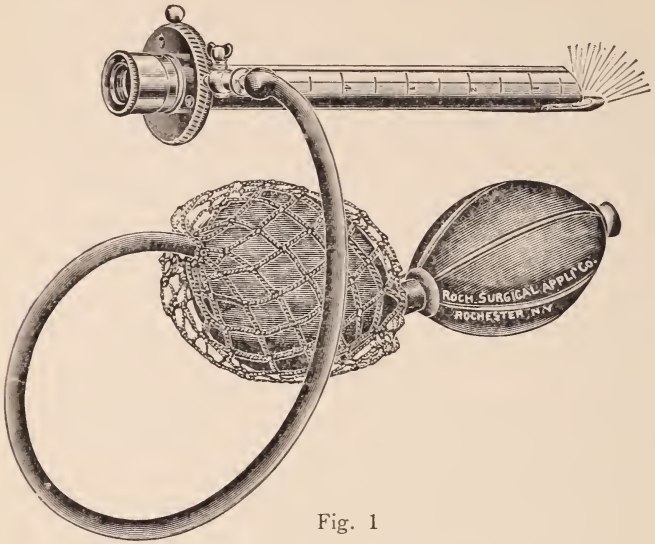


Fig. 1

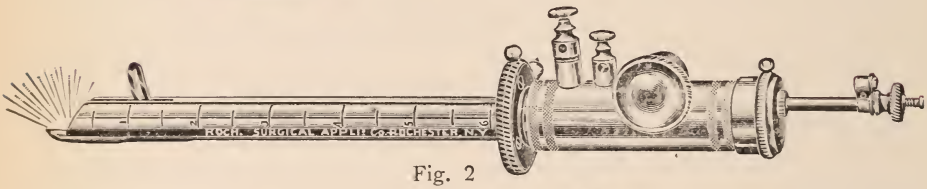


Fig. 2

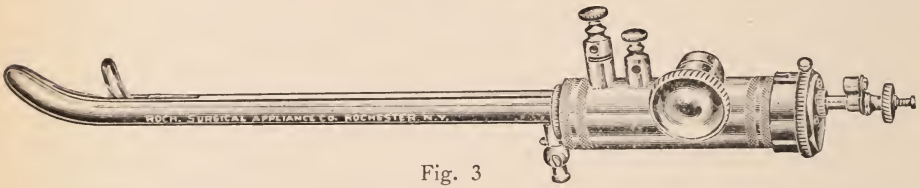


Fig. 3

Note. The three foregoing illustrations give a fair idea of my instrument. The first shows the diagnostic tube with the obturator removed and with the air dilating bulb attached. Illumination is obtained by the small lamp on the inner end of the instrument, and inspection is made through the diagnostic window on the outer end. This window makes the instrument air tight.

The second illustration shows the adjustable cautery introduced through the diagnostic tube. The circular thumb screw is for shifting the cautery blade in either direction. The small screw on the outer end of the shaft is for elevating and lowering the cautery blade. The diagnostic window through which the small shaft passes gives a view of the position of the cautery in operating.

The third illustration shows the cautery armed with a metal sleeve instead of the diagnostic tube, and is for use where bleeding makes inspection difficult or impossible. Air dilatation is used when either the diagnostic tube or the metal sleeve is attached. In some cases a free hand cautery, such as the rhinologists use, is sufficient, and can be applied by the use of the diagnostic tube alone.

SYMPTOMATOLOGY OF CHRONIC HYPERTROPHY OF THE PROSTATE.

By Frederic R. Sturgis, M. D., New York.

FOR the sake of convenience the symptoms may be divided into three groups, but it must be understood that these groups are not always as distinctly marked off as it is stated in the books, for they may encroach one upon the other in such a manner that the dividing line is oftentimes difficult to determine. Not only that, it may happen that the disease may return again to an earlier stage.

The first stage is usually that in which the patient notices he is obliged to get up at night to pass water, a thing which heretofore had not been the case, and this may sometimes come on so insidiously and slowly as not to attract any particular attention, especially as this symptom is frequently due to other causes than prostatic enlargement and may have occurred intermittingly for a long period of time. Most authors state that this frequency of urination occurs more particularly at night than during the day time, and perhaps the reason for this is that if the patient is disturbed during sleep the occurrence is more likely to make an impression upon the mind than if it occurs during the day, and the mere fact that the patient passes urine two or three times more during the day escapes notice among the many circumstances which occupy his mind, and so is not observed. I myself think that this frequency is diurnal as well as nocturnal, because in cases where the patients are confined to bed from some inter-current cause this frequency is noticed during the day also and has led to the belief that the recumbent position is one of the principal causes for this frequency of urination. This also I believe to be an error and I am inclined to think that neither recumbency of position nor any particular period in the twenty-four hours can be assigned as a peculiarity in this first stage of prostatic hypertrophy. In the nocturnal excess of frequency it is noted that it is more usual in the second half of the night than in the first half—

that is to say, toward morning rather than when the patient first goes to bed—and this perhaps is due to the fact that the early sleep is often apt to be the heaviest and soundest, and as the bladder has been thoroughly emptied before the patient gets into bed, and as insensibility is more marked during the first sleep, the bladder is not excited by the accumulation of urine to the same extent that it is later on when it becomes fuller. In this earlier stage the urine is not changed in character. It is usually perfectly clear and normal looking, nor is the amount increased, although it sometimes happens that an intermittent polyuria is noticed. No changes are observed in the bladder, that is to say in its power to retain urine or in its expulsive efforts. If necessary the patient frequently is able to retain his water even after the necessity for micturation is present, and when the patient passes his water the expulsive power of this viscus does not seem to be changed. It should be borne in mind that this frequency of urination must not always of necessity be ascribed to any change in the condition of this organ, because it is a frequent occurrence from other causes, and it is this fact that oftentimes induces the patient to overlook the first stage in this disease. This condition of affairs lasts for a longer or a shorter time according to the general condition of the patient, and although this disease is considered to be one of middle and advanced years, it may occur in persons of a comparatively youthful period of life, and all of these symptoms may be associated together—except indeed the last stage—without any evidence whatever of prostatic enlargement by the digital or cystoscopic examination, and these are the cases probably which are spoken of under the somewhat loose term of "prostatism without symptoms."

The patient having, as I say, gone through the first stage for a varying period of time arrives now at the second stage, which is more serious and is marked usually by a greater or less insufficiency of the bladder, and this is associated with a retention of the urine which occurs suddenly and is generally traceable to the patient's having taken cold, to his having indulged too freely in the pleasures of the table—especially in the use of liquors, or to sexual intemperance. This condition of affairs however is usually evanescent and under rest and proper treatment passes off, returning again to the first stage marked by the frequency of urination. These are the cases in which the patient will inform

the surgeon that he has taken cold and that it has settled in his bladder. Sometimes, however, this condition remains more or less permanent and is marked by an incomplete and intermittent retention of the urine, which is probably never completely voided from the bladder and constitutes the residual urine. In this stage the urine still presents no particular change in its character, and only slightly so in the amount which is passed—which is generally somewhat diminished in total amount owing to the residual urine which is present; but so far as the gross appearances are concerned there seems to be no change. The stream of water is not perceptibly diminished nor altered in shape, unless urethral strictures be present, but if no complications occur the stream is of its usual size and is passed pretty freely without much hindrance or obstruction, except that the ejaculatory power is not so strong as formerly and the stream instead of showing its usual parabolic curve is apt to have a flat trajectory and towards the end to dribble away, the last few drops of urine frequently being deposited upon the shoes or upon the lower portions of the trousers. This, of course, is markedly increased if urethral strictures are present. This change in the stream of water is due to the fact that the bladder has lost its expulsive power from dilatation, and sometimes the difficulty in urinating is so great as to oblige the patient to press upon his lower abdominal wall, over the pubic region, in order to assist the expulsive power of the bladder and so to relieve the pain which is frequently present from inability to relieve the distended bladder. It is in this stage also that the patient begins to complain of a sense of weight in his perineum, especially marked if he sits down or crosses his legs, and usually relieved if he stands up or moves about. In this stage also the catheter comes into play as a means of relieving the over-distended and painful bladder, and it is believed by some authors that the use of this instrument is the commencement of the cystic disturbances which characterize the third stage in the symptoms of this disease.

In this third stage we get the worst features of the prostatic hypertrophy, in the presence of more or less complete incontinence of urine, due to the over-distention of the bladder, which being dilated and having lost its contractility, slops over, so to speak, and this incontinence of the urine is due to the overflow from the bladder which, unable to contract upon its contents, allows the water to dribble away through the urethra, which becomes noth-

ing more nor less than an open pipe. In this stage also occurs the condition of polyuria, due very probably to a co-existing and consequent disease of the kidneys—these organs being unduly stimulated and secreting much faster than the unfortunate bladder can get rid of the urine which is sent to it. Now also we begin to note constitutional disturbances in the shape of extreme thirst and constant dryness of the mouth and fauces, due to a diminished flow of the saliva, loss of appetite, with costiveness rather than constipation—due to mechanical obstruction and pressure upon the bowels which prevents the evacuation of this tube, and decided febrile disturbances—the so-called urinary fever, frequently associated with intermittent chills. In defecation, it is noted that the contents of the bowels are changed in form and become voided either as small flat balls or else as ribbon-like strips—being moulded and changed by the hypertrophied organ pressing upon the contents of the bowels as it passes out. The urine, which before has shown no change, now begins to exhibit that peculiar ammoniacal, foul-smelling condition, which is so typical of retained urine. It becomes turbid, filled with shreds, pus, and detritus of various kinds from the diseased bladder, and loaded with the crystals of triple phosphates and other sequelæ of ammoniacal decomposition. In addition to this pain over the pubic region is complained of as being constant and severe, and this may be associated with a genuine urethritis which may proceed, and terminate, as some of the German authors state, in an orchitis with obliteration of the ejaculatory ducts and more or less persistent and copious hemorrhage. I myself have never seen any such conditions which I could refer as due solely to prostatic hypertrophy, and I should be inclined very strongly to question whether the symptoms were really due to this disease.

Such in brief are the symptoms which accompany hypertrophy of the prostate, which I have been obliged to present very sketchily within the ten minutes allotted me. I have not touched upon the complications in the shape of cystic and renal diseases which are frequently concomitants and results of this hypertrophy, nor have I dwelt upon the changes which occur in the urine, nor the evidence given by the physical examination with the finger or the cystoscope, inasmuch as all of these points are to be taken up by the other speakers who are to follow me.

THE PATHOLOGY OF PROSTATIC HYPERTROPHY.

By Walter S. Reynolds, M. D., New York.

MANY points have yet to be cleared up before the solution of the problem of prostatic hypertrophy is satisfactorily settled. Much has been done of late by Ciechanowski and others in this direction, and while the conclusions arrived at seem logical in the main, there are still many points which must be further studied before they can be generally accepted and the subject finally closed.

Early investigators were obliged to satisfy themselves with such examinations as it was possible to make at the time, and on such examinations theories were advanced which were accepted by their followers without question. In consequence a great variety of opinions were held and taught, lacking in confirmatory evidence.

Nearly all the studies so far made have been from the condition as found after well marked changes have taken place in the organ; of the primary conditions which precede or bring about these changes much evidence is still lacking, except perhaps, from a clinical point of view.

The condition is one so frequently encountered that it has been held to be of almost universal occurrence in man—a physiological accompaniment of advancing years. But Sir Henry Thompson after a dissection of a number of cases says: "It has been said to be the common inheritance of old age, but on the contrary, it is a complaint which a very large majority of elderly men escape." His investigations showed that in 32% some enlargement occurred, while in 12% the enlargement was sufficient to cause symptoms during life. It would be interesting if it were possible to obtain further information on this subject, with a full and complete history of the cases and the pathological findings in each case.

The normal prostate weighs from 4-6 drachms and measures about 1½ inches in length; a little more than this in breadth, and

is about ¾ inch in thickness. As it surrounds the urethra for about one inch of its length at its exit from the bladder, alterations in its size and character produce changes in the relations of the urethra, which, are productive of symptoms relative to the urinary function of which these patients complain.

An organ having such intimate relations to the urethra and important sexual centers, when the seat of pathological changes, would naturally be expected to give rise to symptoms of more or less intensity early in their course. Such is not always the case however, and until sufficient obstruction arises to interfere with urination symptoms are apt to be absent.

What the exact function of the prostate is we are unable to say definitely. We know, however, that in animals it is clearly a sexual organ and that some species are subject to hypertrophic changes. In the foetus it remains a bilobed organ resembling that of the animal up to the fifth month, when developmental changes take place, which unite the two lobes into a solid body connected by a bar or isthmus of tissue, called by some the third lobe.

The organ itself is made up of a number of glands, of the compound tubular variety, lined by a single layer of columnar epithelium, opening through a number of ducts on the floor of the urethra on either side of the verumontanum. There is a supporting meshwork of connective and muscular tissue surrounding and enclosing the glands. A capsule is formed by the connective tissue becoming more dense and compact on its surface, while surrounding it, is a sheath formed from the pelvic fascia.

From its relation to the urethra and bladder it is believed to play an important part in the act of micturition. The apex of the gland is in close relation to the posterior layer of the triangular ligament, so that as enlargement takes place it is almost altogether in a posterior direction, pushing backward and upward into the bladder and into the rectum to a less degree.

The enlargement may assume considerable proportions. Occasionally it may be as large as a good-sized cocoanut and weigh as much as twelve ounces or more. Ordinarily the enlargement is not more than once or twice its normal size. Its size and weight seem to depend largely upon which element is more largely affected by the pathological process. The large prostates are

soft and comparatively light and the glandular tissues in such cases seem to be principally affected. Where the stromal tissues are more involved the prostate is hard, firm and heavier. Whether there is any relation between the two forms as seen clinically cannot be definitely stated, though such would seem to be the case. This, however, has been denied by some authors who claim that the two varieties are entirely distinct.

Thompson classifies the enlargements according to their position as follows:

I. Where the enlargement of the gland takes place equally —a general enlargement.

II. Where the median portion is principally involved.

III-IV. Where the enlargement is most marked in either the right or left lobe.

As a result of the prostatic overgrowth, changes in the length and direction of the urethral curve result. The length is in nearly every case increased; this takes place in a posterior direction, as the apex is fixed at the triangular ligament. The curve may be so altered as to offer great difficulty to the passage of instruments, especially if the median portion is principally involved. If the enlargement is more marked on one side, deflection of the urethra to the opposite side takes place.

As the enlargement pushes back into the bladder the internal meatus is raised, and a pouch or sulcus is formed behind the prostate in which more or less residual urine is contained, and in which after cystitis has developed vesical calculi are quite often found.

Again referring to Thompson's work, we find a classification based upon the character of the enlargement:

I. Where the increase in glandular and stromal tissues are proportionally equally—the enlargement taking place evenly and is seldom very great.

II. Where the increase takes place in the stromal tissues, the connective tissue being principally involved, and is classified as a fibromatous hyperplasia.

III. Where the overgrowth principally involves the glandular structures, these are gradually replaced, as the glandular substance disappears, by fibrous tissue.

IV. Tumor formation, a local hypertrophy—a very com-

mon formation. These tumors bear a close resemblance to fibromata occurring in the uterus and other parts of the body, and were so considered by Rokalansky; others describe them as fibro-adenomatous, with some muscular tissue—*i. e.* composed of the same tissues as the prostate. They are often surrounded by a fibrous tissue capsule from which they are easily shelled.

This classification, while useful from a clinical and descriptive point of view, affords little knowledge of the pathology of the condition.

While many theories have been advanced to account for the pathological changes there were three more generally accepted ones, which deserve notice. The teachings of Guyon were those probably most generally held. He maintained that the process was one of senile change and the term senile hypertrophy came into general use. This change was considered a fibrosis incidental to advancing years—a part of a general atheromatous degeneration. This theory took no cognizance of the large class where fibroid changes are least marked. Velpeau and others maintained the theory of tumor formation to account for the changes, and that the changes were similar to those occurring in fibroids of the uterus.

Another theory was that of Harrison, who claimed that the enlargement was of the nature of a compensatory hypertrophy, the bladder being first involved.

For a number of years no advances were made in the subject and the various theories spoken of were pretty generally held by authors. It was not until Ciechanowski took up the matter that any more light was thrown on the subject.

Ciechanowski's studies led him to believe that the changes occur simultaneously in the glandular and stromal portions of the organ, and that inflammation is the direct cause of the enlargement. This was shown by the presence of round cell infiltration, indicative of somewhat acute inflammatory action. The round cells are found in the stromal portions, more particularly about the ducts and beneath the mucous membrane of the urethra. There are also seen fibroblasts about the ducts and acini denoting cicatricial changes that are taking place. These changes may go on to compression or obliteration of the ducts or acini.

In the glandular structure what was thought to be true

adenomatous tissue formation is ascribed to dilatation of the gland tubules already present, and not to the formation of new acini.

The cells lining the acini may show indications of a catarrhal inflammation, or in some cases the contents of the acini show true suppurative changes. The form of the enlargement depends upon the situation of the changes taking place in the gland.

Green, Brooks, and others have also made painstaking examinations and their conclusions are largely in accord with those of Ciechanowski.

In spite of the excellent work that has lately been done we are not in a position to take a too decided stand in regard to the question.

PHYSICAL EXAMINATION IN PROSTATIC HYPERTROPHY.

By Edward L. Keyes, Jr., M. D.

ONLY two things are always and essentially necessary for salvation in examining the prostatic. First and foremost, rectal touch, next, palpation of the loins. I do not mention urinalysis since that third essential is to be spoken of by Dr. Heitzmann. But all other methods of examination—catheterism, sounding, cystoscopy, skiography—must not only be omitted in certain cases, but most of these may in certain cases do the patient real harm.

Let us suppose a man 65 years old comes to your office complaining that he urinates too frequently at night and starts the stream with some difficulty in the early morning. Suspecting prostatic hypertrophy, the first thing to do is to bid him urinate into a glass. Hold the glass up between you and the light and let your whole future examination depend upon what you see. If the urine is sparkling and clear, neither purulent nor bacterial, beware of any examination involving the introduction of an instrument into the urethra. But, if the urine is cloudy with bacteria or foul with pus, you may proceed to any sane instrumentation with little fear of damage unless the kidneys be gravely infected.

Supposing then the urine sparkling. Bid the patient bend over the back of a chair with one knee upon its seat. Protect your finger with a rubber cot and introduce it into the rectum, sweeping it across the anterior wall of the gut, palpating the membranous urethra, the prostate, and as far as possible the seminal vesicles and the base of the bladder, in order to determine any palpable morbid changes in or about these regions. I might talk to you an hour in a vain endeavor to describe the sensations imparted by the various normal and abnormal structures; but you would much better employ that hour in examining a dozen prostates as they come to you in the clinic—the more normal the better. For it is only the man who knows what the normal prostate feels like that can be depended upon to recognize the enlarged prostate.

It is my belief—contrary no doubt to the opinion of most of you—that the hypertrophied prostate is always palpable as such *per rectum*.* In a series of several hundred cases which I have gone over with reference to this point, it would appear that, while the enlarged prostate is always palpable as such, the normal prostate is often supposed to be enlarged; so that the mistake is made—not of calling a hypertrophied prostate normal but of calling a normal or even an atrophied prostate hypertrophied. The reason for this is that the full bladder may depress the prostate so that it bulges into the rectum as though it were enlarged. Hence if, in the course of this rectal examination, you feel the organ jutting into the anterior wall of the rectum, reach your other hand around to the patient's hypogastrium and impart to it a series of sharp taps similar to those employed in renal ballottement. If the bladder is full the impulse will reach your rectal finger. If there is a large neoplasm or stone these too may be felt. In case you are not sure of the result of this diagnosis, turn the patient over; put him upon his back; introduce the finger into the rectum and repeat the maneuver. In this position you will perhaps not be able to reach so high up the rectum, but you will distinguish better the abdominal impulse.

Now examine the patient's loin *secundem artem* by bimanual palpation and ballottement with the abdomen flaccid and, with

* Since writing this I have seen a large adenoma removed from a prostate that felt normal by rectal touch.

the aid of deep inspiration, search for deep tenderness or for an enlargement in the region of the kidney.

Here stop your examination and sum up the information obtained. You have learned whether the prostate is large, whether the urine is infected, whether there is any considerable retention of urine.

Supposing the prostate is large, the urine uninfected, the residual urine not sufficient to distend the bladder so as to make it distinguishable by bimanual palpation. If such be the case, make no further examination; but endeavor by means of such measures as the hot rectal douche, the administration of alkaline and balsamic medication and such hygienic measures as may suggest themselves to ameliorate the patient's symptoms without putting any instrument in his bladder. In a surprisingly large proportion of cases you will succeed, and, while you may accuse yourself of having made an inadequate examination, of not knowing distinctly the shape of the prostate, the amount of the residual urine, or the length of the urethra, the patient, on the other hand, will have to thank you for having spared him the dangers of grave infection by the introduction of an instrument unnecessarily employed.

But, supposing your treatment of this case fails, or supposing your examination reveals a distended bladder, then, even though the urine be limpid and uninfected, you must carry your examination further and introduce a catheter into the urethra. Unless the emergency is great, however, this instrumentation should be surrounded with every precaution. The patient should be put to bed, urotropin at a dose of 5 grains three times a day, should be administered and, after 24 hours of this, a sterilized, soft-rubber catheter should be introduced into the urethra. As it passes in, note the presence or absence of spasm in the membranous urethra as well as the amount of obstruction to the introduction of the instrument at the neck of the bladder. Carry the eye just within the bladder, halting when the urine first flows.

If you thus empty the organ before a pint has come away, inject 6 oz. of nitrate of silver—1:10,000—and withdraw the catheter. Subsequent catheterization may be required for treatment, but not for diagnosis. If, however, you draw a pint and some urine still remains in the bladder, it is safer to leave it

there and to withdraw it at subsequent catheterizations, passing the catheter with similar precautions every three hours until the bladder is empty; but this again is treatment, not diagnosis.

Such are the precautions with which catheterism should be surrounded when the urine is uninfected. If infection is present, however, you may introduce a sterilized catheter without fear of doing the patient any harm so long as you follow the catheterism by a nitrate-of-silver wash. And nitrate of silver, let me assure you, is far better than any of the new, organic, silver compounds that have replaced it in many other fields.

On withdrawing the catheter, note the urethral length from the meatus to the point where the eye of the catheter rested just within the bladder. A urethral length at or under 8 inches suggests a prostate that may be very easily handled by the perineum. A urethra over 9 inches long means a long reach if this lower route is employed in operating.

Next comes the examination for stone. Every prostatic should be examined by X-ray, by searcher, or by cystoscope, for one can never feel sure that stone is absent however mild the symptoms may be. I leave the preference of instrument to be employed to the choice of the individual operator. A man who is familiar with the searcher can complete his examination rapidly with marvelously little discomfort to the patient and with very accurate results: yet he will fail to find encysted stone or stone in a deep pocket behind the prostate. The cystoscopist has his own troubles; but, if he gets a satisfactory view in a tame bladder, can assure the patient on the subject of stone very satisfactorily. Yet, in uninfected cases, I prefer the X-ray, inasmuch as it makes one less instrumentation.*

If there is question of operation the patient's general condition must be considered, while the urinalysis is always of prime importance. But cystoscopy for the ordinary delineation of the prostate I have not employed nor have I had occasion to require this.

* Yet the X-ray is singularly and inexplicably fallacious in the diagnosis of bladder stone.

THE LIMITATIONS OF THE CATHETER IN PROSTATIC HYPERTROPHY.

By Hermann Goldenberg, M.D., New York.

WHEN, two weeks ago, your president asked me to contribute a short paper on the limitations of the catheter in hypertrophy of the prostate, I acquiesced with reluctance. I fully understood that within the short time at my disposal, much of importance would have to be omitted. I accepted, however, because I thought that at the present time when the operation of prostatectomy has justly come into favor, it was opportune to give the catheter treatment its just due, and to state when and under what conditions catheter treatment is justifiable and indicated. A consideration of this subject must necessarily include a mention of some indications for operative interference or, to be more exact, for prostatectomy. My experience with the Bottini operation is limited. I am glad that it has been left to my friend, Dr. Willy Meyer, whose work in that field is well known to all of you, to speak on that subject.

Anyone who has followed the development of prostatic surgery, must admit that it is only within the last decade that real progress has been made in the direction of the permanent relief of that long chain of symptoms which is due to the hypertrophy of the prostate, and that, up to ten years ago, our mainstay in the treatment of urinary trouble in old men was the catheter.

I think nobody will deny that,—aside from the technical improvements in the manufacture of catheters and the progress in our methods of asepsis and antisepsis,—we have not gone far beyond what was known on the subject one hundred years ago by Home and half a century ago by Mercier, Civiale, and others.

Our first great advance was the Bottini operation, and then came the era of prostatectomy. In spite of the progress that has

been made, our path is not an easy one,—mainly due to the fact that we have to deal with old, more or less decrepid men, who either on account of their advanced age alone, or through their long suffering, or through complications, are poor surgical risks. Naturally we can not lay down any general rules for the treatment of these cases, but must individualize and be guided by the ordinary principles which govern medicine and surgery.

In text-books we usually find hypertrophy of the prostate gland divided into three stages and the treatment is considered separately under three headings. I think it better, however, to give the indications for treatment not categorically, but according to the individual symptoms presented.

If the functions of the bladder are still normal, while the patient has already symptoms of frequent and painful micturition, I see no reason for the use of the catheter except in the presence of cystitis. A regular mode of living, proper hygiene, the occasional use of sounds or of Kollmann's dilator for the posterior urethra, together with instillations of a weak silver solution, will often cure the chronic congestion of the posterior urethra and of the prostate.

I am aware of the fact that even in this early stage " prophylactic prostatectomy " is advocated and practiced by some surgeons; for it is claimed that in these patients in whom prostatectomy might have to be done at a later date, a surgical interference at a stage when there is little or no infection of the bladder, healthy kidneys and a good general condition, would yield much better operative results. But as it is possible that the patients may be not only temporarily, but also permanently relieved of their symptoms, a more conservative standpoint seems justifiable. I do not wish to be understood, however, as saying that no case of this sort should be operated upon; the symptoms of dysuria, of prostatism, are sometimes so marked that they alone constitute an indication for operation.

Acute retention may occur, as we know, as the first manifestation of the disease, or it may be grafted on a chronic incomplete retention. In these cases I advocate the use of the catheter, either at regular intervals, or—if the introduction is difficult, painful, or accompanied by severe hemorrhage—of the perma-

nent catheter. In some of my cases I have left a permanent catheter in the bladder for weeks at a time, during which the patient was able to be up and about and to attend to his work. I usually keep the patient in bed for the first few days, and thereafter change the catheter for cleansing purposes and for irrigation of the urethra every few days.

In a society like ours, composed of practitioners well versed in the technique of urethral instrumentation, it is not my purpose to dwell on the details of catheterization and upon the laws of asepsis and antisepsis, which are to be observed. I shall simply state the general rules which govern me in my work.

In some cases of acute retention, the patient will regain control over his bladder through the judicious use of the catheter. In others, catheterization may be difficult or impossible, or may become increasingly difficult, or the passage of instruments may be followed by severe chills, so that prostatectomy is necessary.

A case illustrating some of the above-mentioned features occurred in my practice eight years ago.

A man, 57 years old, with acute retention, was seen by me in consultation. In spite of all precautions (irrigation of urethra, washing out of bladder, internal antisepsis, and strict adherence to the rules of asepsis), every instrumentation was followed by a severe chill, high temperature, and prostration. As the patient —otherwise in good general condition—lost ground rapidly, a general surgeon was asked to be present at the catheterization. Chills however persisted. After trying various remedies, I one day gave the patient an opium suppository, prior to catheterization, and from that day no more untoward symptoms were observed after catheterization. After the acute retention had been relieved, the patient passed into the stage of aseptic chronic incomplete retention, and from that time up to the present has residual urine varying from three to six ounces. He has entirely discarded the catheter, urinates every three hours during the day and, at the most, once at night. During the last few years, he has presented himself once a month to make sure that his urine is clear and that the amount of residual urine is not increased. He is perfectly satisfied with his condition.

Had such a case come under my observation at the present

time, I think that I should have advised prostatectomy, but I mention the case simply to show what can be accomplished by conservative methods.

I shall not occupy your time with the histories of any other patients, but I desire to refer briefly to a case which has taught me never to do a prostatectomy as a primary operation, in acute retention due to enlargement of the prostate.

A man, 65 years of age, was admitted to my service at Mount Sinai Hospital with acute retention, and a bladder reaching up to the umbilicus. A number of unsuccessful attempts to enter the bladder with a catheter had been made before the patient was brought to the hospital. The house surgeon did not succeed in entering the bladder through the urethra and withdrew 50 oz. of bloody urine by suprapubic puncture. The following morning I performed suprapubic prostatectomy, and shelled out a large prostate without difficulty. The bleeding was profuse, but was controlled by gauze packing. The urine remained bloody all the time and the patient died ten days after operation without symptoms of uremia or sepsis. Unfortunately no postmortem examination could be obtained.

I suspect that this patient's life might have been saved, if I had simply done a suprapubic cystotomy and, a few days later, a prostatectomy. In acute retentions, I deem it best only primarily to relieve the symptoms, viz. the acute retention, and by the drainage of the bladder through a suprapubic wound, to relieve the tremendous strain on that viscus, the ureters and kidneys, and only when approximately normal conditions of the latter have been established, to remove the prostate. The suprapubic cystotomy is a little operation which can generally be done with ease and in a few minutes under local anaesthesia, and the presence of a suprapubic opening makes the later prostatectomy under laughing gas shorter, simpler, and more easy.

In the treatment of patients with chronic incomplete retention various factors have to be considered, viz.: the amount of residual urine, the quality of the urine, the general health, the degree of suffering, and last but not least, the social position of the patient. If the urine is clear, the amount of residual urine small, and the discomfort not great, the catheter should be used. If regular catheterization is not possible, if the patient is suffer-

ing severely, if he is steadily losing flesh and strength, if there is a severe cystitis,—not too much time should be lost with catheterization, but the prostate should be removed as soon as possible.

In chronic complete retention, where the patient is condemned to a catheter life, he should—no matter if rich or poor—be made fully aware of the dangers of catheterization, he should be told that prostatectomy, although an operation not free from danger, offers him far better chances than catheterization.

It is true that a number of patients will stand catheter life for ten years or more, or until they die of some intercurrent disease, but, as Pardoe says, they live continually "on a volcano."

I fully agree with all authors who declare that in a working man the necessity itself for catheter life is an indication for prostatectomy.

I have purposely not spoken of cases in which the presence of other diseases would contraindicate prostatectomy and sometimes any kind of operative interference. If the latter is impossible (by this I mean prostatectomy, Bottini's operation or drainage), then the catheter is the last and only resort.

I have deliberately omitted to mention when and in what diseases any one of the above-mentioned operative procedures is contraindicated, when for example, advanced pyelitis, or nephritis or myocarditis, atony of the bladder or vesical paralysis due to spinal disease, etc., prevent our interference. Nor shall I enter into the interesting question when and to what degree the presence of sugar in the urine is a contraindication to operative treatment. The discussion of these interesting questions would occupy more time than is permitted me by your chairman.

Mr. President and Gentlemen! The views that I have expressed on the use of the catheter in prostatic hypertrophy, are those which have guided me in private and hospital practice. Prostatectomy,—far different from orchidectomy, vasectomy, etc., in that it removes the obstruction itself,—has come to stay, but I think that we all agree that the catheter will always retain an important place in the treatment of hypertrophy of the prostate gland.

THE CONDITIONS IN WHICH THE BOTTINI OPERATION IS INDICATED IN THE OPERATIVE TREATMENT OF PROSTATIC HYPERTROPHY.

By Willy Meyer, M. D., New York.

AFTER a rather stormy time it seems that Bottini's operation has at last also sailed into a safe harbor, being now generally recognized as an operation which has its strict indication in the treatment of prostatic hypertrophy. At the same time, I am fully aware that there is still a minority who are opposed to this procedure as much as others are opposed to litholapaxy in calculosis of the bladder.

The reason why Bottini's operation has gained a stronger foothold as time passed by, lies in the fact that careful observation of a steadily growing number of cases operated upon by the method, has shown such truly encouraging results—results, which often were obtained in cases where operation with the knife would, in all probability, have caused the death of the individual.

I have changed the title of this part of the discussion, as it was proposed by our president, and worded it: "Conditions in Which Bottini's Operation is Indicated in the Operative Treatment of Prostatic Hypertrophy," for in many cases it is not merely preferable to prostatectomy, but the only alternative remaining to the patient, unless we would have him continue the use of the catheter for the remainder of his life in spite of the sometimes almost intolerable subjective suffering entailed thereby.

In this connection I would briefly cite the case of a gentleman, aged 60 years, who, on account of his general debility, had been refused even the establishment of a permanent suprapubic fistula by an eminent surgeon of this city. He was told that nothing further could be done for him. He suffered from bilateral pyelitis, had frequent hæmaturia from the sore surface of his prostate, voided urine every half hour day and night, with a terrible tenesmus. The multiple galvano-caustic division of the

gland was done (in 1900) with the result that the subjective trouble, as far as pain and frequent urination were concerned, was entirely overcome, although the residual urine was reduced to a certain extent only. A second operation would probably have relieved also these symptoms, but was refused. To say that a case like this could have been cured by a bold prostatectomy, as a colleague asserted in the course of a discussion some years ago, I consider a rather absurd statement.

It is but natural, that, with increasing personal experience with the various operations, the limits for using the knife should be gradually extended. We have learned that old age, as such, does not militate against prostatectomy; it is only the condition of the patient that has to be considered. Then we have learned to overcome the dangers of anaesthesia, as far as that ever can be done, by the use of nitrous oxide gas, superficial anaesthesia by means of one of the standard narcotics, spinal anaesthesia, or the application of cocaine locally, and getting the patients out of bed as soon as possible after the operation.

It is natural that we should, whenever feasible, allow our patients to benefit by the radical removal of the gland—the one procedure which strikes the trouble at its very root. Still there are cases, in which other chronic disease, such as diabetes, advanced chronic heart trouble or general debility, makes it appear imprudent to take such a risk, or where the patient or his family is absolutely opposed to the use of the knife. It is here that Bottini's operation steps in.

As regards mortality I feel sure that the death rate of Bottini's operation is smaller than that of prostatectomy. For, although it is about the same on basis of statistics collected from all over the world, it must be remembered, that the material is not the same in both instances. The cases in which Bottini's operation is done nowadays, are, as a rule, those in which prostatectomy was considered either inadvisable or impossible. Hence a comparison of results is obviously unfair. Personally, I have had a series of 30 Bottini operations without a single death, attributable to the procedure, and this number includes quite a few cases complicated with diabetes, advanced heart disease and pronounced general debility.

The reason why Bottini's operation may give such excellent

results, insignificant though the grooves cut by the galvano-caustic knife seem to be, was made especially clear to me not long ago, in the case of a patient, in whom a subsequent suprapubic prostatectomy enabled me to see the work previously done by means of two Bottini operations, neither of which had given the desired permanent relief. After cystoscopy and careful deliberation, the only explanation I could arrive at for the failure of my two Bottini operations was, that the projecting median lobe had been cut in two, from its top down to the base of the bladder, and that the two halves of the soft gland acted as valves, closing each time the detrusor muscle tried to expel the urine from the bladder. Suprapubic prostatectomy proved this explanation to have been correct. The gland had been cut in two and, the lateral incisions having been made in a horizontal direction, there was a peculiar kind of mobility of this part of the prostate, resembling the action of a swinging door. But the grooves cut (twice, it is true), had become so wide, that my forefinger easily passed through them; in other words, there were three deep furrows, each of which in its width, corresponded at least to the usual size of the internal urethral orifice and would have given easy exit to the urine, had it not been for the peculiar mechanical obstruction above described.

This experience, together with a number of others, has caused me to still more urgently insist upon prostatectomy in the presence of a median lobe, provided the patient's condition does not furnish a contraindication.

As stated above, the depth and width of the furrows found in the case described, fully explain to me the many wonderful and lasting results which I have seen following Bottini's operation in the course of the last eight years, results which were originally just as surprising, yes, almost inexplicable to me, as they were to others. My work in this direction has proven to me over and over again the truth of what Dr. Keyes senior said in a paper read before the New York State Medical Society in 1898, that generally it is not the bulk of the gland alone that produces the trouble, but the relation of the urethral floor to the fundus of the bladder. Do we not all frequently come across cases in which permanent absolute retention was produced by a median lobe, half as large as the third phalanx of the small

finger, neither lateral lobes being involved, whereas in other cases a large gland of almost apple's size only produces a certain amount of residual urine. Often have I had occasion to say to myself on viewing the internal vesical orifice through the suprapubic incision, in the course of prostatectomy, "Here Bottini's operation probably would have accomplished the same good result," although I am of course, always glad to have done radical work, if the patient recovers.

Before closing, I would say a few words anent cases with carcinoma of the prostate. These unfortunate sufferers are curable only, if we by chance radically remove the gland, that, on microscopic examination, is found to be the seat of malignant disease. If the neoplasm has perforated the capsule and begun to infiltrate the neck of the bladder and its immediate neighborhood, nothing short of resection of the bladder with greatly increased risk of life, can bring relief, and there are probably few permanent cures even after such extensive operation.

In this class of cases, too, Bottini's operation is preferable. It will prolong life and alleviate the misery of these patients without the great risk and suffering connected with the more radical procedure just indicated and which, after all, offers little if any chance of a permanent cure. Freudenberg's cases and my own observation corroborate the foregoing statement.

Summing up, I would repeat two of the conclusions of my paper on "The Choice of Method in operating upon the Hypertrophied Prostate" (read before the Chicago Med. Soc. May 24, 1905):[1]

"If operation with the knife be refused or there be contraindications to such intervention, Bottini's operation is in order. Surgeons should familiarize themselves with Galvano-Caustic Prostatotomy (Bottini's operation), as well as with perineal and suprapubic prostatectomy, in order to be able to do justice to the prostatics entrusting themselves to their care, for no one method of operation can be employed in all cases of prostatic enlargement to the best advantage of the patient. In other words, we must select the operation that suits the case.

[1] *N. Y. Med. Record,* Oct. 7, 1905.

THE URINE IN PROSTATIC HYPERTROPHY.

By Louis Heitzmann, M. D., New York.

THE gross or microscopical appearance of the urine in prostatic hypertrophy does not present any characteristics which would guide us in making the diagnosis of this condition. In many of these cases there are secondary involvements which frequently influence the appearance of the urine, its specific gravity, reaction and odor. As chronic cystitis may accompany hypertrophy of the prostate gland, the urine may be alkaline in reaction and have a heavy ropy sediment, due to the large amount of mucus in cystitis. The presence and amount of albumen depend upon different conditions. We expect to find it in small amount in cystitis, and in varying amount in cases in which a nephritis of either the interstitial or parenchymatous variety has developed. Such a nephritis may in rare cases be due to a direct ascending inflammatory process, but most frequently is a hematogenous infection. In the milder cases, unaccompanied by other lesions, the gross appearance of the urine may be normal.

Hypertrophy of the prostate gland can be diagnosed by means of microscopical examination of the urine, even when the examination of the patient does not positively reveal an enlargement. In order to understand the features found in urine, the structure of the prostate gland must be understood.

It would seem that the structure of this organ is so plain to histologists and pathologists that there could be no divergence of views. Unfortunately they exist to a great degree. While some histologists call it a compound tubular gland, others speak of it as a compound branched tubulo-alveolar gland, and still others as a compound acinous or racemose gland. If we examine different prostates we will find that the majority of them are not tubular, but distinctly acinous or alveolar or saccular. Although the epithelial lining of the alveoli varies in different cases, in the larger number it is a simple or pseudo-stratified cuboidal epithelium, while near the ducts it becomes columnar.

The excretory ducts themselves are lined by a simple columnar epithelium.

If we examine prostatic secretions from cases of prostatitis, we will find both cuboidal and columnar epithelia of a certain shape and size, and these same epithelia will be seen in the urine in cases of inflammation of the prostate gland. The cuboidal epithelia are either round, oval or slightly irregular, and vary in size to a small degree only; compared with the smaller granular corpuscles, which are the pus corpuscles or leucocytes, they are considerably larger, being about twice the diameter of the latter. Columnar epithelia are somewhat larger, but narrower and elongated. In every case of chronic prostatitis pus corpuscles are found with these cuboidal and columnar epithelia, which contain a varying number of small, glistening, highly refractive granules and globules of fat; these are secondary changes in the protoplasm and denote chronicity.

In cases of hypertrophy, besides the features mentioned, pronounced evidence of proliferation is also present, that is, many of the epithelia contain two, three or four nuclei; the so-called endogenous new formations. The same new formations may be seen in epithelia from the neck of the bladder and the prostatic urethra, if these epithelia are found in the urine, as is always the case when a cystitis and urethritis accompany the prostatitis. In addition to all these features, small connective tissue shreds are usually found in distinct cases of hypertrophy. They are irregular, wavy fibers of a moderate degree of refraction, easily to be distinguished from the pale, straight threads of mucus which are never absent. In cases of simple enlargement without hypertrophy, that is new formation of connective tissue in the gland, all the features above enumerated are present, except the connective tissue shreds, so that a differentiation cannot infrequently be made.

DISCUSSION.

Dr. W. K. Otis: The use of the cystoscope in the diagnosis of enlargement of the prostate possesses certain advantages, particularly in the earlier stages where it is sufficiently enlarged. This can be seen by the ordinary concave cystoscope, and this gives us a better idea of enlargement than others. The use of the cystoscope is not always without danger, especially in those cases which are accompanied by nephritic symptoms, as it may cause the kidney to cease acting.

The lobes of the prostate can be made out, but it is necessary that the window should be close to the lobe, and for this reason it is magnified. It is particularly useful in those cases of intra-vesical growth which cannot be made out through the rectum. We can also see whether the prostatic lobes are eroded or not. It is useful in determining the necessity for the use of the Bottini incision, and you can make out the point at which the groove should be made with this instrument. At the beginning, when Nitze made the first cystoscope, the idea of obtaining a view of the prostate occurred to him, and one of the first cystoscopes he made contained an arrangement of prisms by which the internal orifice could be seen. This was not successful, because he could not see the shaft of his own instrument, and therefore could not locate the point at which he was looking. Such an instrument should look back so directly that the shaft of the instrument can be seen. This was attempted by Young in 1900, by introducing a double prismatic instrument, which was unsuccessful because you could not see the shaft. Shortly after I also devised one of that character, which was made of a single double prism. This was also a failure. Nitze followed this with an instrument which is recognized as an instrument of value. There is, however, an objectionable bulge on the instrument, making it difficult to introduce. An instrument invented by Schlagenweit has overcome this difficulty. He imposes on the window a second prism so that it is brought directly over the one already on the instrument. This gives a directly backward view. In going through this double prism the light is diminished and the view is not as good as it should be. I presented an instrument before the American Genito-Urinary Society. It is arranged without any prism, but by the use of a ball of crystal, an excellent view is obtained, and you get a good view of the internal orifice of the urethra. Having obtained the instrument, it is unsatisfactory for the reason that the field taken in is so small that you have to turn the instrument around to get the whole orifice. You might imagine you could see the whole tumor, but you cannot. Another method of examining the prostate is one introduced by Fenwick in 1897. Where no instrument will pass he punctures the bladder above the pubes with a large trocar and gets a view through the canula, examining in this way the prostate and the bladder. This was recently revived by Tilden Brown. It has not appealed to me, because when a patient has arrived at the point where the large canula introduced into the bladder is necessary to examine the bladder, it makes a considerable operation and you get only a partial view.

Dr. GUITERAS: When the operation of prostatectomy was in its infancy I began doing it by the suprapubic route, performing also a perineal urethrotomy for drainage from below as well as from above. This was considered the best operation at the time, and the results were thought to be amazingly good for an operation which but a few years before had been considered as either impossible or as so dangerous that it should not be attempted.

At about this time there was a growing interest in prostatic surgery, and shortly afterwards a number of surgeons began to work on the gland through the perineum. The glowing reports of the results obtained by this method by other operators led me to begin performing prostatectomy by this route. At first I was very enthusiastic over the results, and devised a number of instruments to assist in the operation. The prostates seemed to come out with ease, the shock was less to the patient, and the drainage appeared to be quite satisfactory. Later I had a recto-perineal fistula develop after an operation, which had been very rapidly, and, as I thought, very skillfully performed. Then I noticed that the

results did not seem to be as good as after a suprapubic operation, and I also found difficulty in performing the operation on a number of prostates, especially in very fat subjects. In looking over the literature I found almost no references to rectal fistulas as a complication, while the general opinion seemed to be that the operation was very simple and not particularly dangerous. On conversing with my friends on the subject of injuring the rectum by this procedure, I found that many of them had had the same experience that I had had, which led me to report my accident at the Academy of Medicine. My observation of a number of cases operated on by others showed me that sometimes the entire gland had not been removed, for one reason or another, and that the symptoms had only been relieved after the operation while the patient was being treated.

I, accordingly, started in again with the prostatic operation as originally performed by me, and as taken up by Freyer and Deaver, employing certain steps which experience had led me to consider important. These were: (1) Full Trendelenberg posture; make the incision through the abdominal wall and bladder sufficiently long; retract enough to give the largest possible exposure of the operative field for my own and the students' benefit during the operation. (2) Dry the bladder well; grasp the base of the prostate with bullet forceps, one blade in the urethra, the other behind the base of the gland; make a vertical incision on either side—one through the bladder wall, covering each lobe of the gland about midway between its side and the urethra; (3) lower the patient to a half Trendelenberg position; insert two fingers of the left hand into the rectum, to make counter pressure below while holding the gland from above, by which means almost perfect control of it is obtained, and the students can see every step of the operation.

After the gland has been removed I insert a very large, thick-walled rubber catheter, No. 38 to 40 F., into the bladder for suprapubic drainage. The perineal drainage I have discarded, and instead I introduce the largest catheter that will enter the bladder easily through the urethra, one with a large single eye, or perhaps two eyes, which I leave *à demeure*. This urethral drainage I find exactly as good as the perineal, and it relieves the patient of an extra operation for the sole purpose of drainage. Such a contrivance by which double drainage can be resorted to for a few days after the operation, that is, during the haematuric period, is of the greatest service to the operator, as it allows him to irrigate through from above to below one or more times a day. The hot solution runs away through the lower tube almost as rapidly as it enters, thus cleansing the bladder thoroughly. I consider the advantage of this method of drainage from below better than no drainage from the lower part of the bladder, or by means of a perineal opening, for two reasons: In the first place, because it assists the drainage from above, and secondly because it allows the hollow remaining after the removal of the gland to fill in around the catheter without disturbing the relation of the prostatic urethra to the remainder of the canal, instead of around the perineal tube, a false route, which also favors the development of a vesical perineal fistula. The upper tube is removed in four days; the catheter as soon as the upper wound heals.

Dr. Eugene Fuller: This question is a very large and interesting one, and I think the sentence that Dr. Willy Meyer ended his paper with is a very valuable one. There is great danger in getting too much routine in this branch of surgery. One should be prepared to resort to various procedures in order to remove hypertrophies. I remember, in the way of illustration, a case where a

man had an infection of the prostate from catheterization after an abdominal operation. His prostate was bound down by inflammatory exudate and I had to operate on him in a great emergency, as he had septic chills. I found the prostate was absolutely immovable, so that I had to do a perineal as well as a suprapubic operation and work both ways. By so doing I gradually enucleated the mass and got it out without injuring the rectum to which it was adherent. This could not have been done by either the perineal or the suprapubic route employed singly. In malignant cases I have often to combine operations in order to avoid undue damage to adjacent tissues in accomplishing removal. My experience was largely with the suprapubic operation, following the procedure I originated and published in 1895. When the perineal furor came in, I did, for a time very many that way, but I have now gone back, and in the majority of cases find the suprapubic operation the better suited and safer of the two.

Dr. Carter S. Cole: One of the early cases I saw fourteen years ago, in which the middle lobe was removed by suprapubic incision, was followed by death in three days from suppression of urine.

Dr. James P. Tuttle: I merely wish to suggest that the oozing mentioned by Dr. Wishard as preventing the use of the cystoscope during operation may be largely prevented by the hypodermic injection of adrenalin into the tissues before operation. I have used it frequently in operations of this nature and have found it exceedingly useful for this purpose, and also for the prevention of shock.

Dr. Follen Cabot: In my 37 cases of prostatectomy, the preliminary treatment has taught me many things, often overlooked. In emergency cases where a man is used up, I believe that a preliminary drainage will tide over the patient and get him in shape for another blow which will not be as hard for him as it would have been had he not had a preliminary drainage.

Irishman, 57 years of age, in poor general condition; had been suffering with urinary obstruction for 5 years and during the past three months with complete retention. The use of the catheter did not give much comfort, the vesical tenesmus continuing, accompanied by a marked failure of the general strength. The physical examination of the man, by the rectum, gave evidence of a moderately hypertrophied prostate, both the lateral lobes equally enlarged. The presence of a large third lobe was undetected and owing to the patient's condition a cystoscopic examination was not thought wise. This, however, as subsequent events proved, was a mistake. Among a list of 37 prostatectomies, 12 suprapubic, 25 perineal, I have with rare exceptions cystoscoped the patients and have never regretted doing it. As I have said, the man's general condition was such that I decided against it and not until the operation was I aware of the large third intravesical lobe. If I had known of its presence I would have performed a suprapubic operation. With my finger in the bladder during the operation I was unable to detect the size of the growth or I would then have added a cut above the bone and extracted it by that route. As it was I broke off the pedicle, which was an inch or more in length, and the lobe disappeared into the much dilated bladder. After considerable difficulty this was seized and removed. At the time no particular stretching of the tissues was observed, but on the fourth or fifth day evidence of slough in the wound appeared and for a few days jeopardized the patient's life. He pulled through, however, and now after two and a half

months has entirely healed, although the urinary control is not yet good. The general condition is excellent and the trace of albumen has disappeared from the urine.

In closing I may add that my experience in regard to choice of route corresponds closely with that of Dr. Willy Meyer. One-third of my cases; 12, suprapubic route; most serious cases, 3 deaths; two-thirds or 25 by perineal incision, the simpler cases, no deaths.

I am firmly opposed to emergency or unprepared removal of the prostate, but always now at Dr. Lilienthal's suggestion, provide for preliminary drainage and tonic treatment for these very exhausted old men. Then later a complete operation.

Dr. W. E. Deeks: I should like to refer to one method for relief of the irritation before deciding on an operation. By passing a solid steel electrode into the rectum and attaching it to one pole of a static machine, the other pole being grounded, by the use of a wave current a spark can be directed on the gland causing muscular vibrations, which acts like a milking process on it, and gives great temporary relief. It has given in my hands as well as a number of others, exceedingly good results, postponing operative interference indefinitely.

Dr. W. K. Otis: In regard to the drainage in these cases of prostatectomy, it would seem logical to make a perineal opening where a suprapubic opening had already been made, and get drainage through the perineum, but I find that the perineal tube does not drain when the suprapubic is present.

Dr. Terry M. Townsend: As an illustration of the occasional superiority of the perineal cautery operation over prostatectomy, I wish to report a case studied in Dr. Wishard's practice.

An old gentleman beyond sixty and diabetic, presented himself for relief from symptoms due to senile prostatic hypertrophy. Under local anaesthesia, perineal drainage was instituted. Within a few days phlebitis of the left leg developed, and death seemed imminent. After a short time he recovered sufficiently to leave the hospital with the drainage tube *in situ*. When his general health and diabetes had improved, he returned for further treatment. Under chloroform anaesthesia the perineal wound was enlarged, and a large phosphatic stone delivered; then the cautery was introduced and two fairly deep incisions were made in each lateral lobe. Digital exploration and visual examination through the observation window of the instrument, disclosed deep grooves through a moderately hard and fibrous gland. Recovery and complete relief from all prostatic symptoms resulted.

Dr. J. F. Erdmann: How many cases have the gentlemen lost with pulmonary embolism or apoplexy within the past three months? I have had that condition present itself within the last three weeks and within two months.

Dr. W. N. Wishard (closing): The limits of catheter life have been referred to in the discussion. Where it becomes necessary to use a catheter it is certainly desirable to keep in mind the fact that no one catheter is suitable to all cases of prostatic obstruction. Some get along better with a metal catheter, more use a soft rubber catheter and some can only use an elbow catheter. Two

or three years ago an instrument maker showed me an elbow catheter, which was flattened laterally. I purchased some of them and found on use that they were practically worthless, as the lateral flattening increased the stiffness of the catheter. Subsequently, I requested this instrument maker to make me a modified Mercier catheter flattened antero-posteriorly.

I present the instrument and you will observe that this antero-posterior flattening greatly increases the flexibility of the instrument. It can be used where any ordinary Mercier is called for and it has the additional advantage of passing easily in some cases where an ordinary Mercier cannot be introduced.

The remarks of Drs. Fuller and Guiteras in reference to the necessity for utilizing more than one method echoes the universal sentiment of the profession to-day. This was illustrated in my first case, sixteen years ago, in which I was compelled after opening the perineum to do a suprapubic operation. After utilizing the suprapubic operation for excision of the intravesical growth, I found on conjoined examination through the suprapubic and perineal openings, that irregular nodular projections were present in the prostatic urethra. Perhaps I should now in a similar case do a suprapubic enucleation by Fuller's method. In this case, however, I passed my finger through the perineal opening and finding the nodular projections, hooked them separately with a straight tenaculum and passing a small tubular rectal speculum into the perineal wound and over the tenaculum, I was able to draw the growths down into the farther end of the speculum. Aided with reflected light from a head mirror I applied the galvano cautery in puncturing and splitting these growths. So far as I know, this was the first application of the galvano cautery through a perineal opening with the operative area under direct observation. The instrument which I have presented to-night is the outgrowth of experience obtained in this and subsequent cases. It has resulted from my conviction that one should be prepared to do an enucleation and if necessary to supplement it by the use of the cautery or in some cases to simply depend on the cautery by making an incision similar to the Bottini or do a light cauterization as the mechanical and other conditions seem to demand after making digital and visual inspection of the vesical orifice and prostatic urethra.

Generally speaking, I believe perineal enucleation to be the operation of choice, but I do not believe it should be applied to all cases. Dr. Young first thought several years ago that the Bottini operation was quite satisfactory, but he subsequently changed it for the suprapubic method and in the past three or four years has been doing the perineal. Dr. Guiteras told us to-night that he first used the suprapubic and then the perineal and is now back again to the suprapubic. There is scarcely a writer who has advocated any one method of surgical procedure on the prostate who with larger experience has not varied his technique, and who has not recognized the advantages of various procedures in special conditions. The application of the best points in the suprapubic and perineal methods should be made by the surgical judgment and skill which experience suggests.

I beg to again emphasize the fact that I believe the cautery to be a very valuable means in certain cases where we dare not enucleate, and I prefer to use it through a perineal opening, which can be afterwards utilized for drainage. In addition, the perineal opening makes accurate diagnosis of the mechanical conditions possible and such diagnosis is not possible otherwise. For simple perineal drainage local anaesthesia is all that is necessary. Local anaesthesia is also ample in the majority of cases for dilatation of the prostatic urethra, and the insertion of my tube at the time or after three or four days' drainage. It is ordinarily un-

attended with shock. I am careful to use a Bransford Lewis applicator and one-half grain cocaine tablets for anaesthetizing the deep urethra and vesical orifice and do not use a solution of cocaine. The anaesthesia secured by this method is more satisfactory and does not give the unnecessary absorption of cocaine following the injection of a solution into the urethra. After the use of three to six tablets I usually wait three minutes and then infiltrate the Schleick's solution into the perineum and immediately make the incision. If the perineum is very thick I may cut half way to the urethra and then infiltrate again as I advance. I find this particularly valuable for complete anaesthesia by injecting the infiltrated solution through into the urethral walls after the perineal opening is made and before the floor of the urethra is divided.

EDITORIAL.

THE PACIFIC COAST BRANCH OF THE A. U. A.

THE recent unparalleled disaster at San Francisco came as if planned by fate to interrupt the progressive and altogether excellent work of the Pacific Coast Branch of our Association.

The program of their meeting which was to have been held in San Francisco on April 18-19 contained papers by Drs. Vecki, MacGowan, Whiteside, Goodfellow, Krotoszyner, Grosse, and Peterkin. Were the names of these gentlemen in themselves not sufficient to stamp the character of the work being done on the Coast, reference might be made to the meeting of that section held on January 16, 1906.

We may count ourselves fortunate in having among our members the gentlemen of this Section whose enthusiasm and love of their work enables them to travel, what we in the East should consider, excessive distances in order to meet and forward the interests of this Association.

Active as has been the interest and excellent as is the work in the Eastern Sections during the past season, we must take off our hats to our brethren of the Coast, and admit that they are our masters in zeal for the cause.

It is inevitable that their work should be interrupted by the destruction of San Francisco, and that we shall miss for a time the intellectual stimulus of their splendid example, but we are not at liberty to doubt that work thus handsomely begun will be renewed with unabated vigor, and that, as their great city rises from its ashes, we shall again have evidence of their activity.

We believe that every member of the Association will join in extending to the "Coast Section" our thanks for their work in the past, our sympathy in the calamity which has befallen them, and our belief in the brightness of their future.

HUGH CABOT.

BILATERAL NEPHRITIS FOLLOWING TRAUMATIC LESIONS OF A SINGLE KIDNEY.

LUMBAR traumatism may not only have as a consequence the lesions of renal contusion, but it also may be the cause of ptosis of the kidney, with or without hydronephrosis. Following these mechanical accidents, the signs of chronic bilateral nephritis may appear and several instances of this description of undoubted nature have been reported by Castaigne and Rathery.

During the first phase of the process, which varies considerably in time, the mechanical accidents alone predominate, such as movable kidney, hydronephrosis, and so forth. Later on the symptoms of interstitial nephritis appear, there being polyuria, the urine being of low density, containing urea in small amount, and traces of albumin with a tardy or prolonged elimination of methylen blue, which completes the cardio-arterial syndrom, such as hypertrophy of the heart, a left-sided bruit de galop and arterial hypertension.

In a recent thesis upheld at Paris, Hedouin controls these clinical data by experiments, such as unilateral renal traumatism, or ligature of one ureter. These experiments showed that the kidney on the other side soon gave evidences of lesions which, in the first place, occurred in the renal epithelium and afterwards underwent an evolution towards sclerosis.

The researches of Castaigne and Rathery have defined the nature and the cause of these lesions, and they have shown that they are due to an intoxication of renal origin. The lesions of bilateral nephritis following traumatism of one kidney, have as cause the entrance into the body, by way of the circulation, of cellular disintegration of the traumatized kidney and of the resulting nephrotoxins. If this opinion is correct, an active therapeutic measure naturally may be deduced from it. A kidney considerably involved by a traumatism should not be allowed to

remain, because, under these circumstances, it would become a great danger for the other kidney which it attacks by the intermediary of toxins which are truly nephrotoxic.

In the case of hydronephrosis, the kidney may be replaced in its normal position and its normal functions may be re-established by wearing a proper abdominal belt. In practice, this treatment is usually sufficient.

The lesions of nephritis rarely follow upon a movable kidney, but, nevertheless, it would be more prudent to watch the condition of the other organ, so as to employ a general treatment against the symptoms of a commencing interstitial nephritis.

In serious traumatism, where the kidney is no longer of any use, and where, on the contrary, it may be injurious, the utility of nephrectomy may occasionally be considered. This operation, however, should be preceded by vesical separation of the urine in order to ascertain the relative functional activity of the two kidneys. Fortunately, however, one will rarely be placed in such difficulty, because wearing an abdominal binder will usually suffice to rid the large proportion of cases of their attacks. If, after wearing the support, they still continue to complain, the nervous system should carefully be examined, because, very frequently, the subjects are neurasthenics of the female sex, and possessors of a renal ptosis. Consequently, the nervous system should be attended to at the same time that the kidney is held in proper position, and usually, one should think twice before advising surgical interference.

THE LOCAL TREATMENT OF CYSTITIS.

AT the Necker Hospital at Paris a local treatment of cystitis has been employed on a large scale for several years. This treatment consists of instillations of gomenol dissolved in oil. The strength of the solution varies from 10 % to 20 %, 5 cc. being used once daily or every other day, while in some cases which are particularly painful an instillation may be given morning and evening.

The relief from the pain is the most remarkable phenomenon observed in this treatment. For example, in a patient having tuberculous cystitis with such imperious and painful desire to

micturate that walking became impossible and he was constrained to empty the bladder at once, while the end of micturition was accompanied by very severe pain, 12 instillations allowed the patient to retain his urine, while after three weeks of treatment all painful phenomena had subsided.

At the same time the bladder capacity increases, the desire to micturate is felt at longer intervals, while the pathogenic bacilli present, such as those of tuberculosis or other organisms in association with it, disappear from the urine. It would also appear that the bladder lesions are cured more rapidly than with any other antiseptic.

Cystoscopy done by Pasteau showed in several cases that cicatrization of the ulcerations took place, along with a decrease of the hyperemia of the mucosa. Lesions of the prostate are also happily influenced by this treatment and in one other case related by the above mentioned authority, both lobes were considerably enlarged, but after treatment the gland became supple and free from pain, the foci of induration nearly completely disappearing in the left lobe. An improvement in the general condition followed the local amelioration, the patients putting on weight with the return of the appetite.

Cathelin comes to the conclusion that instillations of a 10% or a 20 % solution of gomenol in oil will give very evident results, even manifest curative effects, in cases of painful or tuberculous cystitis.

BOOK REVIEWS

A Manual of Operative Surgery. By JOHN FAIRBAIRN BINNIE, M. D. Second Edition, Philadelphia, 1905. (P. Blakiston Son & Co.)

In this well-printed and convenient little manual, will be found an up-to-date *résumé* of surgical technique. The teachings set forth in its pages are largely taken from that excellent work in two volumes on surgical technique by Monod and Vanverts, as well as the practice of the Mayo brothers.

Some recent operative procedures have been introduced, among which we may mention that employed by Cumston and Rolfe for the radical cure of carcinoma of the testis.

The book will be found a useful guide to both student and practitioner.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. JULY, 1906. NO. 10

RENAL DECAPSULATION AND NEPHROTOMY IN THE TREATMENT OF THE SERIOUS FORMS OF ECLAMPSIA.

By PROF. POUSSON AND DR. CHAMBRELENT, Bordeaux, France.

THE pathogenic theory of eclampsia at the present time admitted by the majority of obstetricians, is that of a blood intoxication produced by a poison whose origin and nature still remain undetermined. To this toxemia primary or secondary lesions of the liver and kidneys become added; consequently injury to the two most powerful emunctories of the organism results in an aggravation of the condition. This conception, to which laboratory researches combined with clinical observation have given a character of an almost inattackable scientific truth, has resulted in the treatment of eclampsia founded on a solid basis. In truth it has not given rise to any therapeutic revolution, but it has affirmed the great power of an already old method and which, because it has not inspired the confidence which it merits, has been too infrequently and unenthusiastically employed up to the present time in order to show all the success which may be derived from it.

This method consists in the use of those means by which the blood may be purified, and they are numerous. In the first place we have milk diet or even the water diet, which reduces intestinal fermentation to the minimum, consequently the production of the toxins; and in the same order, we have repeated enteroclyses, after which purgatives and blood-letting come in play, the latter directly removing from the organism adulterated blood; and finally hypodermic injections of normal salt solution which result in a flushing both of the tissues and the blood.

As may be seen, this method of treating eclampsia deals

directly with the toxemia, but neglects the renal and hepatic lesions which are only indirectly influenced by it. Without any doubt the abundant flow of bile which ordinarily follows enteroclysis indicates its action on the liver whose functional activity it excites, just like the diuresis which frequently follows a subcutaneous injection of salt solution, thus making its action on the kidneys evident. But is it always thus? And as far as the latter organs are concerned do not injections of salt solution act unfavorably on account of the chloride of sodium they contain and whose introduction into the body is at the present time considered contraindicated in uremic conditions, and by the water itself, which, raising the blood tension in the renal vessels as well as those of the other viscera, is rather more fitted to aggravate their lesions on account of the increased work that it imposes upon all their anatomical elements and the epithelium in particular. The toxins carried by the blood still more increase these dangers as far as the renal parenchyma is concerned.

It is, in the first place, in order to remedy these possible bad effects resulting from the treatment by lavage of the blood, and secondly in order to render blood-letting more efficacious, and lastly to do away with the renal lesions, that we have decided to interfere surgically on the kidneys in cases of eclampsia. But we would immediately remark that we have not the pretension of substituting this operative treatment for medical treatment. We only present it as a new resource to be added to those already in our possession in order to conjure the effects of the toxemia of pregnancy. For example, we believe that in instances of serious intoxication which have resisted all the medical means which we have enumerated above, particularly in cases accompanied by oliguria with a decrease of urea and other extractive matters of the urine along with a large quantity of albumin, surgical interference is justified and is even absolutely necessary when a histological examination of the urinary deposit shows the presence of the characteristic figured elements of acute nephritis.

Edebohls, who has pursued investigations on the operative treatment of acute and chronic nephritis along the same lines as one of us, although independently, has had the opportunity of successfully applying his method of renal decapsulation in two cases of eclampsia. Our case, also ending by recovery, can be

added to his in order to demonstrate the excellent effects of surgical interference in this serious morbid complication of pregnancy. But while the American surgeon resorted to decapsulation of both kidneys in his cases, we have added nephrotomy on the right kidney along with bilateral decapsulation.

The considerations that we shall develop after having given a detailed report of our case will show the great advantages obtained by the combination of an incision of the kidney and decapsulation.

Mrs. D. seamstress, 21 years of age; no family antecedents and having very good health, menstruated at fourteen and a half years of age, became pregnant several months after her marriage. Pregnancy in the first place progressed without any incident, but towards the eighth month the patient noticed that her face was slightly puffed in the morning, and from time to time she experienced continued headache. A few days before term she consulted a midwife, who found traces of albumin in the urine and prescribed an absolute milk diet.

The next evening, January 14, the first pains were felt and the midwife was at once called. Examination showed that the cervix had commenced to dilate, but that labor was very slow, the pains few and far between and very light. A few hours after the commencement of labor the patient, who had been cheerful and talking with those present, stopped speaking and hardly replied to questions and not always correctly when they were asked her. She fell into a kind of somnolence between each pain, and the irregular respiration appeared hindered. To this torpor some convulsive movements of the limbs soon became added and finally a marked attack of eclampsia took place. A physician summoned prescribed an enema of chloral. The convulsions became fewer and the patient fell into a state of semi-coma, which continued all night. The urine obtained by catheter, (the patient not having urinated for about ten hours), was small in amount, about a dessertspoonful, and became completely coagulated upon heating.

In the morning of January 15th, about sixteen hours after the commencement of labor, digital dilatation of the cervix was done, resulting in the delivery of a dead child. The placenta was delivered without difficulty and the loss of blood was small.

The coma continued during all these manœuvres and an hour and a half after the delivery a very violent attack of eclampsia occurred, the patient biting the tongue, after which she again fell into a deep coma. The coma continued for twenty-four hours, during which time there were three or four convulsions.

Dr. Beely, the patient's physician, called us on January 16th at nine o'clock in the evening. We found the patient plunged in an unconsciousness from which nothing could rouse her. The arms and lower limbs were absolutely inert and when raised up would fall lifeless on the bed. The eyelids, which were partially opened, closed of themselves, the pupils were dilated and did not react to light. The respiration was stertorous, regular and slow. The pulse was full, regular, 108; temperature 37°.8C.

Since the catheterization done before the delivery the patient had not voided urine spontaneously, but about 200 cc. of dark ebony-colored urine had been withdrawn by several catherizations and this contained a large amount of albumin. The catheterization that we performed withdrew 75 cc. of urine, the analysis of which gave the following results: Sp. gr. at 15° C., 1012; reaction, hypoacid; color, dark yellow; aspect, cloudy; sediment, abundant; urea, 8 grm. per litre; total phosphoric acid, 0.85 per litre; sodium chloride, 4.10 grm. per litre; albumin 6.50 grm. per litre. There were also numerous leucocytes, red blood cells and epithelial débris.

On account of the coma which had now lasted for thirty-six hours in spite of the labor, and especially on account of the oliguria, we decided to operate, which was done the same evening at nine o'clock.

Although comatose and unconscious the patient was nevertheless given a few whiffs of chloroform. The left kidney was first exposed by an oblique incision extending from the last rib to the antero-superior iliac spine. The fatty tissue was found greatly thickened and infiltrated, the muscles pale and waterlogged; finally a large quantity of serous fluid escaped upon incision of the fatty capsule of the kidney. The kidney was easily brought up into the incision; it was brown in color, grossly lobulated and of very firm consistency. Its longitudinal diameter was not increased, but its transversal diameter was considerably enlarged, so that the organ appeared rounded. The capsule being

incised over the convex border was peeled off with great ease and the parenchyma of the kidney then appeared less dark in color than before decapsulation, it being more like the hepatic parenchyma in hue. The lobulated condition was more distinct; a very slight oozing of blood, which was easily controlled, occurred during decortication. The kidney was then put back in place and gauze was inserted underneath its lower pole and the lumbar incision was closed, catgut being used for the muscles and silkworm for the integuments.

The patient being turned on the other side so as to expose the right lumbar region, the same incision was made as on the left. The infiltration of the fat, muscles and renal capsule was distinctly more pronounced than on the opposite side. The kidney being rapidly brought up into the wound was enlarged and cylindrical in form, brownish in color, of very firm consistency, but less lobulated than the left kidney. The capsule having been incised on the convex border, the borders of the incision immediately spread apart and the renal substance tended to form a hernia, proving the compression exercised by the capsule. Decortication having been done the organ lost its dark color, becoming a brownish red. An incision extending from pole to pole was carried down to the renal pelvis, giving issue to a very abundant escape of black blood, and little by little as the bleeding continued the renal parenchyma took on its normal light red hue. After having removed a small fragment of parenchyma from each side of the incision, in order to have it microscopically examined, a Pezzer catheter was inserted in the renal pelvis, after which the kidney incision was sutured above and below the exit of the catheter with six catgut sutures. The organ was then replaced in the lumbar fossa and a gauze drain was inserted under its lower pole, after which the incision was closed.

The operation lasted a little less than forty minutes. The patient received only a few whiffs of chloroform, after which its administration was stopped, but remained unconscious and did not come out of her coma.

January 17. The comatose state continued the entire night, but appeared less profound in the morning; sensibility to pricking, nil yesterday, is present, especially on the left side; the respiration is calm, sighing and occasionally showed the phenomenon

of Cheyne-Stokes. Pulse 120. Temperature 38°.8 C. No spontaneous micturition. By catheter 180 grm. of thick dark urine, having a fetid odor, was withdrawn. The dressings were thoroughly soaked, especially on the right (the side of the nephrotomy), with a liquid having a urinous odor and a marked red color. In the evening the coma was less profound. The sensibility had returned and was manifest over the entire body. When spoken to the patient opened her eyes and appeared to understand what was said to her, but did not reply to questions. Cheyne-Stokes respiration no longer present, respiration 44. Pulse regular, well struck at 120. Temperature 38°.4. Spontaneous micturition had not occurred and only 90 cc. of thick cloudy urine was withdrawn by the catheter, but the dressings were thoroughly soaked on both sides.

January 18. Night good. The patient, who, up to this time, had been immovable and inert in her bed, had made a few movements and in the morning came out of her stupor. She opened her eyes and followed those who approached her bed, appearing to well understand what was said to her, but still did not reply to questions. Respiration calm, regular, 40 per minute. Pulse 104. Temperature 36°.8. During the night 300 cc. of urine were voided by spontaneous micturition. Dressings thoroughly soaked; the gauze and absorbent cotton weighed 800 grm., but the bandage and pillow were also very saturated. On account of the considerable quantity and fetid odor of the lochia, vaginal irrigations of potassium permanganate were ordered. In the evening the patient had completely recovered from her coma, talked with her husband and others, but did not appear to have any idea of her condition, nor where she was. Temperature 36°.9. Pulse 96.

January 19. The night was excellent, sleep quiet. The patient expresses herself as feeling well and only complains of being constantly moist. She remembers nothing of what has taken place since her first convulsion and does not appear to wish to know whether she has been delivered or not. Temperature 36°.8. Pulse 96. Milk diluted with Vittel water. The dressings are still very soaked on the right, the urine coming partly from the drain and partly from the wound. On the left the dressings are dry and the wound has united except at the point where the gauze

drainage makes its exit. Seven hundred and fifty cc. of urine voided by the bladder. The weight of the dressing is 450 grm. During the evening the patient talked with her relatives of various indifferent things, but did not appear conscious of where she was. Slightly excited. Temperature 37°.3. Pulse 112.

January 20. Night good. Patient frequently asked to drink; milk given. The patient talked and laughed with those present, but did not recall anything which took place on the day of her labor and did not ask to know what had become of her child. The serous and bloody lochia are still possessed of very bad odor. The uterus was large and painful when pressure was brought to bear over the hypogastrium. Temperature 36°.8. Urine 2200 cc. Vaginal irrigation with potassium permanganate.

January 21. General condition still good, but the temperature rose to 38°. Urine 2700 cc. The gauze drainage on both sides was removed, but the drain in the right renal pelvis was allowed to remain. The lochia was no longer fetid, but the uterus remained large, so that the permanganate injections were still continued.

January 22. For the first time the patient asked about her child and was told that it was quite well in order to avoid any mental shock.

The drainage tube was removed from the right kidney on January 28, that is to say twelve days after the operation, and the wound closed completely four days later. Although the patient felt perfectly well, the temperature still oscillated between 37°.5 and 38°.5 for about two weeks, which we attributed to the uterus which underwent a very slow involution. The patient left the hospital on March 9th. We have seen her several times since and have noted a perfect integrity of her health. At the present time, thirteen months after the operation, her health is excellent and the urine no longer contains albumin.

The condition of affairs that we were able to observe during the operation confirms an anatomical fact that at the present day is well known relative to the somatic lesions of eclampsia, namely, that in our patient a bilateral nephritis was present. In point of fact, when the kidney was drawn up in the wound it appeared with all the macroscopical characters of this affection, namely, an increase in size and consistency, a brownish color and so forth,

and the two small fragments removed from the organ at the time of the operation when microscopically examined, presented the lesions of acute parenchymatous nephritis. The following is the report of the examination made by Dr. Auché: Glomerulitis; the vascular loops are greatly dilated, the number of the nuclei is increased, the cells of Glisson's capsule have disappeared in spots and are replaced by an exudate interposed betwen it and the glomerulæ. The lumen of the descending loops of Henle is slightly increased, the epithelium is nearly everywhere involved and in certain places one cannot distinguish the badly stained nucleus, while pushed against the basal membrane, the lumen of some of the collecting tubes is replaced by a homogenous substance stained red and probably colloid in nature; periarteritis of the small arterioles; in the connective tissue stratum are a few leucocytes in a greater number than normal. Certain pathologists contest the existence of eclamptic nephritis, believing that histological examinations are without value, considering that the changes found are cadaveric lesions. The examination of the bits of renal tissue in our case taken during life and immediately fixed in alcohol do away with this objection. A second clinical fact which is made evident in our case is the cessation of the nephritic process and the re-establishment of the secretory function of the kidney following decapsulation and nephrotomy, and, as a matter of course, the cure of the eclampsia.

Pathological physiology permits one to interpret this triple action. Its mechanism does not differ from that which one of us has put forward in order to advise surgical interference in the treatment of acute nephritis and uremic attacks in chronic nephritis.

First. *The manner of action of renal decapsulation and nephrotomy on the lesions of eclamptic nephritis.*

Reginald Harrison, who was the first to interfere by nephrotomy in acute nephritis, was led to this undertaking from the rôle that he attributed to intrarenal tension in the evolution of the anatomical process. The effects of this tension on the elements of the renal parenchyma are, according to his way of thinking, comparable to those of intraocular tension in glaucoma, and puncture and incision of the capsule of the kidney act like the operation of iridectomy first advised by von Graefe.

Employing another comparison which appears to us more exact, the London surgeon assimilates that which takes place in the tissues of an inflamed kidney compressed in its capsule, to the limited extensibility taking place in the testicular tissue during the progress of certain cases of orchitis, in which one encounters histologic elements undergoing necrobiosis if an early incision is not made in the albuginea. As one of us has pointed out, it is proper to add to this first effect resulting from the suppression of the intrarenal tension, that obtained by the free issue of blood produced by the incision of the kidney itself, which realizes to the highest point the effects of local blood-letting, so much sought after in daily practice by the use of cupping and leeches applied to the lumbar region. The flow of blood thus produced, besides its action on the renal congestion and its moderating influence over diapedesis, favors the exodus of the exudates and epithelial débris which encumber the canaliculæ involved in the incision, all agents which mechanically contribute in the production of oliguria and anuria. The removal of the obstruction even continues for some days afterwards if the renal pelvis is drained with a tube, thus allowing the flow of altered liquids secreted by the kidney and renders possible the use of antiseptic irrigations.

Edebohls, in his operations, has only resorted to bilateral decapsulation. For the reasons that we have given we believe that one should also make an incision in the kidney, at least on one side. This incision does not increase the gravity of the interference and has still other advantages that we will now point out.

Second. *The manner of action of decapsulation and nephrotomy on the return of the secretory functions of the kidney.*

It is again by doing away with the renal hypertension that these operations allow the kidneys to recuperate their physiological functions. It is known that Guyon and Albarran, basing themselves on experimentation and clinical observation, have demonstrated on the one hand, the effect of intrarenal tension, which has, as a result, much perturbation in the urinary secretion, and on the other hand, the happy effects accruing from incision of the renal parenchyma under these circumstances. Applying this knowledge gained in patients afflicted with surgical renal diseases to the medical affections of the kidney, one of us has successfully undertaken nephrotomy in a certain number of cases of acute or

chronic nephritis, complicated by oliguria, diminution in the excretion of urea and other products of the urine. In eclamptic nephritis, as in the nephritis of infectious diseases and the subacute attacks producing uremia in Bright's disease, intrarenal hyertension results from the increase in size of the kidney due to the exudates and the products of cell proliferation held under its inextensible capsule. This hypertension, acting on the vessels and the nerves, in the first place profoundly modifies the circulation and innervation of the organ and soon acts on the epithelial structures, resulting in disturbances of their functions by influencing their vitality or even bringing about their death. From this one may easily understand, without it being necessary for us to insist, the happy effects of removal of the capsule, and still better, incision of the renal parenchyma. As may be seen by the clinical chart here appended of our case, the total amount of urine, urea and the salts, with the exception of the chlorides, rapidly increased after the operation, so that, in this case of eclampsia, as in our other cases of nephritis, the interference acted, if we may be allowed the expression, like opening a stop cock to the flow of urine.

Third. *The manner of action of nephrotomy on the toxemia.* Now, as we pointed out at the beginning of this paper, general blood-letting, which subtracts from the organism a portion of the blood filled with toxins, is one of the most powerful means in our possession for combatting eclampsia. Now, nephrotomy, besides possessing the advantage of realizing quite as well as phlebotomy this therapeutic indication, fulfills the rôle of the liver by directly removing poisoned blood, because the pathologic changes of the hepatic parenchyma prevents it from purifying the blood. In order to explain the genesis of uremic attacks occurring in Bright's disease, Dieulafoy has emitted the opinion that the secretory elements of the kidney undergo intoxication from the blood carrying the toxins, producing a kind of *renal uremia.* Cannot a similar hypothesis be invoked during the progress of a toxemia of pregnancy? And if this be admitted, does not incision of the kidney appear the best means of removing the toxins which saturate the renal parenchyma?

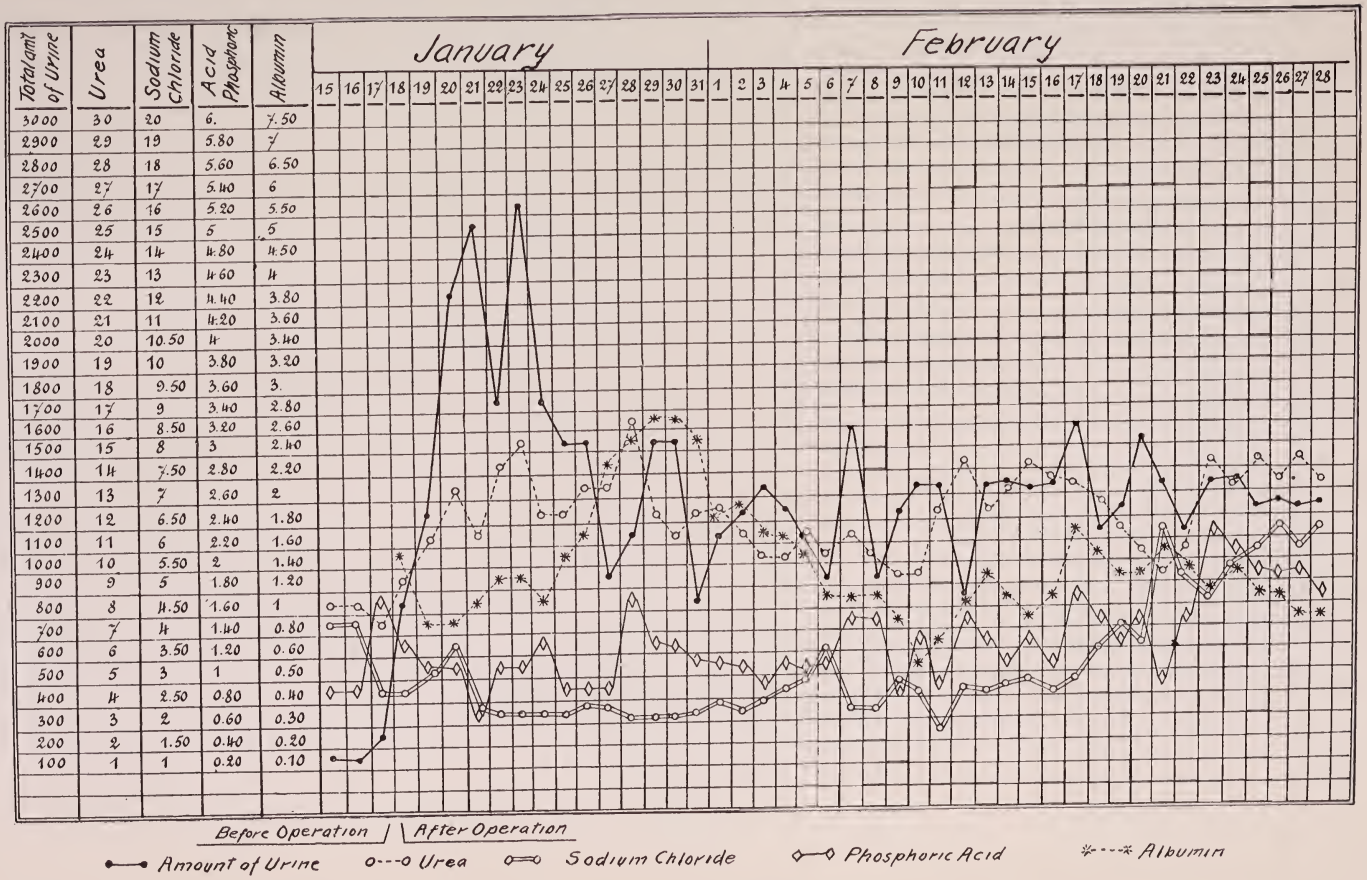


PLATE IV.—To Illustrate the Article by Prof. Pousson and Dr. Chambrelent.

CLINICAL NOTES.

By Dr. F. Kreissl, Chicago.

I. ABDOMINAL AND VAGINAL URETER FISTULA CLOSED BY CATHETER LEFT IN INJURED URETER FOR THIRTEEN DAYS.

September 29, 1904, Dr. L. A. Stillman of Chicago performed a hysterectomy which was rendered very difficult on account of the size of the mass to be removed and complicated by a psoas abscess and by unusually extensive adhesions. The evening temperature rose to 102°, pulse 120, and remained so for the four following days, emesis being present all this time. October 1st, intense pain in the right side was complained of. October 4th, the evening temperature dropped to 99.2°, pulse to 86. While dressing the wound October 5th, a strong amoniacal odor was noticed and upon inspection a urinary fistula in the laparotomy wound and in the vaginal vault discovered, through which urine leaked freely for the following eight days. October 13th, I was asked by Dr. Stillman to make a cystoscopic examination to determine the origin of the leak. I found a normal bladder, a perfect working left ureteral os, but the right ureteral orifice wide open, motionless. Passing a catheter No. 7 French scale into this ureter it semed to be checked in its further progress four inches from the orifice, but upon pushing it on with a very slight effort the tip seemed to glide over an impediment with a jerk and moved easily upward until the marking outside indicated that it had arrived in the renal pelvis. On its way to the obstruction nothing came through the catheter, but as soon as this was passed and all the way up to the pelvis urine containing much pus ran out of it as if under pressure.

At 2:30, two hours after the catheter was placed in the ureter, the dressings covering the fistula were found dry and remained so thereafter. The leakage through the vaginal vault had also ceased. The catheter was left *in situ* and through it the renal pelvis irrigated with antisceptic solutions three times daily.

The bladder was also antiseptically treated through a catheter introduced alongside the other instrument. The urine coming through the ureter catheter was measured daily and examined in the laboratory. It averaged twenty-four ounces; the quantity of pus and albumen being very high the first day decreased gradually, while the percentage of urea rose from 0.1% to 1½% and the specific gravity from 1006 to 1016 at the end of ten days. The fistula was completely closed October 20th. The temperature and pulse during all this time were normal; no pain along the urinary route complained of; in fact, the patient, a very nervous woman, was so little inconvenienced by the presence of the catheter that on October 24th she dressed and left the hospital for a few hours to attend a dinner party. October 27th, I removed the catheter and found both ureteral openings alternately emitting jets of urine by normal rhythmic contractions. A short time ago Dr. Stillman brought the patient to me for re-examination—it is now sixteen months since she left the hospital—and we found her in perfect health; her urinary functions and the urine being normal in every respect.

This case is instructive for several reasons. It demonstrates again the value of the ureter catheter for therapeutic purposes on *suitable* occasions, as in this one where it has returned to perfect function a damaged ureter and saved a kidney which otherwise perhaps, would have to be removed to cure the urinary fistula. It further shows the fallacy of the statement emanating, I think, from Winter, and regarded as an axiom by others, that in transverse lesions of the ureter the os will be seen absolutely motionless, while in lateral injuries the orifice without emitting any urine will open and close although not so complete and regular as under normal conditions. If this ureter had been severed transversely during the operation September 29th, it does not require any further explanation why a catheter could not have passed out from the lower and in again in the upper cut end, October 13th.

Lastly I wish to say that when I suggested this method for such and similar purposes about four years ago a reviewer of my paper questioned its feasibility because of the ill results on the urinary tract produced by a foreign body left therein so long. I have never found the procedure being associated with any inconvenience to the patient or followed by any lesion to the parts it

comes in contact with as long as one uses the necessary precautions. These are, absolute cleanliness and delicacy in introducing and placing the catheter so as to avoid traumatic lesions, and frequent washing of the renal pelvis, which has to be more frequent the more concentrated urines we encounter, or else urinary salts will be deposited in and on the catheter which will act as a chemical irritant outside and plug the lumen within causing urine leakage alongside of the catheter. In this way prompt closure of the defect will be prevented.

II. PRIMARY TUBERCULOSIS OF THE BLADDER AND LOWER END OF THE URETER CURED BY LOCAL TREATMENT.

The report of this case was deferred for more than a year because I thought sufficient time should be given to demonstrate the lasting result.

The patient, a robust girl, aged 18, was seen by me in consultation with Dr. I. A. Abt of Chicago on June 25th, 1904. She gave the following history: October 1904, owing, as she thinks, to a severe cold contracted during menstruation, frequent and painful urination set in. Rest in bed and internal medication kept up for several weeks having failed to relieve her, bladder irrigations were added which made the condition decidedly worse; terminal tenesmus occurred, the urine became more turbid than before and had to be voided every 15 to 30 minutes. Patient was not noticeably reduced in weight during all this time—about eight months—in spite of loss of a good deal of sleep and much suffering from pain.

In the cystoscopic examination a number of typical small-sized tubercules were seen in the trigone and a few in the corpus above the interureteric ligament. The right ureteral orifice appeared normal, the left one was surrounded by an elevated, cone-shaped, infiltrated and congested area; (close to the orifice a tuberculous ulcer was established), the rest of the bladder cavum seemed healthy. Passing the first three inches of a catheter into the left ureter, I obtained an almost creamy fluid containing many fragments of inspissated pus. Gradually passing the catheter higher up the urine became clearer and free from fragments until about six inches from the orifice it was transparent. In view of

the previously mentioned conditions in the bladder and in the vesical portion of the ureter, I did not venture to pass the catheter higher up. The microscopic examination of the bladder urine and the one obtained separately from the left ureter, showed very few blood-cells, pus-cells, a few streptococci, and no tubercle bacilli. This result was corroborated by the Columbus Laboratory who received a part of the same specimen for examination. In a second examination of the urine, June 29th, a few tubercle bacilli were found in that portion which was taken from the lowest three inches of the ureter; but none in that from the middle part. On this occasion several well-developed ulcerations were observed in the trigone. The largest ones were far away from the left ureteral orifice.

July 5th, a guinea pig was inoculated which died July 30th. The report from the Columbus Laboratory read: "Animal emaciated. At point of inoculation area of tuberculosis; bacilli present; glands, liver and spleen tubercular."

In view of the peculiar condition of the urine in the different portions of the ureter and the fact that no bacilli were found in the middle section, the possibility of a primary and ascending infection of the bladder strongly suggested itself and local treatment commenced July 5th. It consisted of instillations of 5% iodoform guaiacol suspensions, alternating with bichloride solutions in the bladder and in the lower segment of the ureter. Under this treatment the subjective symptoms improved rapidly and the ulcers healed within a month, while it took the tubercles about two months longer to disappear. Simultaneously with the latter, the tubercle bacilli disappeared from the urine, which became quite clear and has remained so since, as frequent examinations in the Columbus Laboratory have demonstrated.

An inoculation test made in Colorado where the patient spent a few weeks in the summer of 1905, gave a negative result. I saw her again a few weeks ago and found her enjoying perfect health.

III. RENAL CALCULUS OF UNUSUAL SIZE.

This specimen is from the right kidney of a patient, forty-one years old, sent to me by Dr. A. C. Crofton of Chicago. The short history given me is this: He had renal colic on the left side in

November, 1891; shortly afterwards, and since that time, he was unable to void urine in any other but the recumbent posture. March, 1892, a vesical calculus, removed by Dr. McArthur, by suprapubic lithotomy. Very soon again renal colic on the left side, appearing at longer or shorter intervals, until spring of 1903. X-ray picture taken at this time was negative. He was put on calcium carbonate medication by Dr. Crofton, following which no renal colic was experienced for over six months.

October 25, 1903, urine retention, necessitating drawing of the urine for three days. The latter was alkaline, which was attributed to the calcium carbonate. In a cystoscopic examination, October 27th, I found a vesical calculus, purely phosphatic, of the size of a hazelnut, which I removed by lithotripsy. The subjective symptoms of the cystitis yielded to local treatment within a few weeks following the operation, but the urine remained turbid and alkaline. December 22nd, he returned with dull pain in the *right* lumbar region and severe tenesmus. Through the cystoscope the bladder wall looked normal, with the exception of a small congested area near the right ureter. Catheterizing both ureters simultaneously, I collected 50 c.c. of clear and acid urine from the left kidney, and 100 c.c. of cloudy, alkaline urine from the right, which first came in a continuous stream, and with great force, as I have always observed in hydronephrosis and pyelitis with pelvo-renal retention. Here follows the result of the urine examination, furnished by Dr. Crofton:

RIGHT.	LEFT.
Quantity, 100 c.c.	50 c.c.
Reaction, Alkaline (!),	Acid.
Spec. Grav., 1019,	1016.
Urea, 1.4 per cent.,	0.2 per cent.
Color, yellow (cloudy),	Yellow (clear).

Sediment, right, pus abundant. Few red blood cells; abundant crystals of calcium oxalate; amorphous urates, and staphylococcus.

Left, no pus. No blood. No staphylococcus. Urine sterile. Ordinary sediment, with excess of oxalate and urate crystals.

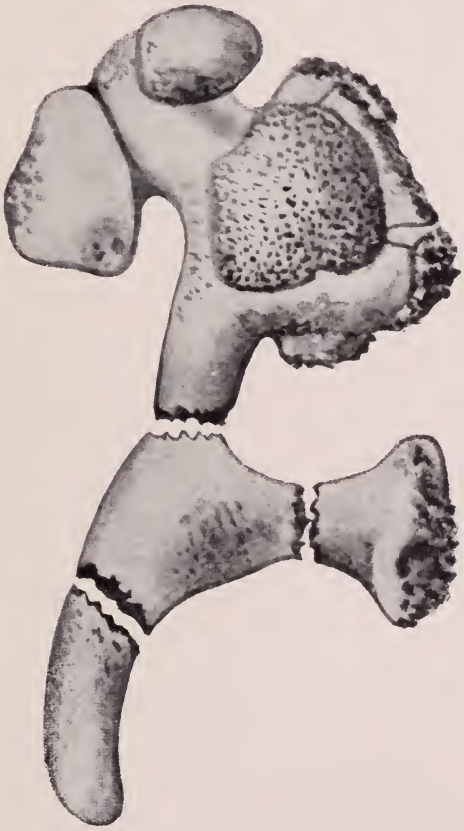
I irrigated the right renal pelvis with oxycyanide of mercury

solution, and injected 4 c.c. of a 1-1000 nitrate of silver solution before withdrawing the ureteral catheter. Urotropin internally, and the same application repeated every third day for three weeks, did not change the condition of the urine, although there was temporary relief from lumbar pain for a day or so following each ureteral catheterization. An X-ray exposure of the right kidney on January 25, 1904, showed two small shadows, as you may observe on the photograph. February 14th, making a lumbar incision in the right side, I exposed a very large kidney, extending far up under the ribs and the vault of the diaphragm, the pedicle shortened and stiffened by dense contracted tissue, which tucked the kidney close up against the spinal column. Much difficulty was experienced in freeing the stone from its encasement, from which it had to be cut out. After removing the large upper part of the calculus, I was able to get at the smaller ones, which filled the infundibulum and extended into the ureter. The accompanying figure conveys an idea of the situation of the stone in the kidney. Its total weight, including two calyx branches, scooped out separately and lost, is two ounces. Though badly infected, I did not remove the kidney because of its apparent much better functional activity than the one of its mate, as indicated by the previous result of the examination of the segregated urine. This conclusion was sustained by the fact that the bladder remained dry for forty-eight hours after the operation, while the dressings on the operated side were so much saturated that they had to be changed every few hours.

An examination of a resected piece of the kidney by Dr. Crofton shows the parenchyma not involved, but an ascending infection of the uriniferous tubules. No miliary abscesses within the kidney substance. The glomeruli were not involved. Patient made a good recovery.

Here we meet again the defects in X-ray diagnosis of kidney disease, which long before this induced me not to rely upon it, but to be guided by the clinical symptoms, supported by the result of urine segregation. The vast majority of suppurating or bleeding kidneys are at any rate surgical kidneys, at least warranting an exploratory lumbar incision or a nephrotomy.

PLATE V.—To Illustrate the Article by Dr. F. Kreissl.



THE SURGICAL ASPECTS OF ANURIA.[1]

By Charles Greene Cumston, M.D., Boston, Mass.

BY the word anuria, is understood that condition in which no urine is formed in the kidney; in other words, there is a complete absence of the secretion. Anuria following abdominal operations occasionally arises, but does not last more than forty-eight hours, but one case has been recorded in which there was suppression of the urinary secretion for twenty-five days, although the subject appeared to be perfectly well during this time. The urine then began to come away and gradually attained the normal amount. There are other cases, however, where anuria of several days duration sets up phenomena met with in uremia, and it is quite true that in certain pathologic conditions resulting in the development of deleterious substances in the blood, the patient may be in a very serious condition. These substances are the urinary toxins, combined with the biliary constituents and CO.[2] Understood in the strictest sense, anuria only occurs in functional disturbances of the kidney, or in the various renal affections, but in a broader sense one can include under this name all those abnormal conditions in which the urine is prevented from reaching the bladder. Thus we have obstruction arising in the ureter or renal pelvis, giving rise to suppression, and which may be classed among cases of anuria. True anuria arises when the arterial blood no longer reaches the renal gland, or the escape of the urine secreted in the glomerulæ is prevented by some obstacle met with along the genito-urinary tract.

I would like here to outline a classification of conditions giving rise to various forms of anuria, with the hope that the subject may be made as simple as possible. I will first consider those cases resulting from reflex action, and here one is dealing with anuria produced by some irritation in another organ, and by way of the nerves the reflex action is carried to the kidney, resulting in suppression of secretion. In this class belongs anuria of hys-

[1] Read at the annual meeting of the American Urological Association, Boston, June 4-5, 1906.

teria and toxic anuria arising from the intestinal canal. There are also instances of suppression of the urine resulting from an irritation arising in one kidney and, by what is probably a reflex action, prevents the secretion of urine in the healthy organ as well. According to Cohnheim, the anuria of pregnancy should also be considered as of reflex nature, and may be traced back to contraction of the renal arteries, but, however, I believe that in these cases an inflammatory process is really at the bottom. As an intermediary or transitional class, we should include those cases of anuria which result from an obstruction at some part of the urinary canal, as occurs in certain infectious processes. Here, in all probability, the circulation becomes arrested in the kidney, usually as a result of cardiac weakness, or on account of an increased density of the blood, but the urinary canals of the kidney are usually filled with small plugs of casts, being in reality an obstructive process. The second group includes the anuria met with in nephritis, renal calculi and in torsion or compression of the ureter, and these cases represent instances of obstruction in the urinary canals. We will now consider the first group, namely, *reflex anuria.*

Hysterical anuria. It is a well known fact that the secretion of urine is directly under the control of the nervous system by means of the vaso-motor system. By irritation of the vascular center in the medulla oblongata, one can directly influence the amount of urine secreted by the renal parenchyma. Stimulation by electrical currents, or by inducing an accumulation of $CO.^2$ in the blood, one may succeed, if the irritant is of sufficient strength to completely stop the secretion of urine. The point, however, which has by far the greatest importance for the understanding of the production of hysterical anuria, is the resulting complete anuria by reflex which arises during irritation of a sensory nerve. In their experiments, Cohnheim and Rog, by stimulation of the central end of a cut sciatic nerve, successfully produced an extreme contraction of the renal vessels with a diminution in the size of the gland. It is very important to note, as these authorities have shown, that the effect of the irritation was present considerably longer than the duration of the stimulation. These experimental demonstrations form the foundation of the hypothesis of reflex anuria in the human subject. The question now arises as to how

far clinical experiments correspond to those undertaken on animals and whether or not it can be demonstrated as a certainty that cases of purely nervous anuria can be met with, when the renal glands are absolutely normal. I feel that this may be answered in the affirmative, and here cases of hysterical anuria belong. This form usually arises in neurotic individuals, or in diseases or anomalies in the female genital apparatus. The splanchnic nerve becomes irritated and from this arises a cramplike contraction of the renal arteries, while the flow of blood to the kidney completely ceases. Hysteria, which represents a perverted reaction of the nervous system, may give rise to changes in the urine due entirely to nervous influence. The polyuria which frequently follows attacks of the affection is well known, and, although less frequent, oliguria may also occur and be so marked that anuria is reached. Pitres says in his clinical lectures on anuria, that the patients succumb of uremia after a certain time, which may vary from several hours to five or six days on an average, but in hysterical subjects, on the contrary, the anuria may persist for weeks without having any apparent effect on the general health and without causing any danger to life.

If one carefully studies the literature of the subject, it will at once become evident that hysterical patients never give evidence of symptoms of uremia, *if vomiting and diarrhea be excluded.* This has induced several authorities to assume that there exists a vicarious secretion of urea by way of the stomach, and Charcot and others observed that in absolute anuria, vicarious vomiting arose, the vomitus containing a relatively large amount of urea. The quantity of urea in the vomitus increased when the urinary secretion was suppressed, and, consequently, it becomes evident that the stomach possesses power to eliminate a certain portion of the urea accumulated in the blood in cases of anuria. The number of such cases, however, is small and there are probably other ways by which the urea becomes eliminated. That a vicarious secretion of urea may take place in the organism there is no doubt, as the experiments of Claude Bernard and Barreswil show. After removal of the kidneys they demonstrated the presence of urea in the blood, and after profuse vomiting had occurred, it could no longer be discovered. This phenomenon may be explained by the secretion of urea in the intestine and which was

also removed, partly by vomiting and partly by transformation into carbonic acid ammonia. Hammond and Marchand, as well as Oppler, found the presence of urea in the vomitus in their experiments.

One must be extremely careful in making a diagnosis of anuria when one suspects it to be due to hysteria. For instance, in one case, a girl twenty-four years of age, occasionally presented an oliguria, and once absolute uremia lasting for two weeks and accompanied with violent vomiting. The patient was carefully watched, and it was soon discovered that she carried a small pitcher with her which she kept wrapped up in a handkerchief. This pitcher had a very strong odor of urine. When she was unobserved, she would pour small quantities of urine out of the window, and it was also found that she drank some of it and then vomited.

We now come to the consideration of those cases where the anuria is proven to be purely nervous in origin and the kidneys perfectly healthy, and here again, I would refer to Charcot, who published a very well observed instance. The patient presented evidences of severe hysteria; there were convulsions, hemiplegia and hemianesthesia with an oliguria, which had been present for several months, with periods of absolute anuria which lasted eleven days. During the whole time, small amounts of urea were detected in the vomitus. After a deep chloroform narcosis, given for the purpose of breaking up adhesions giving rise to contracted joints, the urine secreted was found normal. This case shows that the long duration of an anuria proves nothing so far as its purely nervous nature is concerned, and this case just quoted was in all probability an angiospastic anuria, and besides, other proofs derived from animal experiments well demonstrate the curative action of the relaxing influence of chloroform narcosis over the vascular spasm. If, then, a nervous anuria really exists, it is probable that it is quite similar to the experimental reflex variety and results from sensory irritation, and this theory appears more or less probable from the two following reported cases. Israel had a twenty-four year old woman under his care presenting a stenosis of the external os, uterine catarrh and constant uterine pain, which was increased at each menstruation. For six months oliguria had been present, accompanied by profuse vomiting and occasional

anuria. After bilateral incision of the cervix, the menstruation following was painless and the oliguria and anuria disappeared. A similar condition was found in a case reported by McBride and Mann, of a woman having intestinal irritation, uterine hypertrophy and a deep bilateral laceration of the cervix and who usually presented an anuria of many hours' duration during menstruation. Injections of morphine did away with the anuria each time they were given, while an operation for the repair of the cervix also did away with it for some time.

Toxic anuria as it occurs occasionally in chronic lead poisoning, can also be traced to a reflex contraction of the renal blood vessels, especially the arteries, but, under these circumstances, oliguria is more frequently present than anuria. The same may be said of oxalic acid and cantharides poisoning.

We now come to the question of reflex anuria arising in an occlusion of one ureter, which may be considered as of reflex nature from the genital tract, and it is of importance to ascertain if sensory irritation affecting one kidney or one ureter is capable of suppressing urinary secretion by reflex action. This may be answered affirmatively and the fact was already known as far back as Morgagni, that in obstruction of one ureter, the opposite kidney might sometimes suspend its functions, so that this great pathologist was led to say: "*nam etsi non semper, hand rarissime tamen contingit, ut uno affecto rene alter quoque in consensum trahatur.*"

Clinically, this form of reflex anuria has been repeatedly met with, and as far as the correctness of the explanation is concerned, namely, that under certain conditions, an inhibitory influence upon the secretion of one kidney on the other can occur, has been proven by physiological experiments. It was long ago demonstrated by Claude Bernard that, by irritation of the nerves entering the hilum of the kidney, anemia and anuria could be produced, while in contradiction to this, Cohnheim and Rog showed that by irritating the renal nerves a marked hypermic tumefaction of the organ, with increased urinary secretion resulted.

It is only recently, however, that investigations have demonstrated the paths over which the vaso-motor nerve fibers run and this is of extreme interest from our point of view. Masius, by making a section of the vagus in the neck of rabbits and dogs,

whether on the right or on the left side, could by irritation of the peripheral end, produce suppression of urine in both kidneys. This phenomenon also took place when the sympathetic was cut in the neck after section of the vagi and the cervical medulla and the central end irritated. From this there resulted a depression in the vaso-constrictor nerve fibers of the kidney, partly in the splanchnic, partly in the cervical vagi, and on account of this dividing course of the vaso-constrictors in the cervical vagi also, it immediately becomes obvious that, in a perfectly simple and clear manner, one may explain the changes observed in the cardiac action, as well as the existing anuria. This has also been proven clinically. For many English surgeons, however, the reality of reflex anuria resulting from functional obstruction of one kidney does not appear at all likely, and they only believe it possible when some serious lesion is present in the second kidney. Legueu rejects the possibility of a reflex action when a renal lesion exists on one side only, or when a calculus becomes lodged in a ureter, and he asserts that in calculous anuria from obstruction of one ureter, the kidney on the other side, if it fails to carry out its functions, does so because it is, or has been, the seat of some lesion. Demons and Pousson admit that anuria arising in cases of obstruction from stone in one ureter may occur, but it must be extremely rare and presumably a diseased kidney also exists, because it is only under these circumstances that the renal function could be interfered with in a reflex way.

Israël also comes to the conclusion that reflex anuria, due to a one-sided obstruction of the ureter, usually only takes place when the opposite kidney is already the seat of disease. The reflex interference of the renal function takes place, according to Guyon, from an insufficient blood supply, due to irritation of the vaso-constrictors and since he upholds that a diseased kidney requires a greater amount of blood than a healthy one, it naturally suffers more markedly under a reflex irritation than when normal.

Animal experiments carried out by Gotze would appear, however, to be in favor of some reflex influence brought to bear on the healthy kidney which may impair the latter's functions in cases of obstruction of one ureter by a calculus. In dogs who passed normal urine, the capacity of each kidney was determined quantitively by inserting a glass tube into each ureter. Salt

solution was then injected into one ureter which increased the pressure in the respective kidney and immediately resulted in a decrease of the secretion of the kidney on the opposite side, and when the pressure was kept up resulted in complete suppression of urinary secretion. The same result was obtained when artificial obstruction of one ureter was produced. Increase of intrarenal pressure of one kidney consequently resulted in arresting the secretion in the opposite gland. From this it would appear that those who have criticised the theory of reflex suppression of urinary secretion, have certainly the merit of having disproven a large number of cases which have been reported as reflex anuria, but, nevertheless, the reflex process which arises in connection with renal operations must still be more generally considered than it has in the past. This relates chiefly to the immediate results on the functions of the remaining kidney after nephrectomy. The physiological process after this operation is much more clearly understood than formerly, since surgeons have done away with the injurious influence of antiseptics on the remaining kidney by employing an aseptic technique, and in looking back we can see that in many cases where anuria occurred immediately after the removal of a kidney, it was in many cases due to the absorption of toxic products employed for sterilization. It becomes evident at the present time, when functional disturbances occur in the remaining kidney after nephrectomy, that in the majority of cases the process is purely a physiological one, due to a reflex condition acting on the innervation of the renal vessels.

In cases of obstruction of one ureter other than from calculus, the easiest and clearest reason for the occurrence of a reflex suppression of secretion, giving rise to a so-called sympathetic anuria, is met with when acute suppression arises in movable kidney. In these cases, at the time of the attack, a decrease in the amount of urine, or even absolute anuria may occur. When the crisis is over the renal function is restored, so that any supposition of any arrest of the secreting functions having pre-existed in the other kidney must be rejected. Israel has reported a case where this fact cannot be denied, in which he observed a distinct reflex inhibitory influence over the left kidney, arising after an acute increase in tension, resulting from a temporary closure of the ureter in a right-sided hydronephrosis.

The kidney was enormously distended from time to time and extremely painful from the tension, and, at the time of the attacks, the amount of urine secreted diminished to practically nothing, but, as soon as the sac was emptied by puncture, a flood of urine was voided by the bladder. This polyuria occurred from the healthy kidney, for the urine voided by the bladder was perfectly normal, whereas that obtained from the hydronephrosis was tinged with blood. In another case Israel was dealing with an increase in intrarenal pressure in one kidney, resulting from bending of an abnormally long ureter, and a suppression of the secretion in the healthy kidney resulted. The occlusion of a left-sided hydronephrosis resulted in a total anuria. The right kidney was incised, and during the operation the renal vein was ruptured, death resulting twenty-eight hours after the operation. Microscopic examination showed that the structure of the right kidney was perfectly normal.

According to these observations it becomes evident how an irritation arising in one kidney can suppress the secreting functions in the opposite organ, and by removal of the existing cause the normal kidney will again regain its physiological functions. A still more evident proof, possessing the positiveness of a physiological experiment, is the occurrence of a reno-renal reflex resulting in oliguria or anuria when the latter condition is overcome after removal of the diseased kidney, during the occurrence of occlusion to the exit of the urine from that side. Here, again, Israel has reported an interesting case. He removed a diseased kidney, and after the operation the amount of urine voided in twenty-four hours amounted to three times the quantity expelled before the operation. Here one is dealing with instances of bending of the ureter and hydronephrosis, resulting in an increased intrarenal pressure, which by reflex action stopped the excretory functions in the opposite gland.

Considering now cases of obstruction due to impaction of a calculus in the ureter on one side, and where anuria results, it is difficult to prove the sympathetic nature of the condition. It may be upheld that one ureter is occluded by a calculus, while the ureter of its fellow may be bent, or the opposite kidney may be diseased and incapable of carrying on its function, or that it may be a rudimentary organ, so that the occluded kidney is in reality

the only one carrying out urinary secretion. It is quite true that such conditions have been frequently observed and reported as instances of reflex anuria, but, nevertheless, there are enough authentic recorded cases to be found, in which an occlusion by a calculus in one ureter has distinctly resulted in a reflex action arresting the functions in the opposite healthy kidney. Legueu is very positive in asserting that there is no such thing as reflex anuria, and when suppression of the urine does occur, it is due to the fact that the patient possesses only one kidney. Personally, I believe that this opinion is too absolute and a case recorded by Israel seems to show that the proposition is untenable in every case. After exposing the left kidney and removing a stone from the hilum in a patient sixty-two years old, Israel noted that the urinary secretion returned immediately and very profusely, both by way of the bladder and through the drainage tube in the left kidney. By the cystoscope it was found that the right kidney, which had not been operated on, secreted normally again, which would seem to prove the reflex nature of the cessation of its function. Legueu, nevertheless, upholds that a reflex calculous anuria cannot exist, and when there is anuria from calculous obstruction, both kidneys must be diseased or only one gland is present. The above mentioned case reported by Israel would seem, however, to prove the contrary, because complete anuria was present with obstruction in one ureter only, which was completely relieved after operation and proved by the cystoscope that urine came into the bladder from the healthy kidney after operation. The following case is interesting in many respects.

A male, thirty-seven years old, with a good family history, had never been ill. Up to within six weeks of the time the patient was first seen, there apparently had not been any renal symptoms. The patient, however, became suddenly ill with pain in both renal regions, accompanied by anorexia and abdominal distension. Since the commencement of the illness, the urine appears to have shown a considerable deposit and at the same time, the amount was markedly decreased.

After judicious medical treatment had been resorted to for several weeks, the urine continued to be passed in very small amounts, was decidedly cloudy and contained a fairly large amount of albumen. A few days before coming under observation, the

amount of urine excreted became less and less, until complete anuria resulted. Up to this time the patient's general condition was fairly good and he did not suffer, but, in order to prevent the appearance of uremic symptoms, he was placed under surgical observation.

When first seen the anuria had been present for a day and a half. Physical examination showed a large, well built man, with slight edema of the feet. The mental condition was not changed other than for some slight confusion. The pulse was weak and about seventy to the minute. The thoracic organs appeared normal and no intestinal symptoms were present. Palpation of the renal region elicited no more pain on the right than on the left, but he stated that the last attacks of pain had occurred on the left.

An operation was undertaken at once, and since the patient complained of more pain on pressure over the left kidney, and as the kidney could be palpated on that side, as well as the objective diagnosis, this gland was presumed to be the one that had retained its functions up to the last. As to the condition of the right kidney and whether or not it had become physiologically without value, was a problem that could not be solved. Likewise the etiology of the anuria could not be made out with any certainty, although a reflex calculous anuria, or obstruction of the ureters with calculi, was considered probable. The left kidney was consequently exposed and was found tumefied and hyperemic, but otherwise apparently normal. The renal pelvis was of normal size and the ureter, as far as it could be palpated, was normal. The kidney was then split open and a small amount of cloudy urine made its exit from the renal pelvis. Retrograde catheterization of the ureter revealed nothing, as the instrument could be pushed into the bladder. The operation was completed by gauze plugging and a drainage tube. The outcome was satisfactory, because, several hours after the operation, large amounts of urine came from the wound, but none from the bladder. This continued for ten days, and then less urine was excreted through the tube, while the quantity expelled by the bladder increased. During convalescence, the patient experienced attacks of pain in the right kidney and with each of these there was a decrease in the amount of urine passed. After eight days the attacks of pain on the

right ceased and did not return, and as the wound was closed and the patient felt perfectly well, he was discharged twenty-five days after the operation. We heard from him three months later, when he stated that he was in the best of health and the amount of urine passed was normal. Seven months after the operation he again complained of pain in the right renal region, but the amount of urine did not decrease, although it was found to contain a considerable amount of albumen. Upon examination, the right renal region appeared tumefied and upon incision, a large amount of pus was let out which surrounded the kidney, but the wound closed kindly in a short time.

From this it would appear that a calculus or calculi were present in the right kidney, and that a pyelonephritis had developed and resulted in a pararenal abscess by which the concretion had made its exit. A year later the patient was in excellent health.

A very similar case has been recorded by Mittag which occurred in von Bramann's clinic and another by Godlee. The latter case is briefly as follows: A physician, thirty-one years of age, suffered from septicemia when a student in 1872, as a result of an injury; otherwise he had been well until the last two years, when he had occasional attacks of right-sided renal colic which were relieved by morphine. The attacks became more severe and associated with anuria, while the urine showed quite an amount of albumen and many hyalin casts. In July, 1885, a deep seated perinephretic abscess was opened, but the kidney could not be discovered. No urine came from the wound and the albumen considerably decreased. In December of the same year complete suppression of urine again occurred, lasting a week. No operation was undertaken, because it was supposed that there was only one functionating kidney whose ureter had been occluded by a calculus. Death took place a week later. Autopsy showed a large pus pocket in the right kidney, with a calculus lodged in the middle of the ureter, above which the tube had become greatly dilated. The left kidney was large and normal, and microscopically only showed evidences of a mild intertitial nephritis. The interesting points in this case are that an abscess in the right kidney could produce such a considerable amount of albumen and casts in the urine, and that the irritation in the right renal g'and could cause complete anuria, although the other organ was com-

paratively healthy. Godlee expressed the opinion in reporting the case, that perhaps the amount of morphine given the patient had some bearing in the production of the anuria.

In a case occurring at the surgical clinic at Halle, a renal abscess on the right side was present, which at times gave rise to considerable albumen in the urine. Here again the irritative process arose in the diseased right kidney producing anuria from its reflex effect on the secretion in the latter.

We now come to reflex anuria arising in traumatism of one kidney and we will first consider direct traumatism. In traumatisms of the kidney, whether they be operative or not, anuria may arise, although the opposite gland may be normal. Marsh and Clarke have met with such instances, although, under the circumstances, one is dealing with a combined action of various factors, which, according to the above mentioned authorities, results in a too complicated process to allow one to consider the condition as a reflex anuria with any certainty. On the other hand, other observers have reported cases which are more important. Butler has published the following case. A laborer, forty-three years old, received a blow on the left side of the abdomen, and, although the region pained him, he continued to work for four days. On the fourth day following the accident, anuria suddenly occurred, accompanied by rigors, nausea and violent pain in the back. When seen on the tenth day after anuria had set in, his breath possessed a distinctly urinous odor and the abdomen was slightly distended. On the next day there was vomiting and muscular twitching during sleep, and two days later he died with all the symptoms of uremia. Autopsy showed a cystic atrophic kidney with a patent ureter. The left kidney was considerably enlarged and bound down by old and new adhesions. The ureter was distended with urine and at its middle was found a complete obliteration; in the radicles of the renal vein, thrombi were found, which at first sight looked like small calculi.

After removal of one kidney, anuria may follow, and if the condition is not overcome, death soon results from uremia. Anuria arises under these conditions, either from the fact that the opposite kidney was diseased to such an extent that its functions had been carried out altogether by the organ removed, or, on the other hand, the heart may have been undergoing pathologic transforma-

tion for some time and its action became weakened from the narcosis and loss of blood which accompany all operative interferences. In the latter case, from the poor blood supply, ischemia of the kidney results, causing rapid degeneration of the renal epithelium and with this, cessation of its functions. Without any doubt disturbances in the kidney occur, which, in some cases, are rapidly overcome, while in others an acute inflammatory process arises, resulting in a dimunition of the secretion, which finally ceases. Autopsies on these cases show either an extreme cloudy or fatty degeneration with necrobiosis of the renal epithelium, or the kidney may present an interstitial infiltration in which the renal epithelium also tends to become considerably involved. In the milder cases a reflex action on the healthy kidney is the result of the anuria, but in other instances other influences, probably of a purely nervous nature, are to be taken into consideration, which are evidently direct irritations far exceeding the physiological point. It is not possible for a perfectly healthy kidney to fail under the burden suddenly imposed upon it by the removal of its fellow, so that one should search for some other influences of specific irritation. Bonardi has shown experimentally that in animals from whom a kidney has been removed under narcosis, the subjects were more susceptible to infections and intoxications. A very serious influence upon the renal epithelium, resulting from the narcotic used, whether in the form of a direct irritation, or ischemia resulting from the narcosis, is most doubtful. One should always take into consideration the absorption of chloroform into the system which, in itself is not dangerous, but combined with other influences is apt to increase the danger.

Certain antiseptic materials when coming into direct contact with a wound surface in large quantities are far more important than either ether or chloroform. The deleterious action on the kidney of carbolic acid, iodoform, and especially bichloride of mercury is well known, and if into the bargain the heart's action becomes weak, a condition not infrequently observed in doing nephrectomy, the danger then increases to a considerable degree. For this reason I am of the opinion that in the removal of a kidney the aseptic technique is the one to be preferred.

In this respect an interesting case of anuria following removal of the kidney, occurring in the surgical clinic of Marburg, has

been reported by Barth. The case was a malignant tumor of the right kidney in a five-year-old child. The decreased amount of urine existing before the operation did not at first undergo any considerable change after the kidney had been removed and the amount excreted even began to increase. The patient convalesced and appeared out of danger, when on the fourteenth day he was nauseated and sleepy, while the amount of urine rapidly diminished, only 40 grams being passed on the next day, which contained albumen and large numbers of red blood cells. On the day following, complete anuria set in with marked uremic symptoms. The pulse was irregular and intermittent. On the following day the condition suddenly changed; the urine was secreted to an amount not reached before, the pulse became regular and all the alarming symptoms disappeared and from this time on the patient rapidly recovered.

The remaining kidney was not enlarged, nor painful, the chemical and miscroscopic changes in the urine were only present during the attack, and examination of the bladder showed it to be perfectly normal. To sum up, it may be said that this was a reflex anuria, probably arising from irritation of the nerves in the stump of the removed right kidney, and this caused a reflex angiospasm in the vessels of the left organ, resulting in a cessation of the secretion. The irritation producing a reflex was probably due to an inflammatory swelling of the granulating wound in which the nerves were imbedded. The change in the heart's action should also be taken into consideration in this case. The pulse was very irregular and markedly intermittent during the attack, a condition of affairs not observed either before or after the attack. This phenomenon may, however, be explained when one takes into consideration the intimate and direct relationship existing between the vagus and the vaso-constrictors of the kidneys as has been demonstrated by Masius.

Israel has recorded several cases of anuria following extirpation of the kidney, but he says that, although complete anuria occurred, it was not the result of reflex influences, but wholly dependent on the weakened condition of the heart. This authority is skeptical regarding reflex anuria, although he does not consider it impossible, and, according to his way of thinking, so many conditions are present during an operation that it would be diffi-

cult to consider the anuria following as due to any one particular cause. In his own cases the patients presented atrophic or parenchymatous changes in the myocardium and from the narcosis, the operative traumatism and so forth, the heart already in a diseased condition was influenced in such a way that the renal activity would become lowered as a result of diminished blood pressure. In point of fact, the latter is certainly of great importance, whether resulting from a weak heart or a reflex vaso-constricting action on the renal vessels. From the development of ischemia, if it persists for any length of time, severe damage to the renal epithelium results but it can recover if the blood supply is not interfered with for too long a time. An increase in the secretion of urine then follows and the fact is clinically of great interest, because, to a certain extent, it represents a physiological reaction of the renal blood supply, or rather, perhaps, its nervous apparatus, upon the pre-existing condition of irritation. An angioparesis of short duration follows angiospasm and, as in animal experiments, results in an abnormal secretion of urine. Clinically, this phenomenon is a very well known occurrence.

The following case is not devoid of interest. A male, forty-one years of age, was seen in the middle of January, 1900, complaining of a fullness in the bladder even when the organ was empty. Five days later a swelling was found just below the region of the stomach, with borders which could not be distinctly defined. Considerable pain was elicited in the tumor upon pressure. The patient complained of pains in the legs and back. The descending colon was found lying over the tumor, which extended from the left renal region down into the pelvis. Inflation of the stomach caused the resistance to disappear. The surface of the tumor appeared smooth. The growth increased in size very rapidly, so that, by the first of February, the patient was extremely weak and edema of the lower extremities appeared. At no time was either albumen or casts found in the urine, but, on February 10, a trace was discovered and the specific gravity 1004. The daily amount had averaged about 1300 grams, when suddenly on February 11 the urine decreased; only about 650 cc. was voided and the next day a little less. On February 14, complete anuria arose. When seen in consultation on this date the patient was found extremely emaciated, with considerable edema

of the lower limbs. The tumor presented in the left hypochondriac region in the form of a hard swelling with a smooth surface and not adherent to the abdominal wall. The growth reached nearly to the median line and its lower borders appeared to be about two fingers' breadth below the umbilicus. It was not movable. The growth in the abdomen might be roughly estimated as the size of an adult head. No fluctuation could be elicited. No functional disturbances of the stomach or intestine. By inflation of the large intestine the descending colon appeared to be displaced towards the middle line and somewhat downwards. The thoracic organs showed no evidence of disease.

Hydronephrosis was eliminated on account of the absence of fluctuation, and, although there was little or no rise in temperature, I did not feel that renal tuberculosis could be eliminated, although I was under the impression that I was more likely dealing with a sarcoma of the left kidney. But it might be either of the two latter diseases which had resulted in anuria, produced by pressure of the ureter from metastases in the mesenteric lymphnodes on the right, with displacement of the left ureter from direct pressure, or, on the other hand, the anuria might be due to retension from compression of the right ureter from growths developing in the small pelvis. The marked edema could be best explained from congestion due to compression on the inferior vena cava.

For the next few days that the patient was under observation, there was complete anuria, proven by catheterization. The edema increased, the patient complained of headache and was constantly nauseated. The pulse ran high and, on account of the threatening uremia it was decided to operate. The right kidney was selected as the organ to be operated on, because it was practically certain that it was the healthy one. Consequently the kidney was exposed by a lumbar incision and split open. The renal pelvis was found somewhat enlarged. The opening in the kidney was packed with gauze. For the next few days large quantities of urine were passed by the drain, it being somewhat cloudy and containing some epithelium presenting characteristics of fatty degeneration. A little urine was also voided from the bladder. The amount of urine coming from the wound and from the bladder varied, and when a small amount was passed by the

tubes the amount in twenty-four hours practically was equalled by the amount passed from the bladder. After the operation the patient's condition varied; at times his mind was clear, the appetite good and the tongue moist, while at others he was mentally confused, vomited, and was persuaded with difficulty to take nourishment. He finally sank and died nine days afterwards. Unfortunately no autopsy could be obtained.

Although more proof is not necessary to show that a reno-renal reflex can result in the cessation of function of the kidney on the opposite side, I, nevertheless, would briefly allude to one case recorded by Israel, that of a young woman, who, after removal of a right-sided hydronephritic kidney, presented reflex anuria due to irritation of the drainage tube on the opposite side which was too long. That this was so is proven from the fact that immediately after the dainage tube was shortened, the amount of urine immediately increased to 3000 cm. and after this polyuria had lasted for several days, the urinary secretion returned to the normal.

In anuria due to cholera, one finds, according to Rosenstein, a marked venous hyperemia of the kidney, the organ being occasionally enlarged. Miscroscopically, casting off and degeneration of the epithelium is noted, although there appears to be an anatomical integrity of the secretory apparatus. The glomeruli of Malpighi, tubules and capsules, as well as the interstitial tissue, appear to be intact. Since the amount of urine voided depends, according to Ludwig and Heidenhain, upon the blood pressure, and the rapidity of the flow in the glomeruli, the anuria occurring in the asphyxic stage of cholera is to be explained from this fact, because, in this stage of the disease, the pulse can hardly be felt, and consequently the circulation practically entirely ceases.

In the beginning of the diffuse nephritides there is usually oliguria, so that the amount of urine in most cases will hardly exceed one hundred ccm. In severe cases anuria may develop and last for one or several days. At the commencement of convalescence, the twenty-four hour amount of urine appears increased and polyuria is not infrequently present. The anuria and oliguria appear to find an explanation through the almost complete blocking up of the urinary canals with casts. Whitelaw describes a case of anuria in a boy eight years old which lasted

twenty-five days, commencing two months after the development of a scarlatina. Exceptional cases, however, occur where the connection between a diffuse nephritis and anuria is not at all clear, in which the suppression of urine suddenly occurs without any previous symptoms of any inflammatory process, and it is only operation or autopsy that reveals the correct condition of affairs. Such a case has been recorded by Israel, where a diffuse nephritis of both glands resulted in complete arrest in secretion of urine. As the anuria arose suddenly without any premonitory symptoms and without any qualitative or quantitative change in the urine, it was impossible to make a diagnosis beforehand.

It is well known that in cases of diffuse nephritis, especially when following scarlet fever, oliguria occurs, but absolute anuria is uncommon. However, anuria is far more infrequent in ascending pyelonephritis than in hematogenous nephritis, for the simple reason that in the former the renal changes are not diffusely spread and exist rather more in the form of foci. Israel, however, has met with complete anuria in a case of left-sided sub-acute ascending pyelonephritis in a patient whose right kidney had been removed eight months previously on account of tuberculosis of the organ. The arrest of secretion is probably to be considered as a result of the acute inflammatory process with increased intrarenal pressure, and from this results a sudden increase in tension, which explains the initial attacks of pain which may readily lead the clinician to make a diagnosis of occlusion from calculus. By slitting open the kidney, the excessive pressure on the parenchyma can be relieved, because the blood, tissue fluids and inflammatory products can be eliminated and circulation is restored throughout the organ.

I now come to consider the most frequent cause of anuria, namely, renal calculus. Complete suppression of urine can more readily be understood in those cases where occlusion of both ureters occurs at the same time, or where only one functionating kidney is present. I have already mentioned how a failure in the functions of the second kidney,—although perfectly capable of functionating,—may arise when the ureter on the other side is obstructed, this being the result of a vaso-constrictor reflex type. Nephrolithiasis is more apt to make itself known after the thirtieth year of life, and generally only gravel and small calculi are voided.

However, as these patients advance in years, the calculi from the kidney become larger in size so that they cannot be expelled by the ureter. Now, if a patient presenting anuria has suffered for a number of years with renal symptoms, and if the passage of the stones has been painful, one should be on the lookout for hydronephrosis. During anuria calculosa, a hydronephrosis would hardly be formed, because the occlusion takes place suddenly, but only for a very short time will the kidney secrete a small amount of urine.

Cohnheim was, I believe, the first to experimentally develop hydronephrosis, and he came to the conclusion that in complete obstruction of the ureter, hydronephrosis can only occur to a mild degree, because the enormous tension set up rapidly produces a failure in the secretory power of the organ, so that very large hydronephrosis arises only in incomplete obstruction of the ureter. Clinically speaking, three possibilities may exist as far as the development of calculous anuria is concerned; either both kidneys with perfect functional integrity are arrested in their secretion from a calculus becoming lodged in the ureter, the same thing occurring in the other very shortly afterwards, or what is more uncommon, at the same time. Secondly, we may have one kidney which is physiologically worthless on account of previous lesions and the only one that is carrying out the work becomes clogged by occlusion of its ureter; and lastly, we have those cases where the patient has only one kidney, the other having been removed for some lesion, or is congenitally absent.

Considering the case of two kidneys in perfect functional order, whose ureters have both become obstructed by a calculus, I am only aware of one recorded case due to Haehner. That occlusion of both ureters must have occurred at about the same time, or within a very short interval, was shown from the fact that the mucosa at the points where the calculi were wedged in, presented ecchymosis and the commencement of an ulcerative process, while the parenchyma of both kidneys gave evidences of the same condition. It is quite true that there are a number of instances of calculous obstruction in both ureters, but in all of them one kidney was always functionally worthless on account of some former lesion. In these cases reflex anuria of course does not exist, but they were frequently classified under this heading, on

account of superficial observation of the case. Bischoff has published a case of anuria which lasted twenty-three days, where both ureters were occluded by calculi, but the right kidney had not been functionally active for a number of years. Several instances of calculous anuria have been recorded by Israel, but they differ in no way from the others.

One is always dealing with the mechanical form of anuria, one where one kidney has been diseased for some time and occlusion of the functionating organ naturally leads to suppression of urine. Thus in Arlowski's case, which resulted in death after anuria of eighteen days' duration, both glands had become physiologically worthless on account of the calculi; while in Ultzmann's case, in which anuria of fourteen days' duration terminated fatally, the right kidney was found obliterated, while the left was double the normal size and a stone was found lodged in the ureter. The literature of all countries is replete with such cases. The following case is especially interesting for the reason that the function of the left kidney was suddenly overcome by occlusion of its ureter with a calculus, while the right kidney had apparently lost its functional powers some time past; these were regained, however, just at the time when an operation was about to be undertaken for the relief of the condition. The patient had frequently had attacks of pain on the right, followed by the passage of calculi, so that it could be reasonably supposed that the right kidney was already diseased. Then renal colic occurred on the left side. Anuria appeared, which lasted for nine days, so that it was decided to operate, but, while being prepared for the operation, the patient suddenly began to pass urine and two days later a calculus, the size of a pea, was voided.

The third possibility for the occurrence of calculous anuria, aside from reflex anuria, is where only one kidney exists. It is true that, so far as I am aware, only two instances of anuria arising after the removal of one kidney have been encountered. One instance occurred in the practice of Dr. Lewis S. Pilcher, to whose courtesy I am greatly indebted for the privilege of reporting this case which has not as yet been published; the second was reported by Kammerer, at the March, 1906, meeting of the N. Y. Surgical Society. A male, thirty-two years of age, was admitted to the Methodist Episcopal Hospital in Brooklyn, N. Y., on

October 8, 1905, with a history that in December, 1902, after an uncertain period of previous symptoms, he had been subjected to a nephrolithotomy of the left kidney by Dr. A. T. Bristow at the King's County Hospital. A fistula persisted after this operation, in consequence of which he was again admitted to the same hospital in July, 1904, in the service of Dr. William Maddren, by whom a complete extirpation of the left kidney was done. From this operation he made a good recovery with complete healing of the operative wound. He remained well thereafter until September 1, 1905, when he began to complain of pain in the region of the remaining right kidney. This had persisted with remissions and exacerbations for five weeks, during which time he was under medical treatment, but without relief.

On the evening of October 8, the pain suddenly became very severe, and was attended with vomiting and a rise in temperature. On account of this attack he was brought to the Methodist Episcopal Hospital for treatment, with the statement that no urine had been passed since the attack began. Examination revealed rigidity of the abdominal muscles in the right hypochondriac region; tenderness on pressure in the right lumbar region, where an enlarged right kidney was palpable. Temperature 101°.6; pulse 120; respiration 40. Blood examination:—white blood corpuscles 19,400, polynuclear leucocytes 87%. Nine hours after admission he was catheterized and less than half a teaspoonful of urine was obtained from the bladder. Twelve hours after admission the right kidney was exposed by a lumbar incision. It was found swollen, congested and edematous.

The renal pelvis was much distended, and when incised, several ounces of urine gushed from the opening under great tension. Some pus was mingled with the urine. Through the opening in the renal pelvis twenty-three calculi, varying in size from that of a split pea to a hickory nut, were then removed and the interior of the cavities in the kidney was thoroughly irrigated. A sound was passed down into the ureter, which was found patent.

The outlet from the pelvis of the kidney had evidently been blocked by one of the calculi which had been removed. A rubber drain tube was inserted down into the renal pelvis and the incision in the latter was closed by chromic gut down to the tube. The greater portion of the operative incision was closed by sutures,

a moderate tampon of iodoform gauze being placed around the tube from skin to kidney. For the first twenty-four hours after the operation, the discharges from the wound were very slightly urinous in odor and no urine passed down into the bladder, as ascertained by the passage of the catheter. Nitroglycerin and an abundant ingestion of fluids were then prescribed. During the second twenty-four hours, 105 ounces of urine were voided from the bladder. From this time the function of the kidney and bladder continued normal. The drainage tube gave issue to a slight amount of urine during the first ten days. On the fourteenth day the drainage tube was discontinued, after which the sinus rapidly closed. The patient made an uneventful convalescence and was discharged cured at the end of five weeks from his admission.

Dr. Frederick Kammerer's case was that of a woman, forty-one years old, who first came under his care in July, 1895. Her history dated back for two years, and consisted essentially of frequent attacks of renal colic on both sides. On the right side she had a large tumor corresponding with the site of the right kidney. The urine was filled with pus, and the woman was in a septic condition.

On July 10, 1895, Dr. Kammerer exposed and incised the right kidney, and evacuated a large amount of pus. In the pelvis of the organ a large calculus was found which could only be removed by breaking it up. The patient's condition was such that a nephrectomy was deemed inadvisable at that time. The kidney was therefore drained, and about two months later, after an unsuccessful attempt to induce the fistula to close, the kidney was removed; the wound thereupon healed kindly. The urine still contained a small amount of pus, but there was no further pain on that side.

On February 21, 1897, the patient was suddenly seized with a pain in the left side. For several days her temperature ranged about 103, with very scanty urine, and severe pain over the left kidney. On February 21, she passed about 200 c.c. of urine. On the following day a still smaller quantity was voided, and on February 23, at 5 A. M., complete anuria set in. After fifteen hours had elapsed, Dr. Kammerer cut down on the kidney. He found the pelvis of the organ, as well as the ureter, much distended. He

incised the latter about one inch from its junction to the pelvis, and evacuated a quantity of purulent urine; then, on inserting the finger, he found three small stones in the pelvis of the kidney, which he removed. With a probe he also made out a calculus in the ureter, about four inches from the junction of the ureter with the pelvis, and after freeing the former from the surrounding tissues, he was able to push the stone up into the incision and extract it. Drainage of the kidney was resorted to through an incision into the substance of the organ, and for several weeks the course of the case gave rise to some anxiety. On the fifth day the packing was removed, and five catgut stitches were inserted to close the incision into the ureter. There was still slight leakage at that point, but in the course of a month, both the incision into the ureter and into the kidney tissue had closed, and the further recovery of the patient was uneventful.

Eight years have elapsed since the second operation, and the patient still remains in excellent health. With the exception of a few pus corpuscles, the urine is quite free, and her pain has entirely disappeared.

A case of anuria has been reported by Meyer which occurred thirty-eight days after nephrectomy and was due to obstruction of the ureter by clots and pus. Nephrotomy was performed successfully. During life it is possible to make a diagnosis of the presence of only one kidney, but sometimes it is only at autopsy that this is discovered. In this respect I would mention Schwengers' case. The patient had always been well up to the time of an anuria which lasted nine days. This was ushered in with severe pain on the right side and death resulted. Autopsy revealed the absence of the left kidney, not even a rudimentary organ being found. Occlusion by a calculus lodged in the ureter was the cause of the anuria.

The diagnosis of calculous anuria can ordinarily be made from the history of the case, because these patients generally have been previously troubled by urinary symptoms, such as the passage of gravel or a calculus. Colicky pains and blood in the urine precede in many cases the passage of a stone, but, on the other hand, every symptom may be lacking, the anuria suddenly occurring without any warning. Now, since anuria is not an infrequent symptom of nephrolithiasis, this condition should be first con-

sidered, but some difficulty may be encountered in those cases where the patient gives no distinct history of past trouble. However, the first thing that comes to one's mind is whether or not a calculous obstruction exists in both ureters, or only in one, and, in the latter, upon which side, Then, if it is ascertained that both ureters are obstructed, it is most important to determine which kidney was the last affected, because when the functionating kidney becomes the object of operation, the outlook is good if the obstruction can be removed, as the other kidney may have been physiologically worthless for some time. In order to come to a correct conclusion, the history given by the patient himself will greatly help, because he will probably be able to give information as to the side he first felt the pain in. When the answers relative to pain are definite, one should always bear in mind the possibility that the last pains felt may have been in the diseased kidney, due to a reno-renal reflex and this has been shown in a case reported by Israel. The objective findings are hardly worth considering, for even if by purely objective diagnosis the other kidney is found diseased, it still remains questionable whether it is the cause of the anuria and perhaps functionally worthless for a considerable length of time, and whether or not if the remaining functionating kidney were attacked an operation would relieve the anuria. The pain resulting from pressure on the obstructed side is not of much value, but Israel considers as a valuable symptom a marked rigidity of the abdominal walls on palpation, which occurs on the side where the kidney was the last occluded. As to the value of catheterization of the ureters opinions vary. As this can only be done with a very fine and rather soft bougie, there is a question whether or not the instrument would allow one to recognize the presence of a calculus when it came in contact with it, because the instrument may become caught in a fold of the mucous membrane of the ureter which is swollen and inflamed, or it may be grasped by a spasm of the ureter. However, if a stone should be diagnosticated, the kidney may have been destroyed for some time and the obstruction may have been present for many years, while the remaining kidney has only become physiologically involved recently. Now, supposing a stone should be detected in the ureter of the latter, it is questionable whether the obstructing calculus is not located in the ostium of the renal pelvis. The

passage would consequently then be free and the only infallible sign is when no urine is seen by the cystoscope making its exit from the ureteral orifice. Of equally little value is radioscopy, because the stone is not always made evident. Consequently one may say that the kidney to be operated on is the one which was the seat of the last pain, or when this cannot be ascertained with certainty, then one should operate on the gland, which, on palpation, gives rise to the greatest pain, or on the side where the greatest reflex rigidity of the abdominal walls is found.

As to the time when the operation should be undertaken, it at once becomes evident in looking over the reported cases that the result of the operation depends entirely upon this factor. Israel advises not waiting longer than forty-eight hours if the obstruction is not removed after this time, and statistics plead in favor of a timely interference. Legueu showed in 1891 that the number of cures of calculous anuria where operation was undertaken amount to 66.6%, while of those left alone only 28.5% recovered. Other French authorities opine for early interference.

When Tuffier introduced nephrotomy in 1890, surgeons began to attack all renal calculi and those situated in the upper part of the ureter by splitting open the kidney, and personally, I feel prepared to say that when the obstacle in the ureter cannot be removed, the kidney should always be opened in order to give exit to the urine.

Relative to those cases of anuria whose cause is due to ureteral obstruction from blood clot or compression from without, it may be said that they are rare, and it is probable under these circumstances that the other kidney is functionally destroyed. Some years ago I treated the question of anuria resulting from extension of carcinoma of the uterus, in a paper published in the *Boston Medical and Surgical Journal,* so I will not refer to it again here. Anuria is certainly very rare as the result of compression of the ureter, but Farlow reported a case in the above mentioned journal in 1889, where death occurred in twelve days. The patient was a woman thirty-five years of age, and autopsy revealed a firm, fibrous mass inclosing the walls of the ureter. The ureters and renal pelves were considerably dilated. Patel remarks, in considering anuria resulting from compression of the ureters by ab-

dominal tumors, that both ureters are rarely obstructed at the same time. Now, if anuria occurs, it must be that both kidneys are diseased or that the kidney whose ureter is free has been deprived of its physiological functions by reflex action. He regards the explanation given in those cases which have been reported, as unsatisfactory and believes that only the first theory is correct, basing his assertion on a thoroughly observed case occurring in Poncet's clinic.

In closing this paper, I cannot refrain from recording one case of anuria of puerperal origin, and where I feel quite certain that had I done a nephrotomy, the patient might possibly have been saved. As it was, bilateral decapsulation was done, and, although some improvement manifested itself, the patient died four days after the operation. The history of the case is briefly as follows: A young woman, twenty-six years of age, was delivered on a Saturday evening, the labor requiring only the application of the low forceps. Everything was perfectly normal until at noon on the Thursday following, the patient was taken with a rigor and the temperature immediately rose to about 39.5° C., the pulse following it proportionately. The attending physician rightly suspecting that some uterine infection was showing itself, immediately resorted to intra-uterine irrigations. On the same evening the patient, who had voided no urine during the day, was catheterized and the bladder found empty.

After the irrigation the temperature did not go up and the pulse returned to nearly normal, but from this time on complete anuria existed. I saw the patient in consultation on Sunday morning, *i. e.*, after the anuria had been present for about sixty hours, and made the following notes. Mind perfectly clear, pupils normal, tongue moist but furred. Pulse 80, temperature normal. Bimanual examination revealed nothing abnormal in the genital apparatus. There was no edema other than a slight puffiness under the eyes.

The patient was immediately removed to a private hospital, where a radical treatment to combat the suppression of urine was immediately undertaken, consisting of hot packs, pilocarpin subcutaneously, and acetate of potash internally, with a milk diet. This treatment was carried out for forty-eight hours without attaining any result, and not a drop of urine could at any time be

obtained from the bladder. On the next day the edema of the face became more marked and also appeared at the ankles, while the pulse increased in rapidity and was of a wiry nature. On Tuesday morning, that is to say five days and a half since the commencement of the anuria, the condition was the same, but the edema had become more marked, so that operation was immediately decided upon. Narcosis with ethyl chloride and ether. Bilateral decapsulation was done at one sitting, my assistant, Dr. Rolfe, doing one kidney, while I did the other. The glands were exposed by transverse incision, and were found greatly enlarged, tense and extremely hyperemic. Decortication was rapidly accomplished, as the kidney popped from its capsule like a pea from a pod. Capsules were resected, the kidneys dropped back and the wounds sutured. Duration of the operation, thirteen minutes.

During the next twenty-four hours the patient voided 270 cc. of very albuminous urine containing casts; in the next twenty-four hours 300 cc. were voided, but during the next twenty-four suppression again became complete, the edema markedly increased, the mouth became dry and the patient was delirious. She died sixteen hours later.

The autopsy revealed absolutely nothing abnormal in the abdominal viscera, and miscroscopical examination of the kidneys showed that we were dealing with an acute parenchymatous nephritis, as had been diagnosed clinically.

871 Beacon Street.

BOOK REVIEWS

Differential Diagnosis and Treatment of Disease. By AUGUSTUS CAILLE, M. D. New York, 1906. (D. Appleton & Company.)

This excellent work is in reality a compendium of the practice of medicine, surgery and the various specialties, but so arranged as to make it particularly of use to the general practitioner, leaving aside theoretical details, and only covering knowledge necessary for the proper treatment of patients in daily practice.

Particular prominence is given to hygienic, prophylactic, dietetic, hydrotherapeutic, and physical methods of treatment, although the materia medica has not been slighted.

The book is well illustrated and printed.

The Urethrotomies and Kidney Capsulotomy. By REGINALD HARRISON, F. R. C. S. London, 1906. (John Bale, Sons and Danielsson.)

This neat little volume of some ninety-six pages represents Mr. Harrison's recent clinical lectures at the London Medical Graduates' College and Polyclinic.

Like all of Mr. Harrison's writings the present book is concise, clear, and to the point. It is hardly necessary to say that the teachings are sound and give one an up-to-date idea of the various topics treated in its pages.

Berliner Arzneiverordnungen. By DR. PAUL RECKZEH. Berlin, 1906. (S. Karger.)

It is quite a pity that in America we do not publish some similar book to the one under consideration, for there is much contained in a small bulk, most suitable for the office table.

To all those desirious of having a ready reference book for prescription writing we can recommend this one, as it is thorough and correct.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. AUGUST, 1906. NO. 11

THE AMERICAN UROLOGICAL ASSOCIATION.[1]

By FERD. C. VALENTINE, M. D., New York City.

IT is a pleasant custom that demands from the retiring president of an association, a valedictory address. The usual practice of offering the details of some advance in science representing the president's investigations and work, makes the custom one of profit to the members.

When, however, as in the present case, the incumbent is keenly aware that those who conferred the distinction of presiding officer upon him are his masters, and he their pupil, he stands abashed by the consciousness that his own humble efforts for the benefit of science are too trifling for mention.

In this predicament, your president contemplated constituting this address a recital of the work of the individual members of the American Urological Association. To that end a request was sent each member for a memorandum of his literary contributions to the advance of urology, and a specific description of any new technique of examination or operation he might have devised.

Unfortunately for the success of this plan, the members of the association are so busy in practice, as to be somewhat dilatory in literary work. Besides, as those who have written much know, the difficulty of getting together, for any purpose, articles published at various times in numerous different organs, is almost certain to cause a busy man to fall short of its accomplishment. These facts were brought home to your president by the result of his request. Only fourteen of the members found time to respond at all. Consequently the original intention, of making

[1] Presidential address at the Fifth Annual Meeting of the American Urological Association, Boston, June 5 and 6, 1906.

this address a record of the work of the individual members, would, if carried out, have entailed omitting many most valuable contributions to urology.

Not wishing to present the subject otherwise than with the completeness which it merited, your president deemed it best to devote this address to the work accomplished during the administration closing to-day, by the association as a whole.

Membership—The present roster contains 265 names of active members. About 35 applications for membership will be offered at this meeting. The present members are distributed as follows:

The First Section—Comprising Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut has 35 members. This section is here mentioned as existing because it was organized in Boston on March 9 and will, it may safely be said, be accepted by the association at this annual meeting.

The Second Section—Embracing New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia and the District of Columbia, has 115 members. This section was not formally organized as such until April 3, 1906. It too will, no doubt, be made a branch of the association during this meeting.

In the exercise of his general powers, however, your president called meetings of the association in New York every two months, during the administration now ending. The hearty coöperation of the members, the large attendances, the profound scientific value of the papers presented and of the discussions thereon, make their success a subject of justifiable pride. So highly was the work done appreciated in New York, that the Second Section at the meeting of April 3 adopted the minutes, the papers and the discussions of these meetings as its own, *ipse facto* approving the calls for the meetings.

The Third Section—Which embraces the States of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas and Tennessee, has 10 members.

The Fourth Section—Covering Kentucky, Ohio, Indiana, Illinois, Missouri, Michigan, Minnesota, Wisconsin and Iowa, has now 68 members. It was organized in Chicago on April 16, 1904. Meetings were held every two months and much very valuable scientific work was done.

The Fifth Section—Which consists of North and South Dakota, Nebraska, Kansas, Texas, New Mexico, Colorado, Wyoming, Montana, Idaho, Utah, Nevada, Arizona, California, Oregon and Washington, was organized in July, 1905. It now has 33 members. Meetings were held in January and April, 1906, and at each important papers were read and discussed.

Deaths of Active Members—Since organization, death has robbed us of William R. Blue of Louisville; Geo. Chismore of San Francisco; A. Palmer Dudley of New York; Isaac N. Love of New York; William Hutson Prioleau of Ashville; William R. Pryor of New York; and William E. Swan of Saratoga. Each one of these had made his mark, at least, upon the advance of urology in our country; each one was an enthusiast for science, and each one died in the full vigor of intellectual manhood. Not only has the association to deplore these losses, but the entire profession, as well as humanity at large, must mourn with us.

Deaths among Honorary Members—E. Galozzi of Naples was elected to honorary membership on January 7, 1903. The notification thereof was received at the home of this famous surgeon several days after his death.

On February 21, 1906, the scientific world was appalled by the news that on that date Max Nitze had died of apoplexy. The details appear in THE AMERICAN JOURNAL OF UROLOGY for April, 1906.

Present Status of the Association—We are, at this, our Fifth Annual Meeting, the youngest Urological Association in the world. We have no occasion to be ashamed of the scientific work accomplished, and we are justly proud of the individual contributions of our members to urology.

We are, however, hopefully far from perfection. We pray that none of those now living will ever be satisfied with the standard attained, however high it may become.

That leads your presiding officer to submit some suggestions for improvements that seem necessary for further success.

Constitution and By-Laws—With the growth of the association, the present document has outlived its usefulness. The committee appointed by my honored predecessor to revise the constitution and by-laws, is to report at this meeting. You are requested to give careful attention to the report, with the assurance

that all aid you lend the committee will certainly be for the benefit of the association.

New Members—The advance of urology is predicated as much upon the studies and experiences of the general practitioner, as it is upon those of the urological specialist. The presentation of such studies and experiences is of reciprocal benefit. No specialty whatever in the entire field of medicine and surgery can exist or advance without studies of the urine.

The requirements of science and of the association, therefore, demand an increase of membership. In endeavoring to obtain it, however, we cannot be too careful in the selections made. We do not need members for their annual contributions. We want men who can instruct us, and who desire instruction. Beyond all, we want men who will aid us in sustaining the dignity of the profession.

It seems it would be the part of wisdom to require proof, with each new application for membership, that the applicant is either a member in good standing in the American Medical Association, or a member in the same standing in his local County Society. A man who cannot meet this latter requirement at least, should be discouraged from aspiring to membership. This requirement, of course, is suggested as an addition to the others prescribed by the constitution.

Meetings—Ours is essentially a working association. Membership or election to office therein should never be sought merely for its utility as a title to append to published articles or books. Every member should contribute to the advance of urology by the preparation of papers or at least by discussion of those presented.

Each Section (or Branch) should hold regular bimonthly meetings. The dates of these can be fixed so as to prevent conflict with the meetings of the other Sections. Any Section would then be enabled to secure the presence at a meeting, of any member of another Section, upon whose special work it may desire to be intimately informed.

Discussions—It is advisable that each Section retain the services of a competent stenographer, in order that the discussions may be accurately reported. When this is impossible, each member who has extemporaneously discussed a paper should be

requested to at once write out his remarks for publication and forward them to the secretary of the Section.

Publication—Within three days after each meeting of a Section, the secretary thereof should be enabled to send a complete record of the transactions of that meeting to the editor of THE AMERICAN JOURNAL OF UROLOGY. It is only thus that all the members can be fully informed of the advances of urology made within the association. Moreover, our association's purpose being largely educational, non-members who read the JOURNAL will thus early derive the benefit of our work.

The practicability of the preceding suggestion, is demonstrated by recent issues of the JOURNAL. They contain scientific records of work that is stamped by originality and ability, and of which we cannot be otherwise than proud.

Arrangement of Programmes—An innovation in this respect, was tested at the called meetings.

The paper of the evening was divided as nearly as possible into the etiology, symptomatology, pathology, diagnosis and medical and surgical treatment. When the subject permitted, further divisions were made. The discussion on each division was assigned to the best man available for the special subject. Ten minutes' time was allotted each set discussion. After the set discussions, the subject was thrown open to general discussion, in which each participant was limited to five minutes.

The plan being purely experimental, received considerable comment, both favorable and otherwise.

Those who regarded the arrangement unfavorably, took the stand that it deprived the author of the evening's paper of the integral parts of his discourse.

The majority, however, coincided with the views of the promulgator of the plan. The intent was to give each of the gentlemen to whom a part of the evening's subject was assigned, the opportunity to concentrate in his ten minutes' discussion all he desired to say, and to exhaust the subject, from his viewpoint. When this coincided with that of the principal author, the reiteration but emphasized the benefits derived from the paper in chief; when differing, the confining of the views expressed to one particular part of the subject served to broaden its scope, by inspiring new thought.

The plan of circumscribing the field of each one who took part in the set discussions, was productive of good results in another important manner. It caused each participant to write his part in the programme of the evening for publication, and chiefly in consequence hereof, none transgressed beyond the ten minute limit, none wasted time on the usual complimentary phrases, and the majority were in a position to hand their discussions to the secretary on the same evening.

The general discussion was taken by the official stenographer and sent typewritten to each participant on the morning following the meeting. The authors were requested to immediately correct the copy and return it to the stenographer. True, delays sometimes occurred—in one instance causing a postponement in printing the report until two months later. Justice to those who are prompt should cause the manuscript of the procrastinators to be excluded from the records. The unpleasant duty thereof, would, of course, fall upon the chairman of the Section. He, however, when accepting the honor of caring for the interests of the association, must not look for a bed exclusively of roses.

Amalgamation with the American Medical Association—This subject, so I am informed, is likely to be brought forward again at this annual meeting. Two diametrically opposed views seem to prevail upon the question.

One set of men are in favor of our becoming the genito-urinary section of the association. If I am clear on the arguments that fortify their position, they are based upon the need of a thoroughly united profession, to the end that the American Medical Association may become a still stronger power in the land for public good.

The opponents of the proposition concede that our autonomy would not materially suffer, as it would make no real difference whether we held our annual meetings as a Section, or as an independent organization. They hold, however, that it would entail a radical change in our basic plan by the inevitable inclusion of diseases of the generative organs in our present work. Article I, Section 2, of the Constitution limits our objects to the "study of the medical and surgical diseases of the urinary organs of both sexes." This distinctly excludes genital diseases, venereal diseases, and syphilis.

As mentioned before in this address, the limitation to diseases of the urinary organs appeals to general practitioners as well as to those devoted to any other specialty. If we were to add the genital and venereal diseases, these soon would overshadow the urinary diseases, as they inevitably do. Our efforts then, would suffer the limitation of being cut off from further work in conjunction with other specialists and general practitioners.

Another objection advanced against amalgamation is in the incidental obligatory membership in the American Medical Association. While it is perfectly true that nearly all our members are adherents of that great association, there still are some who will not under any circumstances join it. Among these are men we would be loath to lose, both for professional and personal reasons.

Finally, the fact that we are a strong body now, have an excellent independent JOURNAL, and occupy a recognized corporate existence in the profession is an argument that is daily gathering weight.

It is hoped that the preceding is a fair, impartial presentation of both aspects of the question.

My own views at first were colored by the belief that we would inevitably become a section of the American Medical Association.

Closer consideration of the subject, however, and conference with several of your executive committee, have forced the conviction that as an independent body we can better carry out our purposes. Even if no change in our plans and methods were involved in the proposed amalgamation, it would necessarily compel participation in the immense business matters of the great body. This would take from us time and energy that could be devoted, more effectively, to urology.

Deference to the American Medical Association is shown by holding our annual meetings on the day before and on the first day of that great organization's meeting. The latter's scientific work begins only on the second day of its annual meeting, when we have already adjourned and are free to profit by the work of the men who represent the professon at large. It is my belief that we can best progress by continuing independently, as we successfully have in the past.

And now, gentlemen, permit me to consume a few minutes of your time with a purely personal matter.

A year ago you chose to confer the highest honor in your gift upon me, who in no manner merited the distinction. You made me the successor of Ramôn Guiteras and William N. Wishard, both eminent men in our specialty, both endowed with the intelligence and education fitting them for preëminent posts.

The only explanation for your action seemed to me to be a desire to reward my preliminary efforts as a founder of this association and my two years' work as its secretary.

Since my election as presiding officer, you have upheld and encouraged, coöperated with and aided me, so that the work done by my eminent predecessors has been advanced. It would be false modesty to deny this fact. The records show it. This was your work, gentlemen, not mine.

The pinnacle of honor upon which you have placed me is felt to be the greatest glory an earnest, albeit obscure worker can attain. I shall cherish gratitude through the rest of life for your having elected me, for your having so nobly sustained this administration.

I return to your keeping the American Urological Association entrusted to me a year ago. It would be an evasion of the truth to say that it is not a better or a larger body than it then was. Yours is the credit therefor.

At this meeting you will elect my successor. Doubtless he will be chosen for his merits, as were my predecessors. Let me ask that you give him that cordial support with which you favored me. Then will our association continue to progress, with those tremendous strides it is bound to make.

When the time comes for comparison between his work and my efforts, say for me that I did my best.

Remember that the language at my command is inadequate to express my gratitude to each and every member of the American Urological Association.

Gentlemen, I declare the Fifth Annual Meeting of the American Urological Association open for the transaction of such business as may legitimately come before it.

171 West Seventy-first Street.

PRESIDENT'S INAUGURAL ADDRESS TO THE NEW ENGLAND UROLOGICAL SOCIETY.[1]

OLIVER C. SMITH, M. D., Hartford, Conn.

Members of the New England Urological Association:

At this, the first scientific meeting of this association, it might be well for us to consider briefly the origin and growth of the parent society, The American Urological Association; to review the field of work which this society is to encompass, and to consider the ways and means by which we can accomplish the greatest benefits to the general profession, to the public, and to ourselves.

Most of you are familiar with the short sketch of the origin and growth of The American Urological Association, by its founder and first president, Dr. Ramón Guiteras of New York. This appeared in the June number of THE AMERICAN JOURNAL OF UROLOGY, 1905. In this sketch he tells us that the New York Genito-urinary Society was founded five years before, and consisted chiefly of the members of Dr. Guiteras' clinic. Shortly after its formation, those who had formerly served as assistants in the clinic were invited to join, as well as the fresh recruits. This society held meetings in one another's houses until January, 1902, when, stimulated by the success of the French Urological Association, it was decided to increase the scope of its work, and to adopt the name of The American Urological Association. The first officers were: Dr. Ramón Guiteras, president; Dr. William K. Otis, vice-president; Dr. Ferd. C. Valentine, secretary; and Dr. John Vander Poehl, treasurer. It was the privilege of your chairman to attend the first annual meeting, which was held in Saratoga, June, 1902, at which time he became a member. Although the attendance was not large, from the character of the papers and discussions it was apparent that the members were earnest, and that there was a clear and wide field of usefulness for The American Urological Association.

The second annual meeting was held at New Orleans, with

[1] Meeting May 3, 1906.

an attendance of fifty members, and the third annual meeting at Atlantic City, when it was found that the membership had reached two hundred. At this time, the Chicago Urological Society was incorporated as a branch in the The American Urological Association.

The fourth annual meeting was held at Portland, July, 1905. It must be admitted that this meeting did not quite meet the expectations of the members, although several valuable papers were read. The lack of attendance, however, cannot be attributed to any failure of interest in the subject of urology, or lack of subjects, but rather to the fact that the vast majority of visitors to the Portland meeting were bent upon taking in all the sights and scenes which a country entirely new to most of us afforded.

At the coming meeting in Boston next June, this condition will not exist, as a large number of the members will be familiar with Boston and its surroundings, and will be disposed to devote more of their time to scientific work.

The association is now composed of four branches or departments: that of New York, the Pacific Coast, Chicago and New England.

The early work of the New York Genito-urinary Society was confined to diseases of the genito-urinary tract in the male, but with the broadening out of this society into The American Urological Association, its scope of work was likewise widened, and in the words of Dr. Guiteras: "The Urological Association cut out most of the genital part of genito-urinary diseases. Veneral diseases, with the exception of urethral infections and lesions, were debarred, and genital diseases, excepting such as have an influence over the urinary organs, were not considered. On the other hand, diseases of the urinary tract in women were considered equally as important as those of men." By this expansion of the field of its work, many others than those strictly specializing in genito-urinary diseases were induced to join, such as gynecologists, pathologists, general practitioners and general surgeons. Dr. Guiteras, in the paper above referred to, is careful to state, "That The American Urological Association is not a rival of the American Genito-urinary Association, and that papers on all genital diseases, other than those of the prostate, and on all veneral diseases, excepting those of the urethra, were not accepted."

We are all familiar with the organ of this association—THE AMERICAN JOURNAL OF UROLOGY—which had for its first editor, Dr. Henry G. Spooner of New York, and which is now in the competent hands of Dr. Charles Greene Cumston of Boston.

Dr. Guiteras urges members to favor the JOURNAL with their papers which are read at the association's meetings. This seems to me eminently proper, and now with the expansion of the association into its four divisions, with increased numbers of meetings, the number of papers which shall be available by the JOURNAL will be largely augumented.

It might be well for each branch to have a committee on publication, to which all papers read at the branch meetings should be referred, and such published in the JOURNAL as the committee and the editor select. No one interested in this line of work can afford to be without THE AMERICAN JOURNAL OF UROLOGY.

The objects of this society, as of every scientific society, are the dissemination of knowledge by communications, discussions and publications; the increase of knowledge of each by association with one another, by the exchange of ideas, and by the work and research which we must accomplish to be of value to the society, and to do our duty to ourselves and each other. It will at once be seen that the range of subjects included within the legitimate province of this association is very wide, embracing as it does the various diseases of the kidney, ureter, bladder and urethra, and in all of these organs and tissues we have acute and chronic infections, neoplasms, congenital abnormalities, traumatic lesions and calculous deposits.

When we appreciate that much of the pathology of the urinary tract has been rewritten during the past two decades, that many procedures, both diagnostic and operative, are even now in their primitive states, and that many important and life-saving operations upon these organs, although some of them were accomplished many years ago (for instance—lumbar nephrectomy by Gustave Simon of Heidleberg in 1869, nephrolithotomy first performed by Henry Morris in 1880, nephropexy by Hahn of Berlin in 1881, suprapubic prostatectomy accomplished by Belfield and McGill in 1885), have become accepted as orthodox surgical procedures only at a comparatively recent date. The causes for the relatively slow development of this branch of sur-

gery may be found in the fact that until within the recent past, our methods of diagnosis, except to extremely few, have been vague and uncertain, and that too often the operator failed to find what he had anticipated, and although the greater part of this work has developed since the days of asepsis, the earlier work carried a high mortality, and was attempted by comparatively few, either in this country or abroad.

We must admit that until a few years ago, the treatment of acute infections of the urethra was not considered an enviable branch of the profession. In our country, at least, it was rather relegated to men who had failed to succeed in more attractive fields.

With the accomplishment of urinary segregation by Tuchmann, and the vesical illumination by Nitze in 1876, the science and art of urology took fresh impetus, until now there has clearly dawned an era of hitherto unknown scientific activity and success in the field about which the interest of this and kindred societies centers.

We must consider how best to bring before the attention of the general profession the importance of this subject, its advancement, its opportunities and its limitations. We must remember that the general practitioner is usually the first to be consulted in this as well as in other classes of diseases. In so much as we can increase his knowledge of the importance of early diagnosis, early quarantine, and proper and prompt action where it is possible, will we benefit the urologically afflicted. It is certainly wisest then, that we include the general surgeon and the general practitioner and the gynecologist in our membership.

It is fortunate, too, that the progenitors of this society decided upon a periodical publication, rather than upon an annual volume of proceedings for our communications and discussions.

It is to be hoped that our JOURNAL will enjoy the widest of exchanges, and that abstracts of important articles may have extensive circulation.

To be of the greatest use to one another, and to our association, we must be honest with ourselves, for no one knows his capabilities and limitations better than he himself. It is our duty to put forward, in the most lucid and attractive style, that which we have learned best, even though we confine ourselves to a narrow

field, rather than to attempt to cover the entire range, and in so doing largely make use of what others have become more expert in than we. In other words, if each member gives to the other member, unstintedly, the best that is in him, the entire body approximates the strength of that which excels in each.

It is the fervent hope of your chairman that this association may shine in unselfish devotion to the interests of this important branch of the profession.

44 High Street.

THE SEQUELAE OF PROSTATECTOMY.[1]

By Richard F. O'Neil, M. D., Boston, Mass.

IN taking up the subject of the sequelae of prostatectomy, one finds that it is very difficult to treat this question fully without going much more deeply into indications, methods, etc., than the title of this paper suggests or the space permits. I have endeavored to confine myself to the untoward results occuring at the time of, or immediately after, the operation, and due to it, and to the conditions present during the first few months following. Even then I find myself confronted with the death rate on one hand and the end results on the other, both of which are sometimes identical with the sequelae.

I wish to enumerate and describe briefly the various complications, to form an estimate of their frequency, their cause, and if possible, their prevention. These complications are numerous, all of the following having been reported. They may be roughly divided into two groups, those of a general type, and those more or less local. The first, including shock, haemorrhage, sepsis, kidney insufficiency, pulmonary congestion, cardiac failure and marked nervous symptoms. All of these of course may follow any surgical procedure, but are especially to be feared and guarded against in the class of patients whose organs are very apt to be more or less damaged by age or disease.

In the second class may be put peritonitis, urinary infiltration

[1] Read at the first meeting of the N. E. Urological Society, Boston, May 3. 1906.

resulting in pocketing, abscess and sinus formation, urethro-rectal or vesico-rectal fistulae, perineal and suprapubic fistulae, epididymitis, orchitis, sexual impotence, cystitis, calculi, incontinence, frequency, residual urine and retention, stricture, and tortuous urethra resulting from cicatricial contraction, rendering instrumentation difficult. Of this truly formidable list, fortunately a number of these conditions are rare when the operation has been well advised and carried out. Still they have all occurred and the surgeon should have them in mind and guard against them.

Before taking up the question of which of these sequelae are more prone to follow one or the other method of operation, it might be as well to consider briefly those affecting both, and what can be done to prevent them.

There are few, if any, cases calling for better judgment upon the part of the operator than those of prostatic hypertrophy. He must not only select the proper case, time and method for operation, but estimate the patient's resisting power, determined by the condition of his heart and kidneys. He must be dextrous and perform a complete operation, as I believe many of the sequelae and poor end results are due to a partial or mutilating operation, or to some error or omission in technic or after care. Mistakes in diagnosis also lead to disaster, for example case of tabes and cancer.

Assuming these requirements to be fulfilled, what can be done in general to prevent unfortunate sequelae? Before the operation the patient should be gotten into as good condition as possible, especially as regards his elimination, and should be encouraged to drink freely of water. Strychnia and other cardiac tonics and diuretics are indicated to forestall shock and kidney insufficiency. At the time of operation, prevention of loss of body heat, the use of stimulants and salt solution, enema or infusion are the measures to be employed for the same purpose. Shock may be a very considerable element in these cases, as the nerve supply to the prostate is extensive. Post-operative anuria and uremia are to be met in the usual way. The patient should be kept quiet before operation, but not put to bed until just before and should be made to leave his bed just as soon after operation as he is strong enough to sit up. With regard to prevention of sepsis, in addition to the ordinary surgical methods, some urinary antiseptic, the best of which is hexamethylenetetramine in the form of cystogen or

urotropin tablets should be given and if moderate cystitis is present the bladder should be irrigated with caution at frequent intervals. If there is a bad septic bladder, a preliminary cystotomy should be performed, the prostatectomy being done at a later and safer date. Hemorrhage does not seem to be as a rule a serious feature of the operation, it generally being readily controlled by irrigation with hot saline or adrenalin solution, secondary packing being only occasionally required. It would seem that according to most authentic sources, serious bleeding is generally found in those cases where an incomplete operation has been done. Cystitis and the formation of calculi occasionally follow the operation, a striking case in point being reported by Lilienthal, where severe cystitis followed a suprapubic operation; at a second operation several stones were found, their nuclei being bits of tissue. This case was not irrigated after operation and shows the importance of this procedure in the after treatment.

According to Guiteras, prostatics are particularly liable to more or less marked neurasthenia.

In taking up some of the more strictly local complications peritonitis has followed both methods of operating, but is infrequent. In the suprapubic incision there is danger of opening the peritoneum, particularly when a previous operation has been performed. The writer has seen this happen several times with no ill result. It has been torn in the perineal operation.

Injuries to the rectum with resulting vesico-rectal or urethro-rectal fistulae occur most frequently when there has been a previous inflammatory condition, such as prostatic abscess which may have resulted in firm adhesion of the gland to the bowel. Injury to the rectum rarely occurs in the supra-pubic operation. I have found mention of but one case in a large series. Such fistulae are very troublesome and difficult to repair.

Injury to the vesical neck, urethra, and other structures in the perineum give rise to a number of conditions depending more or less upon the extent of such injury, one of the immediate results being faulty drainage which may allow infiltration of urine with subsequent abscess and sinus formation. Epididymitis and orchitis are not of infrequent occurrence and are due to infection from the posterior urethra, either from injury or instrumentation. Among the later results are the conditions due to cicatricial contraction, *e. g.*, stricture and tortuous urethra, rendering instrumen-

tation difficult. Permanent incontinence may also result from this cause. Temporary incontinence may be due to long stretching of the vesical sphincter. Sexual impotence is another one of the later sequelae and is said to be due to injury of the ejaculatory ducts. By the technic of Young these structures are protected. In a number of cases this point is of secondary importance, the object being bladder drainage and not the preservation of a doubtful sexual power. According to statistics all of these conditions occur much more frequently after the perineal operation than after the suprapubic.

Frequency and urgency of urination are common sequelae of prostatectomy; often they are temporary and due to conditions at the vesical neck, as a natural result of the operation. That a moderate frequency, say every three hours in the day, and arising one to three times at night, persists in a number of cases, is not surprising and has nothing to do with the operation, but results from permanent changes that have taken place in the bladder itself, such as hypertrophy of the bladder membrane, sacculation and trabeculation, and changes in the capacity of the viscus due to the effects of long continued back pressure and recurrent attacks of cystitis, or both. To expect a prostatectomy, however complete and well it may have been done, to relieve symptoms due to such pathological changes is asking too much. It does not seem to the writer that the choice of operation would have any particular bearing in such cases.

Frequency, urgency, scalding, and residual urine occur in a certain number of cases, due probably to some avoidable point in technique or error in judgment. Retention may be due to an atonic bladder or to some undiagnosed lesion of the cord.

As we have seen, both methods of prostatectomy are liable to certain sequelae in common, not due to the route selected but to the condition of the patient's kidneys, bladder, etc. Each method has in addition its particular train of complications. With regard to the perineal operation, the classification given by Proust seems to be the most natural. First, wounds of the rectum with their resulting fistulae; second, urinary troubles, frequency, incontinence, residual fistulae and cicatricial contraction; third, injury to the sexual apparatus, orchitis, and sexual impotence. These points have been already spoken of more in detail.

The suprapubic route is remarkably free from any of the above on account of not invading the perineum or opening the urethra below. Injury to the prostatic urethra is one of the sequelae of the operation, but even here the removal of the whole or of a large portion of it does not seem to affect the result, as this has been done a number of times. Suprapubic fistula and infection of the prevesical space must be very uncommon and should not occur with proper treatment of the suprapubic wound. Adhesion of the bladder to the abdominal wall is said to have given rise to some urinary discomfort from traction upon the organ. This is probably of unusual occurrence.

With regard to ascertaining the frequency of sequelae, the writer has gone over with great care the detailed reports of 115 cases of perineal, and 93 cases of suprapubic operation given by Proust. Of the perineal operations, 8 patients died, of the remaining 107, 55 cases had some postoperative condition, often several, orchitis occurring 14 times, fistulae 14 times, of which 5 were temporary, residual 20 times. In 10 cases there was marked frequency. In 30 other cases, only 8 of which are included in the 55 because of other conditions, a moderate amount of frequency was present, that is from two to four times at night and every three hours in the day.

The beginning of micturition was give in 66 cases, longest 70 days after operation, shortest 5 days, average 26 days.

Of the 93 suprapubic cases 11 died. Of the remaining 82, 12 had sequelae (this includes 2 cases of shock and 1 of hemorrhage), 4 suffered from frequency, 2 from slight residual, 1 abscess, 2 orchitis, one of which was in a fatal case.

Micturition began on an average 17 days after operation, longest time being 45 days after, the shortest 3 days.

That certain of these cases suffered from moderate frequency the writer has no doubt, but by comparing the two series of cases, we may say that the perineal route is much the more liable to troublesome sequelae.

379 Beacon Street.

Note—It is with regret that the Journal cannot publish Dr. Benjamin Tenney's excellent paper on "The Mortality after Prostatectomy," this being due to the fact that its author had offered it to another periodical some time before he decided to read it at the meeting of the Society.—The Editor.

THE RESULTS OF PROSTATECTOMY.

HUGH CABOT, M. D., Boston, Mass.

TEN years ago the results of surgical treatment of hypertrophy of the prostate were far from being satisfactory, but the years 1898 to 1904 showed tremendous activity in this field, and there is perhaps no department of surgery which has, during that time, attracted more attention. To its problems were brought some of the most brilliant minds of the surgical world in the attempt to reduce the then most discouraging mortality, and give us an operation which we could consientiously recommend. The results of this work are everywhere to be seen and the advancement of our knowledge has equaled any reasonable prediction. Collections of cases so large as to command attention, show a satisfactory decrease in the mortality. The present radical operations, both suprapubic and perineal, show, in the hands of experienced operators, as favorable a death rate as is to be found in any capital operation on patients of a like age.

The right of prostatectomy to be considered one of the great life-saving operations of the day must be admitted, and grave discussions of the propriety of classing it as a curative operation are no longer in order. We have come far, but much yet remains to be done before this branch of surgery can be regarded as abreast of the times. But the admission of the position which prostatectomy has made for itself does not absolve us from the necessity of considering with the utmost care what it may properly be expected to accomplish, and of avoiding extravagant claims which we cannot fulfill. Unfortunately, the eagerness to show the reasonable safety of the operation has led to a neglect of careful tabulation of results other than the fact of recovery, and while we can count by hundreds the reported cases showing mortality, we must count by tens the cases in which we can honestly say that we know the functional result one year or more after operation.

It is well to remember that the operation of prostatectomy is not to be classed with that of appendectomy or hysterectomy, for

in these instances we are dealing with organs which are isolated, or at least working largely independently. In these operations, to know the mortality is to know the result, but with prostatectomy the case is far otherwise. The prostate is an organ at once urinary and sexual, and its position is such that its removal without damage to neighboring organs is practically impossible, and the return of these organs to their previous condition is a myth. These are self-evident facts and their recital would be unpardonable, were it not for the fact that there has been and still is a dangerous tendency to class and speak of prostatectomy with other major operations such as those above mentioned, with which it has nothing in common.

The goal set for the surgical treatment is to supersede the catheter and enable us to offer to our patients something better than the tyranny of the catheter life, but this result will be obtained not by making light of our failures, not by pretending that a discussion of mortality is a discussion of results, not by the misleading statement that all the patients who recovered from operaton " did well," but by a full and free discussion of our failures and a diligent search for the cause of these failures. It cannot be denied that many patients have been made worse, and no long service in the Out-Patient departments of any of our large hospitals is necessary in order to see men whose condition is miserable and whom we are powerless, or nearly powerless, to relieve. These, gentlemen, are the interesting cases and it is by the study of this, the shady side of the picture, that we shall assist most in placing the operation upon a sound footing.

At the meeting of the American Urological Association held in Portland last July, Dr. Whiteside read a paper on the Results of Perineal Prostatectomy, in which he drew a most discouraging picture of the present conditions. It was a careful, conscientious, honest piece of work, and a step in the direction of full reporting and fearless criticism of end results; but either the work of the last ten years has been sterile and an extraordinary number of ordinarily sane men have been egregiously deceived by their senses, or Dr. Whiteside is wrong when he concludes that " the average is not much better than that given by Dr. Belfield in Morrow's textbook twelve years ago." I fully beleve that he is wrong, that a somewhat different presentation of the facts will justify the con-

clusion, that the results to-day are an immense improvement on those presented by Dr. Belfield.

Keenly as I realize the weakness of statistics, and though entirely willing to admit that many unsound propositions have been bolstered up by their use, I still regard them as more likely to be accurate than our impressions, for *they* are often but the reflex expression of our hopes.

In collecting his cases Dr. Whiteside has given much weight to very small groups and has used only one large group. Thus, in series " A " he presents cases from nine different surgeons, with an average of a trifle over four cases each. I doubt the soundness of conclusions drawn from so few cases, especially as it does not by itself show that any of the surgeons had a very wide experience, and gives a very unfair representation of such an experienced surgeon as Dr. Paul Thorndike, who, though we know him to have had excellent results, is represented in this table by one case, and that a case of cancer. Series " B," that of Dr. Murphy, is an excellent one, but does not deal with the conditions as they stand to-day, and the large statistics of Dr. Young and Dr. Goodfellow could not be considered because they did not show end results.

The operation of prostatectomy in its present state of development is not one in which the surgeon can expect good results without considerable experience, for it requires not only operative skill, but a full and comprehensive knowledge of the pathology of the urinary tract. Moreover, it requires a careful and skillful study of each case. I believe that this society will concur with me in the belief that the operation itself is but a small part of the treatment of each case, and that much special knowledge is necessary to get good results.

In the collection of cases which I have to present, I have taken cases only of surgeons of experience in this work, and who report not less than fourteen cases, showing the results one year or more after operation. The only exception to this is the cases from the Massachusetts General Hospital, and I have thought it only proper to quote these cases, showing a great improvement in the results of the surgeons who so kindly allowed me to publish their results two years ago. I have considered as cured those cases which comply with Caspar's requirement, in that they re-

main without subjective symptoms and show no considerable amount of residual urine. The number of such cases is necessarily small because true end results are hard to obtain, but such as they are they cannot but be suggestive. They show the results of the perineal operation, as I have been unable to find reports of a sufficient number of suprapubic operations to justify any conclusion.

CASES WITH RESULTS KNOWN.

Legueu [1]	14 cases	7 cures
Heresco [2]	16 cases	8 cures
Rivière [3]	9 cases	5 cures
Loumeau [4]	28 cases	15 cures
Escat [5]	337 cases	287 cures
Hartmann [6]	20 cases	11 cures
Albarran [7]	57 cases	44 cures
M. G. H. (year '04)	14 cases	11 cures
	495	388=78%

This is certainly a good showing and after making every allowance for the tendency of man to report his successes, we must admit that the outlook is less discouraging than we have been led to suppose.

It is further interesting to note the higher percentage of good results in the cases of complete retention as compared with those of incomplete retention. The following table shows this comparison in all the cases which I have been able to collect from the same surgeons whose cases are reported above. The number is small, but worth recording.

	COMPLETE RETENTION.			INCOMPLETE RETENTION.		
	No.	Cured	%	No.	Cured	%
Hartmann	13	9	69	7	2	28
Albarran	34	32	91	23	12	52
Legueu	6	5	83	8	2	25
M. G. H.	8	6	75	4	1	25
	61	52	85%	42	17	40%

The explanation of the difference between the results here shown and those obtained by Dr. Whiteside, is to be found in the

experience of the operators. A famous genito-urinary surgeon has well said that when a patient asks him what is the chance of cure by operation, he always reples: "Who is to operate upon you?" In the field of general surgery many bungling operations do not reflect discredit on the operator, because recovery takes place in spite of, rather than on account of the operation, but after a poorly executed operation upon the prostate, retribution is swift and sure, and patients who have been left with a partial retention, an incontinence, or a fistula are not famous for their consideration of the feelings of their surgeon. A mistake in diagnosis either of the condition of the prostate or of other parts of the urinary tract, an unwise selection of the best route for operation, or unskilled after treatment, may alike spell failure. The operators of right judgment are getting far better results than their less experienced brethren, and it seems logical to expect that this will be the case.

In conclusion, I believe that we are justified in assuming:

(1) That the mortality bears little relation to the functional results, and we should avoid confusing good mortality statistics with cures.

(2) That of properly selected cases in the hands of competent surgeons, about three-fourths of those who survive the operation will be cured.

(3) That of the remaining one-fourth, many are very greatly relieved by the operation, and

(4) That as experience with the operative treatment becomes more general, the results obtained will be better.

[1] *Ann. d. Mal. d. Org. Gen-Urin.* 1904, p. 1715.
[2] *Ann. d. Mal. d. Org. Gen-Urin.* 1903, p. 1668.
[3] *Arch. prov. de Chir.* Oct., 1903.
[4] *Ann. d. Mal. d. Org. Gen-Urin.* 1905, p. 1871.
[5] *Ann. d. Mal. d. Org. Gen-Urin.* 1904, p. 1635.
[6] *Ann. d. Mal. d. Org. Gen-Urin.* 1905, p. 694.
[7] *Ann. d. Mal. d. Org. Gen-Urin.* 1904. p. 1716.

1 Marlboro Street.

REMARKS ON THE INDICATIONS, CONTRA-INDICATIONS AND MANAGEMENT OF PROSTATECTOMY.[1]

By Charles Greene Cumston, M.D., Boston, Mass.

FROM the recent papers published by Albarran, Bako, Czerny, Fergusson, Freudenberg, Goodfellow, Gundersen, Hartmann, van Hook, Horwitz, Legueu, Lichtenstern, Longfellow, MacGowan, Marwedel, Murphy, Miculicz, Nicolich, Parker, Pauchet, Pilcher, Pousson, Rafin, Riedel, Rivière, Sheen, Squier, Verhoogen, Young, and Zuckerkandl, a total of 755 cases of perineal prostatectomy have been reported, and of these 49 resulted in death, making a mortality of 6.47%. If this mortality is compared with that of the year 1902, which was reported by Burkhart at 12.1%, it at once becomes evident that there has been considerable improvement made in the operation. As regards the functional results, they are almost invariably reported as good, so that it may be fairly assumed that of those patients who survived the operation, nearly all have recovered the power of spontaneous micturition.

Up to the present, I have performed 19 perineal prostatectomies without any mortality, but in one case a perineal fistula resulted. The patient was a man of some eighty years of age, and fourteen months after the operation he was still voiding his urine per perineum, this being the last time that his physician informed me as to his condition.

In these rambling remarks, I would like to refer to a few points relative to the feasibility of performing either suprapubic or perineal prostatectomy, but I would say at once that I shall not refer to the question of malignant disease of the gland, as I have already gone somewhat into detail relative to this pathologic process in a paper which will soon be published in the Birmingham (England) *Medical Review*. There is one point in connection with enlarged prostates in young men, that is to say from twenty-five to thirty-five years of age, to which I wish to refer, because I

[1] Read at the first meeting of the N. E. Urological Society, Boston, May 3, 1906.

believe it is not generally considered, and that is that when symptoms of this condition exist at the above time of life, syphilis may be suspected, and a properly conducted specific treatment has in several instances resulted in a cure, the gland returning to its normal size.

In certain diseases, such as diabetes, cardiac or pulmonary complications (conditions which naturally are always ascertained before proposing surgical interference), any attempt at a radical cure offers considerable risk and a minimum chance of success, and I feel compelled to admit that prostatectomy is also absolutely contra-indicated in certain septic complications arising in the urogenital system. Thus, when a prostatic or periprostatic abscess develops in a hypertrophied gland, prostatectomy in these infected tissues is dangerous, and from the cases published, I think it is safe to assume that it has never been crowned by success. Here, even catheterization done four or five times in twenty-four hours, with irrigation and minute care, is not attended with any results of a favorable nature, the urine remains filthy and the temperature is up in spite of the administration of urotropin, quinine and a milk diet. If prostatectomy is attempted in these cases, the temperature will remain up after the operation, and serious general phenomena still are present in spite of the disappearance of the suffering, and death frequently occurs within a few days after the operation.

When a serous urinary infection has become established in cases where catheterization has been the means of keeping up the phenomena, or has been their direct etiological factor, suprapubic cystostomy will conjure the immediate danger. In spite of the ease with which the catheter may be introduced into the bladder, it is only by the above mentioned palliative operation that urinary cachexia will be avoided. There are other cases where cystostomy is of value, such, for example, as chronic retention with distension —where no sign of infection is present, there is an absence of temperature, but urinary poisoning nevertheless exists, it being indicated by digestive disturbances and so forth.

In these patients who are uremic and frequently have emptied their bladders by overflow for a considerable length of time, this operation permits the bladder to recover from its congestion and does away with the unfortunate occurrence of uremia

coming on a few hours after an aseptic catheterization has been done. It is in just these cases that an early suprapubic cystostomy has saved numerous patients by conjuring the evolution of the accidents, or at any rate delaying them.

In considering the proper radical operation to select it appears to me that perineal prostatectomy is by far the surest manner of placing the bladder at rest, thus doing away with the hyperemia of the entire urinary tract, stopping the pain, bringing down the temperature and helping the kidneys. Cases are now no longer wanting in which prostatectomy has been followed by most favorable and satisfactory results in chronic retention, severe pain or an impossibility to pass the catheter, all conditions where it is most legitimate to operate. In a large number of these cases the faculty of spontaneously emptying the bladder returns, micturition is easy and the bladder may empty itself almost completely, while in the less brilliant instances some residual urine still remains, but the urine becomes clear and the cystitis disappears.

There are, however, certain precautions which should be taken before the operation is done. When dealing with a complete or nearly complete retention, even if the urine is not foul, the catheter should be used for a certain time, being passed several times a day or allowed to remain à demeure and the bladder carefully irrigated. By these means the organ is kept empty, its contractility is preserved to a certain extent, while ascending dilatation of the ureters and renal pelves is prevented. Vesical contractility is of great importance as far as the results of the operation are concerned, but, unfortunately, one can never be sure of its exact condition, because in some cases where the power has been thought to be absolutely lost, it returns completely after operation, while in others it remains abolished. When catheterization is regularly done before a radical operation is undertaken, the contractile power of the bladder will be greatly aided, so that after the operation very excellent results may be obtained as far as evacuation of the viscus is concerned in cases where complete retention has existed. Bladder contraction, which in these cases may have been absent for a long time, will return and patients who have presented complete retention for a variable length of time will be able to completely empty their bladders and are no longer obliged to resort to the catheter.

The question arises whether or not there are cases where a very early operation is to be advised in which prostatic retention exists and where the very best results may be obtained—in other words, where operative interference becomes the treatment of choice. I believe that this indication is to be found in young prostatics—that is to say, in men from fifty-five to sixty years of age—who are in good health, easily catheterized, where there is hardly any residual urine and in whom the urine is normal, or only momentarily cloudy.

In these cases I believe that prostatectomy should be done in order to do away with a future catheter life, more particularly when the social condition of the patient prevents regular and aseptic catheterization being done. When prostatectomy is done early under the above conditions, and in patients who are still robust, very remarkable results may be obtained, both from the operative and functional view points.

When an operation is done early the contractility of the bladder is completely preserved, and these younger subjects, operated on before vesical distension and considerable residual urine occur, rapidly recuperate, while their bladders are easily and completely emptied and nocturnal micturition disappears completely or almost so.

I would say that I always make it a point to inform the patient, whatever be his age, that generic power may disappear or be weakened, but usually the number of those who desire to retain this function is small, and in comparing the mental quiet obtained by operation to the misery that they are undergoing from their condition, most will, I believe, willingly accept the loss of what little sexual power they may still retain.

In assuming the defense of prostatectomy, I would point out that the first objection usually made against an interference of the importance of this one is that the opponents of the operation say that patients presenting themselves for operation are already infected and weakened, and that one only hastens their death by submitting them to a surgical traumatism, which is in reality considerable, followed by horizontal rest in bed for a considerable length of time.

Now, in the first place, allow me to say in parenthesis that, as I have already said, I believe the operation especially good in

young subjects and not in old prostatics, and, placing ourselves in the worst condition possible, is the poor general condition a contra-indication to the operation? I would say yes, if one does not wish to darken his statistics, but would reply no if we are considering clinical facts. It goes without saying that the statistics of prostatectomy have been rendered sombre from the fact that many interferences have been undertaken on patients who were nearly in the jaws of death, but beside these dying subjects that the operation was unable to save, there are others, none the less compromised vitally, who owe their life to operative interference. Upon this point the partisans of cystostomy will not fail to say that the successful outcome is due to the rest given to the bladder, and drainage.

But now if the prostate is removed at the same time as cystostomy, a thing easily accomplished in a few minutes, what exaggerates the surgical traumatism? Hemorrhage? No, because it is practically insignificant and even if there is some, it can always be controlled and has seldom been the cause of death.

In very old subjects anuria has been known to occur after the operation, but this complication is nearly always transitory. Vignard has collected six cases due to Robson, Kümmel, MacGill and Schmidt, where the general condition was very serious, but the operation not only did not result in death, but allowed the patients to recover their health.

When considering the question of prostatectomy, one should always recollect that the general condition may be favorably influenced by the rest given to the bladder from the drainage. As the retention ceases, the ureters are no longer dilated, the renal functions gradually return and there is no retention of septic products.

Can the value of prostatectomy be denied in cases where catheterization is difficult? It has been upheld by a number of eminent surgeons, that a careful and skillful catheterization will always overcome the prostatic obstacle, and they refuse to believe that difficulty in the passage of a catheter is in itself sufficient to justify radical procedures. American and English surgeons have upheld that to facilitate catheterization and to render it harmless in the future, is a decided advantage, greatly in favor of a radical procedure, and many, including Southam, Keyes, Wol-

sey, Fuller and Mansell-Moullin, have considered this as one of the principal indications for prostatectomy, and I am decidedly of the same opinion, because I believe that a well-conducted prostatectomy, performed in time, is far preferable to bad catheterization.

In reply to this the opponents will naturally say that the difficulties to catheterization are not always removed by prostatectomy, but this point needs no consideration, because it has been proven beyond a doubt that, although many other advantages have been refused in the case of the prostatectomy, this one has never been contested. The true difficulty is nearly always seated in the neighborhood of the vesical neck; a bar of prostatic tissue blocks the catheter, this being represented by the so-called median lobe, no matter what form of development it may have taken on, and it is of very rare occurrence that an hypertrophied lateral lobe has resulted in obstructive difficulties as serious as those accruing from an enlarged middle lobe. Now, this median lobe may always be removed sufficiently to allow easy catheterization.

The question can also be raised as to whether there is not more danger in performing prostatectomy than in giving the patient up to the chances of a difficult catheterization, but I would say that the time is no longer when the eminent Professor Guyon judiciously remarked upon the simplicity of catheterization in opposition to radical operation. False passages certainly count for something, they render the urethra impermeable just at the most critical moment, while hemorrhages of an alarming nature may arise on account of the prostatic congestion usually present. Then, again, infiltration of urine may arise, generally of a very septic nature, placing the patient in imminent danger of septicemic accidents. For all these reasons prostatectomy, from the fact that it is capable of rendering catheterization easy, is certainly an excellent procedure, even if only undertaken to obtain this result.

Prostatectomy is also indicated in cases of painful catheterization, and after it has been done, the passage of the instrument is painless. Other interferences, resorted to a few years ago, among others castration, obtained the same result.

Many prostatics have hemorrhage even when the passage of the catheter is an easy matter, the loss of blood being due either

to the usual congestion of the organ or to lesions accruing from a laborious catheterization, so that it is not infrequently a difficult matter to attribute the part played by each of these causes. Now, prostatectomy with drainage does away with all this; the obstacle is removed, the passage of the catheter becomes easy, the prostatic congestion disappears on account of the drainage, and thus both factors of the hemorrhage are at once suppressed by the operation.

I now come to the efficacy of prostatectomy where there is retention or formation of calculi in the bladder. Take a man of a certain age, gouty, with an enlarged middle lobe; he is seized with nephritic colic and the renal concretions come down the ureter into the bladder, where they are almost fatally retained on account of the obstacle presented by the enlarged prostate. This is an eventuality far from theoretical, but more frequently the calculus is developed directly in the bladder and this is by no means an infrequent complication of prostatic enlargement. Behind the prostatic obstacle residual urine is retained in which may develop all types of calculous formation. Now, it naturally follows that the only proper operation for the removal of the stones is by prostatectomy, which not only does away with these pathologic products, but their etiological factor, namely the prostate, as well.

Taking all things into consideration vesical retention of urine is the principal cause of suffering in prostatics, and I would here ask what prostatectomy can accomplish? I do not refer here to incomplete chronic retention, but to acute retention. Two points are to be considered. The first is where one is dealing with a patient going through his first attack of retention, and here I believe that radical interference should not be considered, because it has been demonstrated beyond a doubt that these cases when properly handled by catheterization may frequently go through life without a repetition of the retention, and unless the prostatic obstacle makes catheterization impossible, it should certainly be the method of choice.

Even if catheterization is impossible, prostatectomy should not be advised at once, nor simple cystostomy for that matter, and one should, in the first place, resort to suprapubic puncture. Numerous are the cases where the prostatic congestion is done

away with by the depletion of the bladder thus obtained and has rendered the urethra again permeable to the catheter, while spontaneous return of micturition takes place.

The question is entirely different, however, when acute retention takes place repeatedly at near intervals, and in this case and within certain limits, prostatectomy is indicated quite as distinctly as in cases of chronic retention.

In closing I would say that, personally, I feel that the important question at the present time to solve is that of the selection of cases which should undergo a radical operation and those where the interference can be delayed with all propriety, rather than of the technique to be selected.

871 Beacon Street.

SIGMATE * URETERAL OBSTRUCTION.[1]

A. Ernest Gallant, M. D., New York City.

IN coming before this association, it is for the purpose of bringing to your notice the history of a patient suffering from an abdominal tumor, which from the history apparently originated in the pelvis, but proved to be a hydronephrotic kidney, induced by prolapse and the subsequent formation and agglutination of an "S"-shaped flexure of the ureter at its junction with the renal pelvis; with the course and result obtained by operation.

December 28, 1905. History furnished by Dr. L. H. Moss. Mrs. B., aet 41. One child fifteen years ago, instrumental, no complications. Appendicitis eight years ago, in bed two months; no operation; recovery complete. Well until two and one-half years ago, when she had an attack of pain in the left ovarian region, with nausea lasting twenty-four hours, compelling her to go to bed; all symptoms disappearing in twenty-four

* N. B.—Sigmate: Because to the ureter an "S" has been added, thereby causing it to resemble the early Greek and Latin ς or Σ with an appendix attached.

[1] Read before the annual meeting of the American Urological Association, Boston, June 4-5, 1906.

hours. These attacks have recurred at irregular intervals of two months, one month, and two weeks, ever since, always of the same

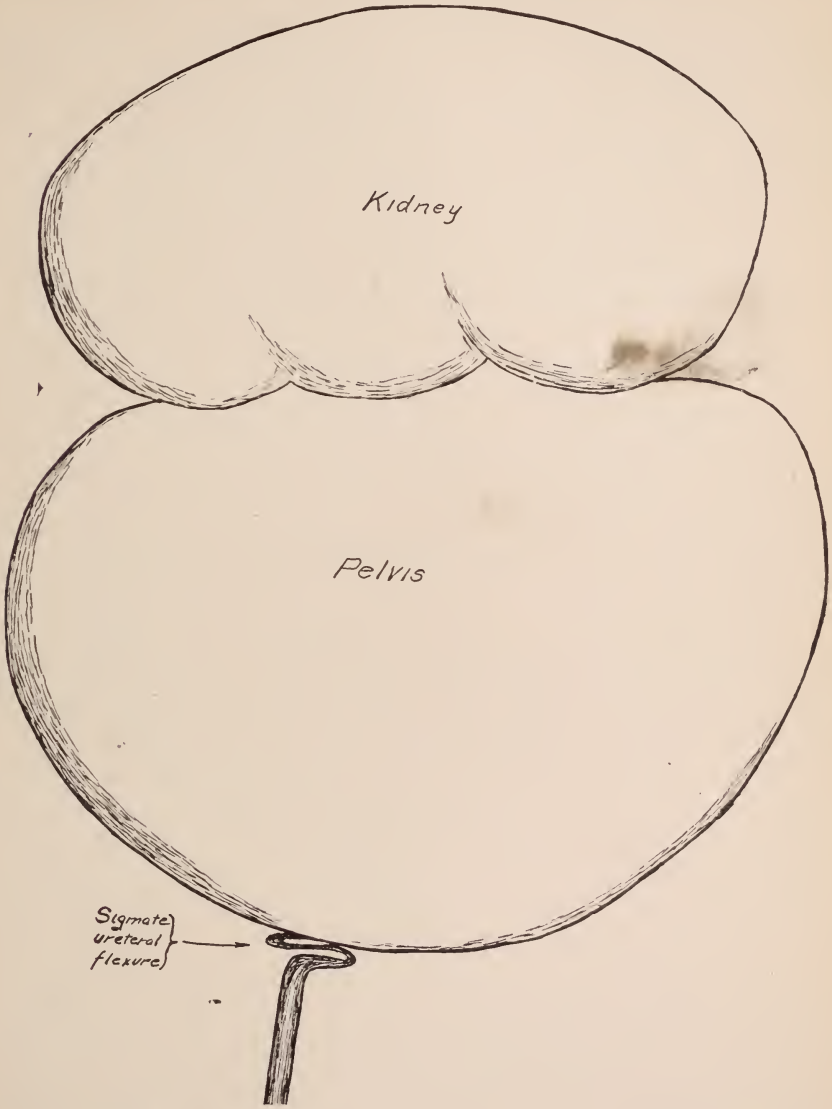


FIG. 1. HYDRONEPHROTIC KIDNEY AND PELVIS CAUSED BY SIGMATE URETERAL FLEXURE, BOUND DOWN BY INFLAMMATORY BANDS.

character, without any symptoms whatever in the interim. Vaginal examination in September last revealed a mass in the left side of the pelvis about the size of a lemon, tender and sensitive. Mens-

truation normal, and no apparent relation to the attacks; bowels regular. The last attack five weeks ago.

The present attack began forty-eight hours ago, with continuous pain and aching on the left side; pain, rigidity and fullness on abdominal palpation.

December 29, 1905. Abdominal palpation demonstrates a tumor lying alongside the umbilicus, somewhat larger than a grape-fruit, of irregular, yet smooth outline, non-fluctuant, moveable up and down, two inches above and two inches below the umbilicus. Splenic dullness normal. Uterus retroverted; left tube in the cul-de-sac. Appendix not palpable. Diagnosis: Prolapsed hydronephrotic kidney or possibly ovarian cyst.

Through a median incision the tumor was determined as of kidney origin, the uterus, ovary, and tube lifted up; the former site of the appendix was marked by a mass of fibrous material.

January 8, 1906. Ureteral catheters introduced into both kidneys and specimens secured. The right kidney discharged freely, the left very slowly.

Professor E. E. Smith's examination of the urines showed:

Left kidney, S. G. 1008. Pale amber color. Sediment: Mucus, small amount; epithelia, moderate number, squamous, round and tailed, common to the superficial and deeper layers of the upper urinary tract.	Right kidney, S. G. 1019½. Normal amber color. Sediment: Mucus, a trace; calcium oxalate crystals, small number; blood, few corpuscles; epithelia, moderate number, squamous and round, common to the superficial layers of the upper urinary tract.

Pathologist's conclusions: "The left kidney passes urine of a lower molecular concentration than the right, and hence is functionally less active, while the upper urinary tract associated with the left kidney exhibits epithelial exfoliation to a greater degree than the right."

January 17, 1906. An oblique incision, five inches long, from the tip of the twelfth rib, the muscles and nerves were displaced, and the kidney found densely adherent to the fatty capsule, now devoid of fat, was with difficulty freed, but during attempts

to deliver, the pelvis was ruptured at its junction with the middle border and about 20 ounces of urine escaped. Through a one-inch incision the finger was introduced and an unsuccessful attempt made to find the uretereal opening. On following it down, the ureter was discovered, bent upon itself, and securely fixed by dense adhesions at its junction with the pelvis. The bands were separated, and the ureter straightened, after which a bulbous probe, ¼-inch in diameter, was easily introduced into the ureter, down to the pelvic brim. The opening into the pelvis was closed by a double layer of black silk sutures. The tear at the kidney edge could not be closed by suture and was covered over by a piece of fatty tissue from the adjacent structures.

Owing to the thinned-out condition and large size of the kidney, it was deemed best to support that organ by gauze packing, rather than by sutures, a rolled gauze pad being placed below, in front, and behind the lower pole. The wound was partially closed by silk-worm sutures.

Urine drawn from the bladder at the close of the operation was bloody, showing that the left ureter was permeable throughout its length.

January 21. Four days later the side gauze drains were removed. By reference to the chart you will note that it was not until the seventh day that the quantity of urine really increased, when it ran up to 82 oz. and continued until the tenth day, when it reached 116 ounces.

February 1. The lower piece of gauze was removed and two days later urine escaped very freely from the wound.

February 4. The lower portion of the wound was repacked with gauze and two days later the bladder excretion was up to 64 oz. and continued at or above that point up to February 15.

On February 16, the patient was permitted to sit up, and the amount of urine passed from the bladder gradually decreased, with a corresponding increase of discharge from the wound. While sitting up a distinct prominence could be felt below the wound, which became painful; relieved by lying down and making pressure over it, causing considerable discharge, which during the first two weeks of April became purulent.

Between April 4th and 24th, the quantity of urine passed through the natural channel was markedly diminished, as low as

28 ounces per diem, and as the discharge of purulent urine through the loin continued with tumefaction and pain, it was deemed best to reopen the lumbar incision. This was done April 23. The kidney cortex was found thinned out, and the pelvis greatly dilated (nearly as large as at the original operation) and filled with pus.

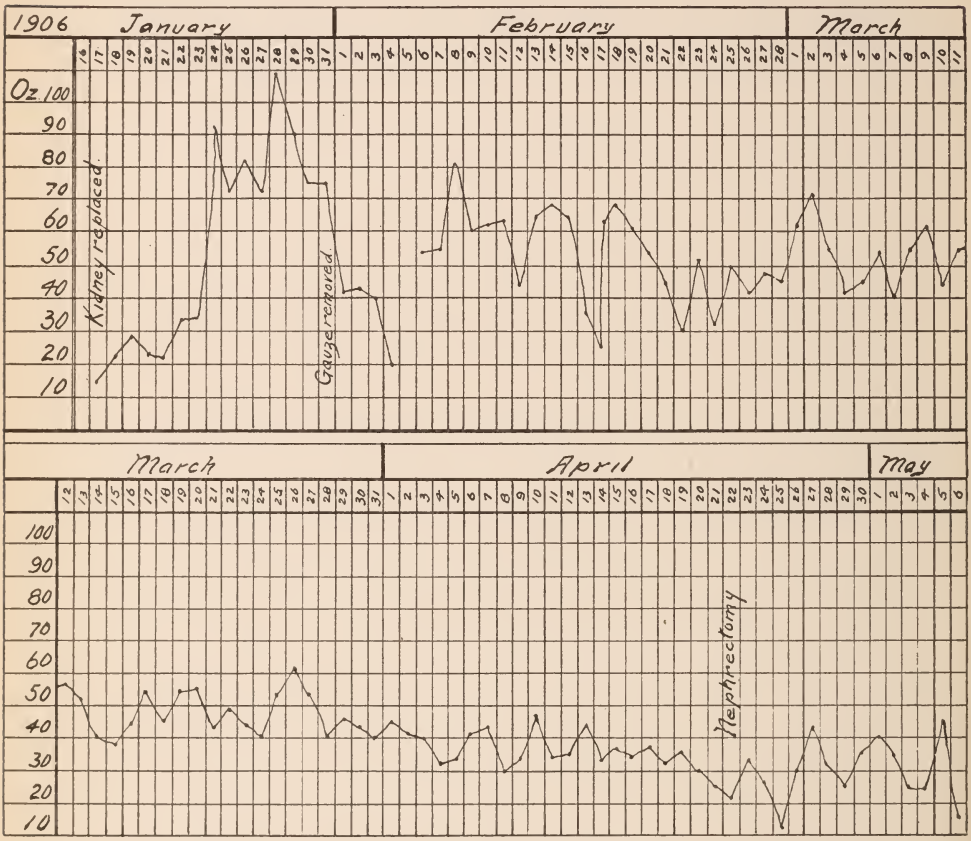


Fig. 2. Mrs. B. Chart Showing Daily Excretion of Urine.

The kidney was easily freed from its bed. But the thickened pelvic sac could not be freed as a whole and part was not removed. The ureter was sutured into the lower angle of the wound with its mouth opening into the cellular tissue of the loin. A thick roll of gauze was placed in the cavity as a drain, and the lumbar structures sutured layer by layer, with cat-gut, the skin with silkworm gut.

During the three days following the operation, the tempera-

ture ranged from 101° to 103°.5 F., and since that time has been practically normal. The urine from April 12th to May 6th has averaged 31 ounces daily. The low quantity of urine secreted on two or three days can be accounted for by the number of loose stools induced by magnesia sulphate and castor oil. The urine from the remaining kidney is normal.

May 4. The patient to-day is sitting up, feels cheerful, good appetite and little discharge from the wound, which is nearly closed.

This case is of interest as it adds to the list another form of ureteral distortion productive of obstruction. It differs from the varieties described by Henry Morris, James Israel and others, and from the "Swan's neck" form described by Byron Robinson, in that the flexion occurred at the pelvic apex, which occupied the lowest point within the abdomen, and was surmounted by the greatly dilated kidney, lying in the transverse axis of the body.

The points of interest which have come up during the course of the case have been: (a) the complete restoration of the ureteral caliber as soon as the inflammatory bands were removed: (b) the resumption of secretory function shortly after the kidney was replaced and the ureter freed: (c) the gradual return of obstruction with infection of the kidney and pelvis, and (d) the excellent work of the remaining kidney since the left kidney was removed.

The one question which on "looking backward" stands out most glaringly is—would resection of the ureter and its implantation into the lower part of the pelvis at the first operation, have permanently restored its function, and saved the kidney? My own feeling is that the adhesions would have reformed and occluded the ureter.

60 West Fifty-Sixth Street.

INTRA-VESICAL OPERATIONS WITH THE AID OF THE CYSTOSCOPE

By Henry Meyer, M. D., San Francisco, California.

(Read before the Pacific Coast Branch of the American Urological Association, January 16, 1906.)

SINCE the use of the cystoscope has become a practical and valuable procedure in the hands of competent and skilled operators, and since the operation-cystoscope has come into use, we are now able to accomplish ends which a few years ago were entirely unthought of. The removal of stones, foreign bodies, and small growths from the bladder, and cauterization with the electric cautery all under the guidance of the eye, and without the use of the knife, are procedures which are to-day being accomplished in favorable cases, by skilled operators. In the female bladder we can readily use the curette, forceps for removing foreign bodies, and the instillation syringe for applying solutions to localized areas in conjunction with the ordinary examination cystoscope, but at the same time independent thereof as far as the movements of these various instruments are concerned. On account of the shortness of the female urethra, it is an easy task to introduce any of these instruments, *viz*:— curette, forceps, or instillation syringe (which I will presently describe) into the bladder, after which the cystoscope can be introduced alongside thereof, thereby permitting of a wide range of motion of the operating instrument while the cystoscope is steadily focused on the part of the bladder which is being treated.

For the benefit of those who are unacquainted with the operation-cystoscope, I shall first exhibit a typical variety of such instrument which I have used successfully and then some simple and useful instruments designed and intended for use in the female bladder; the use of which in the manner which I will presently describe I believe to be original with myself.

The operation-cystoscope at present in use by me is that

PLATE VI—To Illustrate the Article by Dr. Henry Meyer.

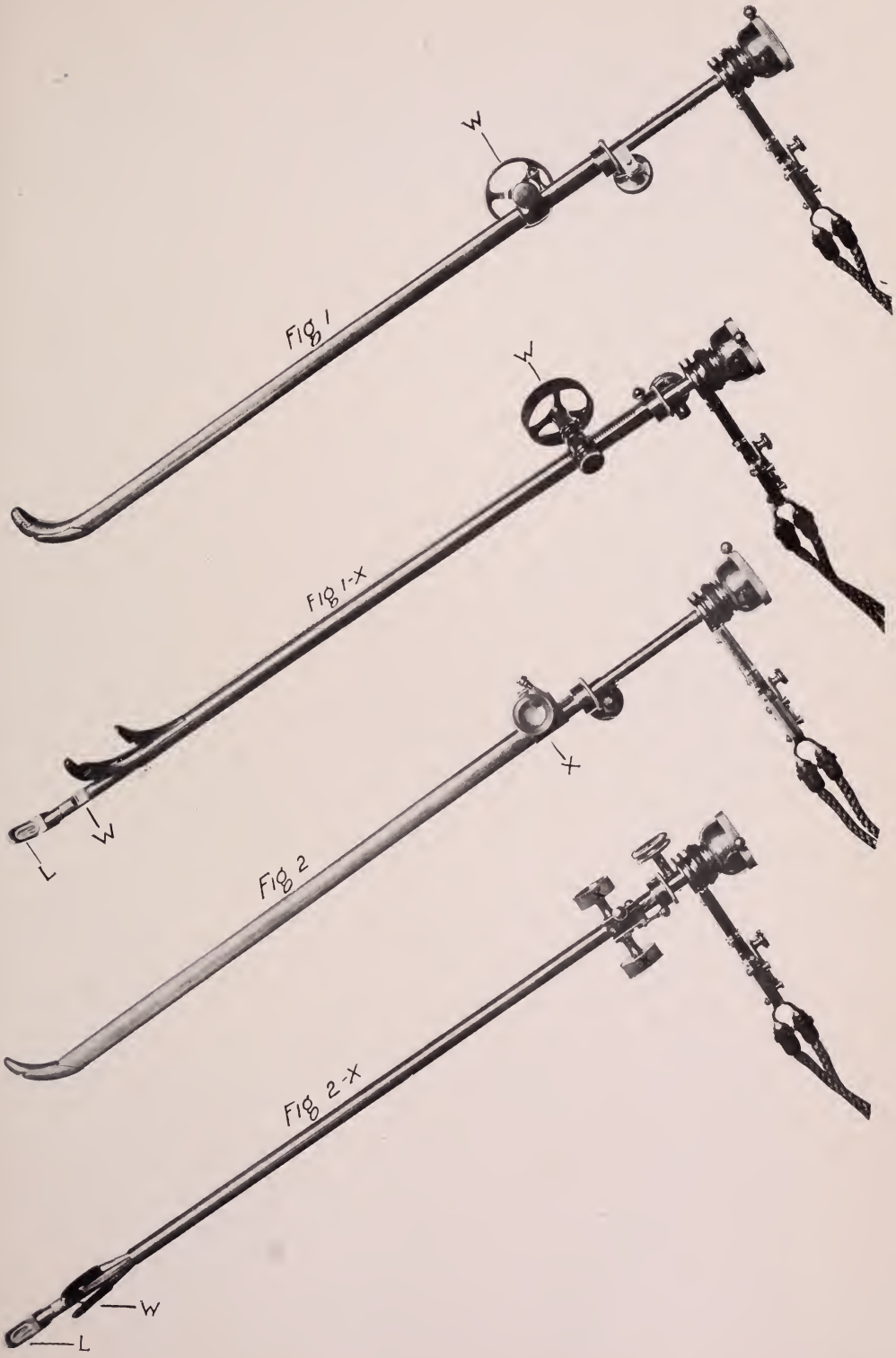
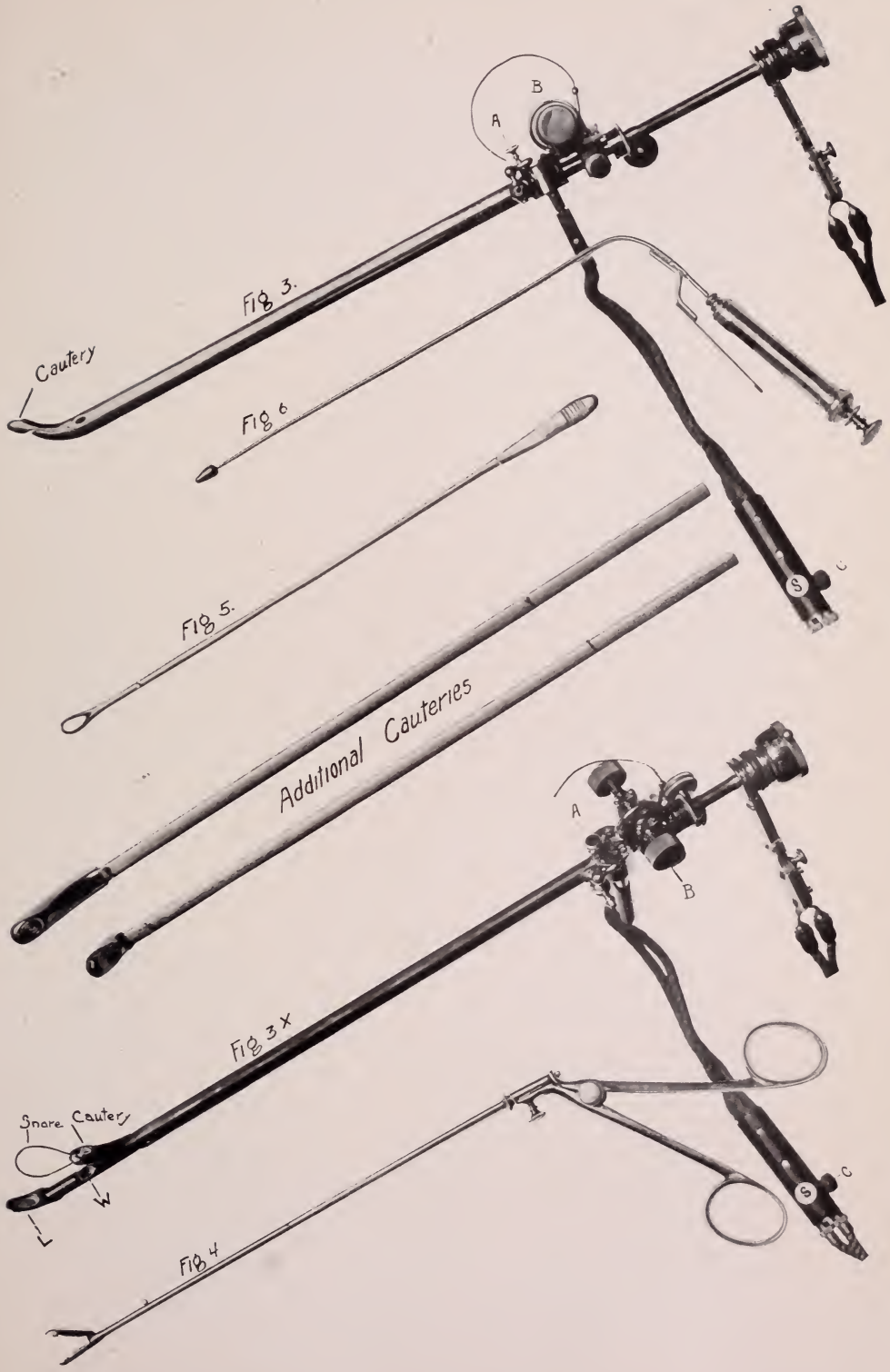


PLATE VII—To Illustrate the Article by Dr. Henry Meyer.



variety made after the ideas of Professor Nitze and known as the Nitze operation-cystoscope, which consists of three principal parts, *viz*:—

First—Lithotrite.

Second—Forceps.

Third—Snare and cautery combined in one, but capable of being used separately.

There are three cauteries of different shapes and sizes which are interchangeable by means of small screw marked A (Figs. 3 and 3x). Each one can carry its own snare.

The lithotrite (Figs. 1 and 1x) is capable of grasping and crushing a concretion three centimeters in diameter, the male blade being operated by a wheel marked "W." The forceps (Figs. 2 and 2x) have a bite 1¼ inches long and ⅓ of an inch wide, and is operated by either wheel marked "X." The snare and cautery (Figs. 3 and 3x), when set up, are in one piece, but capable of being used independently of each other. The snare is operated by an apparatus marked "B," whereby it can be made large or small, and when this instrument is ready for introduction into the bladder, the snare is not visible. Either snare or cautery can be heated by merely elevating the buttons marked "S" for snare, and "C" for cautery, situated on the cord attached to the instrument. However, both buttons should not be raised at once, as both cautery and snare will glow simultaneously. When both buttons are pressed down, both cautery and snare are cold; so that the snare can be used hot or cold.

Each of the instruments described above carries its own cystoscope, which is entirely removable from the rest of the instrument, and all movable parts are also removable for purposes of cleanliness. This set of instruments in the hands of those skilled in its use is certainly a valuable acquisition. The various parts are all intended for use both in the male and female bladder and are easier of introduction in the male than the ordinary cystoscope, since the ends of these instruments have a curve, as will be seen in the illustrations, while the ordinary cystoscope is usually bent at a sharp angle. Furthermore, when closed and ready for introduction, the lamp and window of the cystoscope are completely covered by the operating part of the instrument, thereby protecting both lamp and window from blood which

may possibly get on the same during its introduction in the male subject; while with the simple cystoscope it is not rare to get slight bleeding while introducing the same into the male bladder, which may cover the lamp and thereby diminish the power of illumination, or in event a drop gets on the window, it may make it impossible to get a satisfactory view. Thus this variety of operation-cystoscope being equivalent to a No. 26F sound in size, is usually easy of introduction, and in almost every instance insures a clear view.

In order to use any of the instruments constituting the operation-cystoscope, the patient should be thoroughly cleansed, the bladder should be irrigated until the washings return clear, after which it is distended with from 150 to 250 c.c. of a clear solution, preferably 4% boracic acid or 1/4000 formalin solution at ordinary room temperature. The cleansing of the instrument can be accomplished by removing all removable parts and boiling the same; this does not apply to the optical apparatus, however, which should not be boiled, but rubbed with tincture of green soap for ten minutes, after which it should be washed with alcohol, and then immersed in a 5% solution of carbolic acid for one hour before use, after which it should be washed with sterile water. The instrument being properly cleansed, it is put together and closed, lubricated with sterile glycerine and inserted. After the instrument is in the bladder, the cystoscope is slowly pushed in the direction of the patient until the lamp and window have emerged from their hiding-place, which can be determined by looking through the cystoscope. Thus you are ready for the operation. As stated before, in order to use this instrument successfully, one requires practice and more skill in the handling of scientific instruments than is possessed by the average man. So that before commencing operations with this instrument, one should study its mechanism, which is simple, and should manipulate it both in the phantom and human bladder until dexterity and precision are acquired in its use.

I will now cite two cases in which I have used this instrument successfully and with no difficulty.

Case 1. Mr. C. G., age 41, married, consulted me October 28, 1905, giving a history of painful and frequent micturition which had existed for an indefinite period. He had been

treated on several occasions with internal medications and irrigations for catarrh of the bladder; he also had sounds passed, but continued to get worse. The urine passed in two glasses was the same, both being turbid and containing pus, some red blood cells and bladder epithelium. A cystoscopic examination showed a small concretion in the bladder, which appeared to be about 1½ centimeters in diameter and fairly round. With the assistance of Dr. L. H. Hoffman, I removed the same with the aid of the lithotrite pictured above (Figs. 1 and 1X). This concretion being quite small and fragile, it was only necessary to grasp and crush it twice. After the first crushing it could be readily seen, through the cystoscope running through the instrument, that a fragment was left too large to come through the ordinary evacuating catheter, but this was readily grasped and crushed and all evacuated with the Bigelow evacuator. I have since examined this patient and no fragments can be seen with the cystoscope, and he now enjoys perfect health.

Case 2. Mr. S., age 21, had a calculus; the diagnosis was made by his own physician. On examination this calculus was found to measure ⅝ of an inch in diameter. Cystoscopic examination showed it to be very dark in color (almost black), and with a very rough surface. On Dec. 27, 1905, in the presence of Dr. Louis Gross and Dr. Albert Abrams, I removed this concretion with the operation-cystocope. In this instance also, the stone was crushed twice, as it could readily be seen through the cystoscope, after the first crushing, that a fragment was left too large to come through the evacuating catheter. The crushing operation was done with no difficulty; and in both instances the stones were grasped at once and with the greatest ease. On Jan. 6, 1906, a cystoscopic examination showed the bladder to be entirely free from any fragments, and the patient is well.

After having removed calculi by other methods, I am of the opinion that this is the best and most satisfactory for removing stone from the bladder in any case which is favorable for the use of this instrument, because you see the field of work.

Having described the operation-cystoscope and some of its uses, I now come to a subject that I desire to speak of, *viz*:— The use of various instruments in the female bladder, together

with the ordinary examination cystoscope. Everybody cannot use an operation-cystoscope successfully, but any expert cystoscopist can use a long pair of forceps in the female bladder, such as is illustrated in Fig. 4, together with the ordinary cystoscope, for removing foreign bodies,—for the removal of ureteral calculi which are sometimes found protruding from the ureteral orifice, and which I have done on two occasions with this instrument. I desire to call attention to the fact that the shank of this instrument is quite thin, with a sharp pointed alligator-mouth working from the handle, and corresponds closely to the ordinary urethral forceps made for removing foreign bodies from the urethra, except the mouth is pointed and the shank is thinner.

Again, anybody skilled in the use of the ordinary cystoscope, can use the curette of my pattern (Fig. 5) in the female bladder in conjunction with the ordinary examination cystoscope. This curette I made for the purpose of curetting a slough from the center of a single ulceration in the female bladder (which later healed under the use of iodide of potash) and also removed a concretion which was imbedded in the wall of the bladder in another female subject; it was easily lifted from its bed under the guidance of the eye with this instrument, and removed later with the forceps pictured in Fig. 4. I have since used this curette several times over small areas of ulceration in the female bladder, but I am not yet prepared to speak of the results of this treatment. This curette is not very blunt, nor is it sharp; it is nine inches long, two inches of which consists of the handle. The shank is 1/16 of an inch thick, yet strong, being made of steel. I also have one of copper, capable of being bent if desired. The loop, or curetting end, is ½ inch long and 3/16 of an inch wide. It is readily inserted into and removable from the female bladder without scratching the urethra.

I further desire to present a syringe (Fig. 6) designed and made by myself for making instillations of nitrate of silver or other solution directly to any spot in the female bladder with the aid of the ordinary examination cystoscope. This instrument also possesses a long thin shank, being 7 inches long and 1/16 of an inch thick, the tip of which is surrounded by an olive point, thereby making it easy of introduction and extraction. The

proximal end is mounted with an ordinary hypodermic syringe which can be unscrewed for purposes of filling the same. The lumen of this instrument is fine, permitting the solution to be used drop by drop. This instrument can also be bent if desired, provided a wire be inserted into its lumen before bending, so

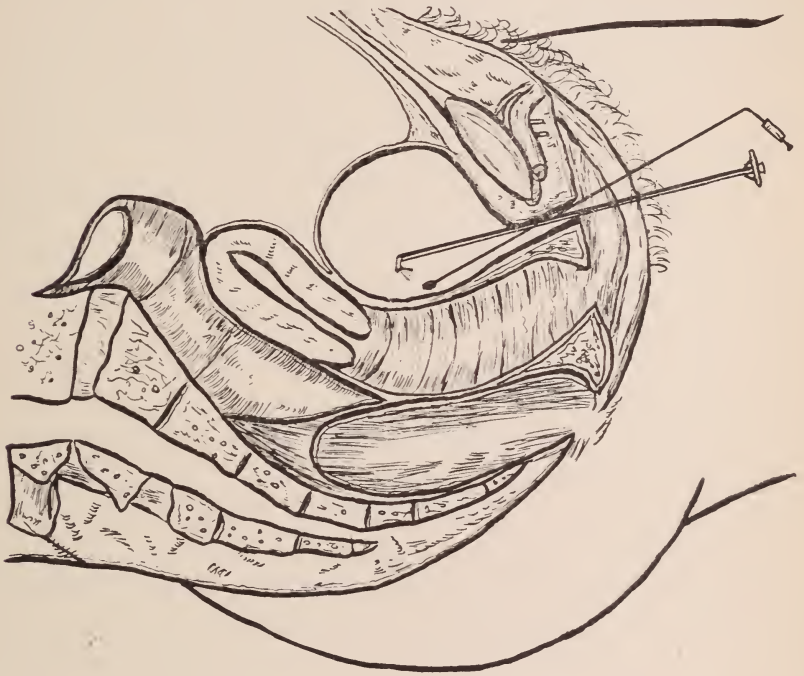


Fig. 7.

as not to obliterate the same. This instrument is always used with the bladder distended with air.

The principal feature of all the instruments described as Figs. 4, 5, and 6, is that the shanks are very narrow, thus occupying a minimum amount of space in the urethra after they are introduced. The technique of the use of these instruments is most simple. After taking the usual antiseptic precautions in regard to patient and instruments, the bladder is washed with a 4% solution of boracic acid until the washings return clear. The bladder is then distended with the same solution, or air, as seems best to the operator in the individual case. (Always use air when employing the instillation syringe.) The operating

instrument is then lubricated with sterile glycerine and inserted into the bladder and held by an assistant. The cystoscope is next lubricated with the same lubricant and inserted alongside of the first instrument introduced, and the bladder examined until you have in view the spot or place desired for the use of any of the instruments just described. The cystoscope is steadily held in position with one hand, while with the other you will be able to move the operating instrument freely and with a wide range of motion, capable of touching any part of the female bladder which can be seen through the cystoscope, and at the same time see what you are doing.

With a little practice one will be surprised with what degree of accuracy one can work, and the wide range of motion which can be obtained in any direction desired. After the operator has finished the use of any of these instruments, the cystoscope should always be removed first, and then the operating instrument. The cystoscopes which I have been using in the female bladder in connection with the other instruments described, are Nos. 22, 18, and 15F. Usually I have no difficulty using a No. 22F. If, however, the urethra be narrow, I use a smaller cystoscope.

In conclusion I desire to say:

First—That the Nitze operation-cystoscope is a practical instrument for selected cases and that it can be used successfully by those who will give sufficient time to practice with the same, until they become skilled in its use, before commencing to perform operations.

Second—That on account of the shortness and comparative straightness of the female urethra, it is easy to operate in the female bladder under the guidance of the eye, using any of the instruments above described together with the ordinary examination cystoscope, or with any instrument capable of passing through the female urethra, so long as the shank of such instrument is narrow and occupies a minimum amount of space in the urethra. This method of operating in the female bladder will be found simple to anybody accustomed to intra-vesical manipulations and skilled in the use of the cystoscope. Other instruments can readily be made to be used for such purposes as cauterization, or snare work, all to be used in the same manner, thereby accom-

plishing ends for which bladders are often opened. I am sure that these methods of operating will save some people whose cases are favorable for these procedures from undergoing cutting operations, thereby saving time and suffering to the patient. If I have accomplished those ends in some cases, I will feel sufficiently rewarded.

DESCRIPTION OF ILLUSTRATIONS.

PLATE VI.

Fig. 1. Lithotrite ready for introduction.

Fig. 1 x. Lithotrite, after introduction, ready for use.
L—Lamp for illuminating bladder.
W—Wheel for operating male blade.
W'—Window of cystoscope.

Fig. 2. Forceps ready for introduction.

Fig. 2 x. Forceps after introduction, ready for use.
L—Lamp for illuminating bladder.
W—Window of cystoscope.
X—Wheel for opening and closing forceps.

PLATE VII.

Fig. 3. Cautery and snare ready for introduction.

Fig. 3 x. Cautery and snare, after introduction, ready for use.
A—Screw by which other cauteries may be inserted.
B—Apparatus for controlling and moving the snare.
C—Button on cord to heat cautery.
L—Lamp for illuminating bladder.
S—Button on cord to heat snare.
W—Window of cystoscope.

Fig. 4. Forceps described above.

Fig. 5. Curette for use in the female bladder.

Fig. 6. Instillation Syringe.

Fig. 7. Showing two instruments lying side by side in the female bladder.

2298 BRODERICK STREET.

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THE AMERICAN JOURNAL OF UROLOGY

VOL. II. SEPTEMBER, 1906. NO. 12

SURGERY OF THE URETER.[1]

By EUGENE FULLER, M. D., New York City.

IN approaching this subject it is well first of all to consider for a moment the physiological function of the ureter. Its purpose is so obvious that the most elementary student has never to ask his instructor its use, and it is, perhaps, on that account that this important organ has, as a rule, received so little general attention. In thinking, however, of its prominent function when one considers its length, its narrow lumen, and the grave constitutional disturbances which immediately follow any stoppage of the urinary flow along its course, it is then easy to become impressed with its importance, and even, perhaps, to err in the belief of attributing to its disorganization more than its true quota of urological disturbances.

It is chiefly to cystoscopy, and in a minor though somewhat important degree to skiascopy, as diagnostic aids that the profession is indebted for making possible of accomplishment much which is now being done in this branch of surgery.

It has seemed well in treating this subject to sub-divide it under two headings, the first, to be devoted to the surgical uses to which the ureter is put in the diagnosis and management of disease in the kidney and its pelvis, and the second, to consider the diseases and lesions of the ureter itself together with their surgical management.

The first of these headings will be considered briefly. Some may even object to any consideration of this special subject in a paper with the above title, still, as catheterization of the ureter, or more exactly the ability to accomplish it, is the foundation as it were on which is based so much that has been accomplished in this surgical branch, it has seemed proper to give it attention.

[1] Read before the American Urological Association, New York, April 3, 1906.

The pioneer work of Pawlik and Kelley on the female ureter, employing the endoscopic principle and reflected light, doubtless did much to stimulate surgical attention in this direction. One great objection, however, to the work of these authorities was that their method could be made applicable only to the female. In the early Nitze and Leiter cystoscopes the lamps were so hot that the bladder wall was cauterized unless great care was observed, and it was only after the advent of the cold lamp that a systematic study of the ureteral orifices could be attempted. Then it was that Nitze solved the problem of ureteral catheterization by the aid of reflected light, the indirect method, and Tilden Brown by the aid of non-reflected light, the direct method. Both these methods of procedure are satisfactory and practical. A surgeon who has, however, rendered himself expert with one of them is not apt to be an adept with the other, and it seems hardly worth while to perfect oneself in both methods. Before attempting to catheterize ureters the surgeon should first accustom himself to the manipulation of the cystoscope proper and to the study of intravesical appearances. He should next practice finding and locating the ureteral orifices without attempting to pass a catheter. After he has perfected himself in these particulars, the last step in the study, the actual passage of the catheter ought not in the great majority of instances to present any special difficulties. If, on the other hand, one attempts to become skilled at ureteral catheterization without the preliminary study recommended he will be doomed to failure.

From a diagnostic standpoint catheterization of the ureters is in the great majority of instances undertaken for the purpose of collecting separately the urine from each kidney. The advantages gained by such a procedure are almost too obvious to require detailing. There is no longer any excuse for a surgeon, should he have removed the wrong kidney, the only kidney, or one damaged kidney in a case where the remaining kidney was also so damaged as to be unable of itself to support life. It may be also that catheterization of a ureter aside from renal urinary segregation may furnish important diagnostic data. Thus in cases of hydro or pyo-nephrosis from the volume of the fluid drained directly from the renal pelvis the degree of distension and renal disorganization can be reckoned. Occasionally also the tip of a catheter or sound, especially if it be waxed as Kelly

has recommended, may be able to detect stone even in the renal pelvis. Catheterization of the ureter undertaken for the purpose of lavage of the renal pelvis in cases of pyelitis has at the hands of Ayres and a few others accomplished marked results. Where pyelitis exists as the result of defective drainage conditions this form of treatment must, of course, be only palliative, just as is washing the bladder for a cystitis of a similar description, the radical treatment being a removal through surgical operation of the condition causing the defect in drainage. One other purpose to which ureteral catheterization is sometimes put is to divert the urine temporarily from the bladder after a vesical operation. The most striking instance of the value of this procedure of which I have cognizance was in connection with a case of exstrophy of the bladder reported by Guiteras, wherein the urine was in this manner diverted from the bladder until healing by first intention had occurred in connection with the plastic flaps formed to make an anterior wall for the bladder.

Diseases of the ureter rarely manifest themselves clinically unless they serve as a cause for interference with the functions of the organ, that is, unless they cause an obstruction to urinary flow. Physiological experiments have shown that atrophy of the kidney follows complete and permanent obstruction of the ureter, whereas hydronephrosis results from a chronic narrowing of the canal, especially where such a narrowing has developed slowly, and also from an intermittently recurring obstruction. From a surgical clinical standpoint ureteral diseases can be classed under two divisions, first, obstructions to the lumen of the canal by calculous formations, and second, obstructions to the lumen dependent on diseased conditions of the organ itself. Under the first classification are grouped a majority of cases. In this majority, with very few exceptions, the ureter itself is primarily normal, the cause being the calculus, while the resulting clinical symptoms depend largely on the size and contour of the stone and on the degree of its progression along the canal. Diseased conditions affecting the organ itself and causing obstruction are acute flexions, torsions, traumatisms, neoplasms, and infections. There is another pathological condition which, although profoundly affecting the ureter, does not give rise to surgical symptoms in connection with that organ, and that is the existence of chronic obstruction to vesical drainage. Such obstruction often

results in a marked dilatation of the ureter, thus allowing urinary reflux and an ascending infection of the kidney and its pelvis.

Stone in connection with the ureter is of special surgical interest only when it effects a lodgment in the canal. The most acute and agonizing symptoms are, of course, associated with a stone which has not become so lodged, those symptoms ceasing immediately on the exit of the stone into the bladder. The surgeon, however, in these latter cases has little to do aside from the administration of anodynes to enable the patient the better to withstand the ordeal. Where, however, a stone has become lodged the question is different. Then it is that the surgeon has to make his diagnosis, locate the position of the calculus, and lastly, accomplish its removal. Clinical symptoms and the examination of the urine, of course, direct the surgeon's attention to the urinary tract, while cystoscopic examination of the bladder eliminates that organ from consideration. Sometimes the observation cystoscope, by allowing an inspection of the ureteral orifice, may reveal a calculus protruding to a greater or less degree from that opening, or if the calculus be lodged just above the orifice such lodgment may cause the opening to appear unduly patulous. The next step in a diagnostic procedure is to pass a ureteral catheter or bougie. In many instances it may be impossible to pass by the calculus, the tip of the instrument bringing up firmly against it. Here it is that the wax-tipped bougie is of much diagnostic value, the impact on the stone leaving characteristic scratches. Many times, however, a bougie may slip by a calculus and enter the renal pelvis. It is in such cases that the skiagraph is of supreme importance, and in order to make doubly sure that the shadow in the picture is cast by a stone in the ureter itself Brown has initiated the practice of having the skiagraph taken subsequent to the passage of the ureteral bougie. By this arrangement the tract of the ureter in the picture is definitely determined, and consequently if a stone is lodged in the canal its shadow will lie close to the line which marks the course of the ureteral bougie, thus eliminating all doubt. For otherwise it might be open to argument whether a shadow cast by a ureteral stone, for instance, could not have been made by some bowel concretion. A few instances have been reported wherein the passage of a ureteral catheter or bougie has of itself served to

so dislodge a stone from its ureteral resting place that a spontaneous cure has followed through a natural elimination of the calculus. In most instances, however, where by the means mentioned a positive diagnosis of calculus lodged in the ureter has been made, operative surgery for its direct extraction is next called for. If a calculus is lodged at or just behind the ureterovesical opening it is then advisable to perform a supra-pubic cystotomy, seize it with forceps or encompass it with a scoup, divulse the opening if needs be and extract it by direct traction. In order to steady such a stone while an attempt is being made to grapple it with instruments rectal or in the female vaginal digital counter pressure may be of aid. In a few instances in the female stone in this position has been extracted through a vaginal incision. Where the skiagraph shows a stone lodged at or just within the uretero-pelvic orifice nephrotomy should be performed, the renal pelvis opened and the stone seized and extracted in practically the same manner as just described in connection with supra-pubic cystotomy. Where a stone is lodged in the course of the canal at a distance from either orifice an extra-peritoneal incision has to be made, exposing the course of ureter, and in such a case the surgeon should try, before opening the ureter, by a stripping manipulation to force along the calculus if it be not manifestly too large, or by such manipulation to disintegrate it in case it should happen to be very soft and friable. Where these expedients fail the next step in case the kidney is not also disorganized is to open the ureter at the site of the impaction sufficiently to allow the direct extraction of the calculus. Such an incision should be made carefully and parallel to the course of the canal, so that no contracting cicatrix may be left to cause a stricture of the lumen of the organ. To close such an incision fine chromocized catgut is preferable, care being taken not to pierce the mucous surface, thus exposing the catgut to urinary action, lest calculous deposit may there form. In order to make sure of preserving the lumen of the canal while the sutures are being taken it may be well to have a bougie in the ureter. To guard against damage from some urinary leakage at the site of the ureteral opening a wick or gauze drainage should connect that part with the surface of the body through an otherwise closed wound. In cases, of course, where the associated kidney is

greatly disorganized such conservative ureteral surgery may not be wise, a better course, perhaps, being the removal of the kidney, together with the ureter, at a point below the lodgment of the calculus.

Acute flexions and torsions of the ureter are caused by a floating or moveable condition of the kidney. Their correction is consequently a matter of renal rather than of ureteral surgery. In this connection it can be said, however, that nephropexy in case the kidney has not already become disorganized and the fixing of the organ in its proper position effects a cure of the resulting ureteral disorder.

Moderate torsions and flexions of the ureter, especially where the secondary element of infection is superadded, are among the causes of stricture of the part. Traumatisms and infections, either singly or combined, are other causes for a like condition. Neoplasms can also cause obstruction through an involvment of the wall of the canal or from the outside pressure they may exert. Such conditions of the ureter are diagnosed and studied as are corresponding lesions of the urethra by sounds and bougies. One can, of course, manipulate the urethra much more thoroughly than he can the ureter. If the standard sized bougie or catheter cannot be made to pass a ureteral obstruction the surgeon has to desist, contenting himself by locating the obstruction, reckoning the distance the instrument passes up the canal. Sometimes by careful manipulation a stricture can be passed, and in such cases it may then be that much benefit will follow the regulated passage of a bougie and the gradual dilatation of the part. Aside from the actual passage of an instrument much diagnostic information may be gained in many of these conditions from a careful cystoscopic study of the ureteral orifice. Where the ureter is completely obliterated atrophic changes generally occur, so it may be that no trace at all of the orifice is preserved, or perhaps a little shallow sulcus may persist. It is rare, however, in such instances to be able to make the tip of a catheter enter any distance along the canal. In partial obstructions the so often associated element of infection is apt to lend an edematous, or more or less inflammatory appearance, to tissues surrounding the vesical orifice. Besides this, just as in renal pelvic inflammations, if the surgeon watches such an orifice

he is likely to see the swirl of purulent material as it is ejected into the bladder.

The surgical treatment of these lesions causing ureteral obstruction may be palliative, it may consist in the removal of the involved organ and its kidney, or it may attempt a direct repair of the lesion. Palliative treatment may be advisable and generally is in cases where the element of infection alone or combined with another cause accounts in large degree for existing symptoms. The gonococcus, the streptococcus, and the tubercle bacillus, either alone or combined, are the usual agents of infection. Of the resulting lesions those from tubercle are apt to be the most severe. Palliative treatment consists chiefly of diuresis, the administration by mouth of drugs tending to sterilize the urine or eliminate the infection, and in some cases topical treatment through ureteral lavage. Where ureteral obstruction is of a severe grade, and is caused by a lesion which involves either a considerable length of the ureter, or two or more separate portions of the canal, so that a repair of the obstruction is out of the question, then it is that a nephrectomy is demanded to put the diseased ureter out of commission. Besides the nephrectomy it is also generally advisable to remove the diseased ureter, especially in cases where its walls are thickened by inflammatory action or its canal much overdistended, lest a troublesome sinus should persist at the seat of operation. The surgeon should attempt to accomplish a cure by repairing the lesion in cases where the ureteral obstruction is localized in one small area of the canal, the rest of the part being in a fairly healthy condition and where there is no coexisting advanced lesion in connection with the kidney and its pelvis.

Credit for such an operation belongs in large degree to the late Dr. Fenger, who cured a case of valvular obstruction at the pelvic opening of the ureter by its adoption. The operation consists in first making a longitudinal incision into the ureter, laying open the canal. The upper part of the incision lies above the seat of the obstruction and the lower termination of it extends below it. A suture is then put into the ureter so as to draw together the upper and lower ends of the cut, thus shortening the canal and at the same time widening its calibre at the spot where it is contracted. Side sutures are next put in, permanently closing the looped together edges to the lateral incisions.

Van Hook's splicing operation can sometimes be made to apply in this connection. The first mentioned procedure is, however, preferable.

In the performance of abdominal operations, or as the result of penetrating wounds or injuries, the ureter is occasionally cut completely across. If it is severed very close to its renal pelvic, or to its vesical termination, it may be that the main trunk can be grafted directly into the pelvis or into the bladder, as the case may be. Where such is not the case, however, the only reparative procedure available is that of Van Hook's, the splicing together of the severed ends. Failing in these devices it remains in such a contingency to remove the kidney or to establish a renal surface, or possibly a bowel fistula, both disagreeable alternatives.

Sometimes, as in cases of exstrophy of the bladder or malignancy, the attempt has seemed advisable to divert the urine from the bladder, this being accomplished by grafting the ureteral ends into the rectum. In most such attempts ascending infection of the kidneys has resulted. It has been claimed, however, that such renal infection will not ensue, provided the bladder wall about the ureteral orifice is taken away in the grafting process so that the vesico-ureteral valve is left intact.

In conclusion it has seemed well to mention the tolerance shown by the ureter to catheterization. The passage of a catheter along the ureter, if carefully done, causes little of no pain. The complaint, if any, which a patient makes in connection with the procedure arises from the urethral sensations due to the movements of the cystoscope. If the urethra is narrow or inflamed the cystoscope causes discomfort, and perhaps actual pain. Asepsis should be observed in this as in all surgical procedures. In my experience, however, there is less danger of provoking an inflammatory reaction from ureteral than from urethral instrumentation. I have seen but one instance wherein a very severe reaction seemed to follow urethral catheterization, and that occurred in connection with a case suffering from a tubercular involvment of the kidney and the ureter. The catheterization seemed here to account for an acute exacerbation of the existing infection, dangerous symptoms developing. In most cases no apparent reaction follows.

To become skilled in ureteral catherization requires much practice. From personal experience I should say that one should

catheterize the ureters in at least fifty cases before much real aptitude is developed. After one has, however, performed the act several hundred times he begins to wonder why the procedure is considered difficult, for then it is that the catheter seems to enter the canal promptly and almost of its own accord, whereas in the first attempts very likely after a tedious half hour's trial the ureteral orifice had not been even found, while the tip of the catheter had been so bent in vain efforts as to have ruined the instrument.

252 Lexington Ave.

THE SYMPTOMATOLOGY OF URETERAL DISEASES.[1]

By Douglas H. Stewart, M. D., New York.

IT is generally admitted that the ureters are almost immune from diseases of their own and consequently ureteritis is always a complication of some trouble above, or below, or outside of them. Probably this immunity is explained in great part by their position, their excellent drainage and by their being flushed by a sterile fluid under normal conditions, which drainage and flushing will be interfered with by the bending of the ureteral tube as in movable or floating kidney; by distortion and more or less occlusion resulting from the pressure of an abdominal neoplasm and by an internal stricture resulting from prolonged inflammation or internal traumatism, such as the passage of a rough stone.

Serious injury from external traumatism is so well known that Dr. Kelly directs that the first step, in his operation for the removal of the womb and appendages, should be the introduction of catheters into the ureters in order to render them more distinct and thus enable the operator to avoid harming them during the progress of surgical procedures. Dilatation follows obstruction here as elsewhere, and it would be more marked were it not for the physiological fact that when the urinary pressure in the pelvis of the kidney equals the blood pressure in the renal substance, then excretion ceases and naturally if the ureteral pressure be artificially raised beyond a certain point the whole mechanism of the kidney is reversed and absorption takes place. If you will consider the

[1] Opening discussion at the meeting of the American Urological Association, held in New York City, April 3, 1906.

anatomical relations of kidney and ureter it will be evident that the ureters, schematically, are good air pumps, and that the excretion of urine is practically carried on from the high blood pressure in the kidney to the minus pressure created by the force of gravity and the peristaltic contractions of the muscular walls of the ureter. As might be anticipated the ureter conveys the most urine when the kidney contains the most blood, and it seems quite reasonable in theory to suppose that should a ureteral obstruction be sufficient to raise the urinary pressure in the renal pelvis above the blood pressure in the renal substance, then the renal mechanism would be overthrown.

One of the most remarkable features of the ureter is its peristalsis, and I have not the least idea of its cause. Research has failed to enlighten me. This much I do know; contractions go on in a piece of the ureter removed from all attachments and conveying no urine.

It is true that contractions are more marked when the ureter is exercising its natural functions; but neither nervous influence nor the passage of urine cause peristalsis: although they do stimulate it.

Inflammation of the ureter is practically always a complication, therefore the symptoms are marked to such an extent, that while the original disease may be quite plain to the general practitioner, ureteritis only exceptionally receives the consideration it merits. Hence a clear opinion can be formed on the passage of renal calculi with scarce a thought on the laceration produced thereby. A cystitis may be diagnosed without any consideration of the possibilities of an ascending ureteritis: or an abdominal tumor or misplaced kidney may be defined with little heed given to the effect on the ureter. I may perhaps truly say that even a urologist may discover a ureteritis more often because he is thorough and wishes to examine every part of the genito-urinary tract, than because he had any preconceived idea of its existence and was searching for it. The expert microscopist is most favorably situated because he has no baffling mixture of symptoms to consider, but describes what he finds in the urine solely: hence the immense advantage of the cystoscope and microscope going hand in hand.

Broadly speaking, I would suggest as a working symptomatic basis, that if a patient has just passed, or is passing renal calculi—

we can take the ureteritis for granted. If he has a cystitis of any duration or an abdominal tumor, then an expert microscopical examination of the urine for ureteral inflammation is invaluable.

The most common symptom is pain, and this pain is peculiar in that it is radiated downward to the bladder, or even to the testicle. Tenderness is often found along the ureter, so that its course may be made out by palpation.

A very good routine question to incorporate in a history is "Have you noticed any difference in the quantity of your urine?" Should the answer be "No," then it is a fair inference that the ureteritis has extended from below upward. Should the answer be "Yes; it is sometimes very little and at others a lot," then the inference is equally fair as to extension from above downward; because in an inflammation pure and unobstructive, practically no change is to be expected in the quantity of urine; but in case of obstruction, by calculi for instance, we would find the flow diminished or very variable as in hydronephrosis. And should we get tenderness along the ureter with no history of calculi, that tenderness points strongly to a ureteritis of gonorrheal or septic origin. Perhaps I am partial to this symptom because I once received a great deal of credit through it.

An excellent physician, one of the fine minds of the profession, asked me to look after a patient for him. The diagnosis was hydronephrosis in a boy aged nineteen. Prognosis; grave. In order that I might have a clear idea of affairs, and know what to do should an emergency arise during the night, the doctor asked me to accompany him and make a careful examination. I found a slightly enlarged right kidney, and tenderness along the ureter. Palpation was easy as the patient was very thin. Inquiry revealed that the quantity of urine passed did not vary materially: examination showed a urethral discharge: the residuum of a gonorrhoea of two years before. The patient was transferred to a hospital where he died a few days later. Autopsy revealed about as much damage as gonorrhoea could produce in the urinary tract.

While not infallible, the symptom is valuable. For emphasis I repeat: Tenderness along the ureter with no variation in amount of urine, justifies search for evidences of specific ureteritis.

Differentiation between a right-sided ureteritis and appendicitis may be difficult. The pain of appendicitis is likely to appear anywhere and follow most any sort of a course on oc-

casions. Palpation usually reveals rigidity of the right rectus abdominalis and flexion of the right thigh upon the abdomen is very uncomfortable in appendicitis; while the muscle rigidity is lacking and the flexion does not incommode in ureteritis.

The symptoms of ureteral diseases are important, but often obscure. In their discernment and interpretation, success may only be hoped for from the united efforts of the urologist, the general practitioner and the skilled microscopist.

URETERAL LAVAGE.

By Winfield Ayres, New York.

LAVAGE in the treatment of inflammation of the ureter has decided limitations. Without an associated pyelitis or nephritis, ureteritis is rather rare, its origin being then commonly due to a local condition such as impacted calculus, kinking, or stricture of the ureter. It is possible to have tuberculosis of the ureter without other involvement of the urinary tract, yet one would scarcely expect to obtain satisfactory results in these cases from lavage; or if benefit were derived therefrom, one would doubt the diagnosis. Acute inflammation of the ureter is a contraindication to the passage of the ureteral catheter.

In one condition only is lavage of the ureter indicated as soon as diagnosis is made. I refer to stricture of the ureter. Inflammation cannot be eradicated until the stricture is fully dilated, but if the ureter be thoroughly washed after each dilatation, amendment will more quickly follow. In all other cases lavage should be employed only after the proven failure of internal medication, etc.

Calculous ureteritis usually disappears after the stone has been dislodged, yet if it persist may be treated by lavage. Occasionally it is possible to induce a small calculous to leave its niche in the ureter and pass into the bladder by injecting sterilized vaseline above and about it through a full-sized ureteral catheter. As an ordinary thing, however, an ureterotomy is necessitated.

Ureteritis due to kinking of the ureter, can be cured by lavage, but a return of inflammation may be expected unless nephropexie be performed. Commonly, the only essential to overcoming inflammation, is fixation of the kidney, and therefore as a rule lavage is unneeded.

Conclusively then, the only cases of ureteritis benefited by lavage are those occasioned by stricture, idiopathic ureteritis and ureteritis associated with pyelitis.

Diagnosis of ureteritis without pyelitis or nephritis may be made on microscope testimony, but clinical diagnosis is much easier and should always be employed in corroboration. Pus may have been seen issuing from the ureteral meatus, or perhaps its appearance may have prompted suspicion of trouble in the ureter; an ureteral catheter is inserted a short distance collecting cloudy urine; is passed further into the ureter and again secures urine. In this manner the entire length of the ureter is tested. If from some point high up along the ureter or from the renal pelvis, clear urine be obtained, clinical diagnosis of ureteritis without pyelitis is manifest. One possible exception to this rule exists: the extremely rare condition of a double ureter on one side with a single opening in the bladder—one ureter and its pelvis being involved, the other not. The catheter below the point of union of the two ureters might gather urine from both, and yet proceeding further might enter the normal branch and there collect clear urine. This condition must be excessively uncommon, but I am led to speak of it because I believe I have such an one under observation at present. I shall report his case more fully later. If the amount of pus in the urine collected in the lower portion of the ureter be out of ratio to that which would be found in an ureteritis, and the urine from the renal pelvis be clear, the above condition must be taken into consideration no less than the possibility of an abscess cavity communicating with the ureter.

Lavage for inflammation of the ureter should be employed only after the asserted inefficiency of internal medication, etc. No benefit may be expected, however, unless the operator be thoroughly trained in technique. Lavage will not remedy all cases, but before resorting to operation, it is well to first attempt cure through that agency. In two or three weeks signs of benefit or non-influence are readily detected and the patient being constantly under observation, an operation may be performed at any time.

Method of lavage. The catheter is passed slowly and gently beyond the area of inflammation or, if there be ureteropyelitis, well into the renal pelvis. The cystoscope is removed and unless a sample of urine be desired, the patient is ready for treatment. Primarily, very small amounts should be urged

through the catheter until the ureter becomes accustomed to the foreign fluid. The initial injection should be not more than 2 cc. —this being allowed to flow out. The second injection may be 3 cc., but during the first lavage it is best not to inject at any time more than 5 cc. When about 60 cc. of the solution has been used, the catheter is withdrawn 10 cm. and lavage repeated, and so on until the entire ureter has been thoroughly washed. In nearly all subjects there is a return flow along the catheter, as the fluid is introduced, in so much that quite a large injection may be given without causing the patient any discomfort, but in occasional instances very little return flow is noticeable, and it is in apprehension of similar cases that the first few injections must be made carefully and gently; otherwise, severe renal colic may ensue. At first also very mild solutions should be used or a colic may occur several hours after treatment. In all cases the bladder and urethra must be washed out after the ureteral catheters have been withdrawn; the bladder in order to remove all products cleansed from the ureter and the urethra as a precaution against urethral chill.

After the first treatment, the patient should be required to continue in a recumbent position without constriction about the waist from thirty to sixty minutes. Being then allowed to go home, he should previously be warned to remain perfectly quiet for the balance of the day. After several lavages these precautions are not necessary, and he may be permitted to do as he pleases directly after treatment. In the event of a renal colic, the patient should be directed to apply hot water over the kidney. Under this suasion, pain usually ceases in ten or fifteen minutes.

I prefer to use the direct view cystoscope for inserting catheters, because with it, the time occupied in operation is much less and the instrument may be removed without disturbing the position of the catheters. The bladder may be washed out through the cystoscope, thus avoiding the passage of an extra instrument. It must be admitted, however, that in isolated cases, impossible of catheterization by the direct method, the indirect must be employed.

Drugs to be used should be selected to suit each case. For catarrhal inflammations, I have found silver nitrate in a boric acid medium the best. Its strength should vary from 1:8000 primarily, to 1:3000 as the patient becomes accustomed to it. I

have not proved it necessary to employ a stronger solution in this class of cases, and I rarely use a stronger than 1:4000. For purulent inflammations of the ureter and renal pelvis, when there is good drainage, I have found freshly dissolved argyrol (15%) excellent, but when the solution is retained for some time, it decomposes and irritates. Colargolum, from 1:2000 to 1:100, is sometimes efficient. Silbermine 1 to 3%, is another drug whose usefulness I have confirmed. A saturate solution of boric acid, however, will often clear the urine better than any of the above named. This must be used very copiously, but only in those cases which allow a free return outside the catheter. When administering boric acid, I attach the catheter to a percolator and regulate the current by hydrostatic pressure, about a litre being allowed to flow through the catheter.

Frequency of treatment depends upon the case under observation and tolerance of the bladder and urethra to the use of the cystoscope. Catarrhal ureteropyelitis does not require lavage oftener than once in five days. Purulent ureteritis or ureteropyelitis must be treated at shorter intervals—every second day if possible. I have had several patients undergoing lavage every second day for two or three months without any occasioned irritation of the bladder or urethra. Catheters may be left in the ureters for several days, the renal pelves and ureters being frequently washed meanwhile. In cases of ureteritis, this would be of benefit only when there is a free return flow. Just as soon as the catheters become eroded or plugged they should be removed and new ones inserted.

For treatment of the ureter alone lavage is indisputably limited in usefulness.

616 Madison Avenue.

DISCUSSION.

Dr. Louis Heitzmann. Even at the present day most clinical pathologists consider it impossible to diagnose epithelia from different parts of the urinary tract, by the microscopical examination of urine; nevertheless, there can be no doubt that such a diagnosis can not only be made, but is not at all difficult in the majority of cases. The different genito-urinary organs are lined by epithelia which are more or less characteristic, and in pathological conditions these epithelia appear in the urine in varying numbers. Since the advent of the ureteral catheter, the subject has been simplified to a considerable degree, as the epithelia from the lower tract can be positively excluded, and only those from the uriniferous tubules, pelvis of the kidney

and ureter, with perhaps an occasional epithelium from the superficial layers of the bladder, will be found in urine obtained by means of the ureteral catheter. In order to understand the ureteral epithelia as seen in urine, a general idea of epithelia is necessary, as it is impossible to diagnose them without a fair knowledge of histology. There are only three varieties of epithelia in the body, the flat or squamous, the cuboidal, and the columnar or cylindrical, so that their shapes alone do not help us in the diagnosis; the sizes, however, are characteristic enough in the majority of cases. The ureter is composed of a number of layers of epithelia, that is, has stratified epithelium. If we make a transverse section of a ureter, we will see that it contains five, six or more layers of small, slightly irregular, cubodial, with one, the deepest layer of columnar epithelia. These formations are distinctly different from those seen in the different portions of the uriniferous tubules or those seen in the pelvis of the kidney, being larger than the former, but smaller than the latter. On examining a urine, and looking for similar epithelia, we will have little difficulty in recognizing them. The only organ of the genito-urinary tract which is frequently lined by cuboidal epithelia of the same size, is the prostate gland, but here columnar epithelia from the ducts of the gland, distinctly different from those seen in the ureter, are always associated with the cuboidal epithelia. In a ureteral catheter specimen no formations are ever present, which at all resemble the epithelia from the ureter, and they can be located with absolute positiveness. Upon comparing the epithelia from the different organs seen in urine, those from the uriniferous tubules, the pelvis of the kidney and the bladder, they are found to be different in size at least. Those derived from the ureter have a moderate size and are approximately twice as large in diameter as the pus corpuscles or leucocytes in the same case. It must be remembered that an epithelium is bound to change somewhat in the urine, on account of the imbibition of the watery constituent of the urine, the cuboidal epithelia becoming rounded, oval or even perfectly globular, and a trifle larger than in the tissue. There are no other epithelia in the urine, with the exception of those from the prostate gland, which have twice the diameter of pus corpuscles, those from the convoluted and narrow tubules of the kidney being about one-third larger than the pus corpuscles. The deepest layer of the ureter is lined by columnar epithelia; these also are perfectly characteristic, the more so, since they differ from those derived from the ducts of the prostate gland, and are caudate in character. These caudate epithelia are frequently seen in ureteral catheter specimens, being due to the injury caused by the catheter. In this manner we are enabled to locate a hemorrhage directly in the ureter, or an impacted calculus, a tumor, or a destructive process of any kind.

Dr. Follen Cabot. The cystoscope I prefer for this work is the prismatic or right angle instrument. With this we get a better view of the ureter and can bring first one ureter into view and then the other one with a turn of the wrist. This is done more quickly and easily than can be done with the direct view instrument. In hemorrhage from one kidney, I was deceived a few days ago in my first examination, by the blood coming apparently from the right ureter, but before I could be positive, dimming the whole field. I felt sure one kidney was bleeding. I catheterized both ureters and found that the blood came from the left kidney. Later on I examined the case again, and was able by meatoscopy to determine the point positively. We must be careful about depending too much on this method alone. If we get a clear field in a healthy bladder, thick pus is more easily located. Where the bladder is diseased, it will be much more difficult without the catheter to determine which ureter is involved. In a tuberculous kidney, we usually get an uneveness; also reddening around the opening of the ureter, depending on th stage of the disease. Slight red-

ness and swelling around the opening combined with some suggestion of tuberculous nodules, is frequently seen in these cases. A plain inflammation will sometimes give us nearly the same picture, so we can only decide by catheterization. In hypertrophied prostate or where the ureter is brought into view with difficulty, I use a 4% salt solution of indigo carmine. I inject this subcutaneously to help in determining the opening of the ureter. I have examined several cases where there has been a nephrectomy. The longest period was eight years. The remaining kidney usually has a rather enlarged ureteral opening and much more activity than where both kidneys are present. After observation of the ureteral opening, I have found stricture in several cases an inch or two from the meatus. This may almost be considered typical in tuberculous disease of a kidney. In calculus of the kidney, but more particularly if producing obstruction, as it does when in the ureter, we find by meatoscopy, the golf hole ureteral opening. The sphincter of the ureter in these cases seems paralyzed and remains inactive and patulous. It is quite typical of ureteral stone or of stone in the renal pelvis.

Dr. O'Neil. On account of the high mortality attending ureteral implantation, Dr. Watson of Boston, has suggested that double lumbar nephrostomy be performed to establish permanent renal fistula. At a second operation, the bladder to be removed entirely. This suggestion is based on the fact that he has a patient who a number of years after double nephrostomy is well, and attends to his regular duties. This method although radical, would be of undoubted value in selected cases.

Dr. Valentine. Dr. Fuller said that it is hardly worth while to perfect oneself in both methods of cystoscopy. He was speaking of the direct and indirect methods. I cannot agree with him on purely personal grounds. I would not want to do without both cystoscopes. There are instances where I would fail with the prismatic and make good with the direct one, and the reverse would hold good. It may be due to larger experience with one instrument or maladroitness. I find it necessary to use both methods. Why I fail with one in some instances and succeed with the other, I am unable to say. I have spent as much as five minutes trying to get a catheter in, would then change and succeed at once. The author has also said that for the pain with the patient experiences, there are few people who have used cocaine. His analgetic must be his fingers. When we consider the introduction directly through the urethra, the rotary motion and finally the tilting, we do not discommode the urethra and there is no pain. I would like to ask Dr. Fuller to give us a few words more regarding anodynes in the passing of stones. My reason is that I have failed in all cases in getting any relief from any of the hypnotics. I have been obliged to use an enesthetic to a light degree until the stone was passed.

Dr. E. Fuller. I don't use a great many anodynes. Where a stone is progressing, the surgeon is in the position of the obstetrician where the baby is coming along all right. There may be little to do aside from assuring the patient. I never have pushed a case with anodyne, but I think there have been cases in which the amount of morphine given was so great, that after the stone had passed, death from morphine had to be feared. In extreme conditions, keeping them under an anesthetic is all right. I am not defending anodynes and I yield to Dr. Valentine that they are probably not of much value. I think the actual passage of the catheter in the ureter rarely causes pain. The principal pain caused is introducing the cystoscope into the deep urethra, and in certain cases where you have inflamed conditions, bending the shaft of the instrument has given more pain than anything else. Personall . I use the direct method and am not skillful at the indirect. I think there are few who use both methods.

CYSTOTOMY IN THE FEMALE.[1]

Dr. Edgar Garceau, M. D., Boston, Mass.

THE cases which are amenable to treatment by this operation are the following: (1) Nervous cases; (2) tubercular cases; (3) cases of simple chronic cystitis without infection of the upper urinary passages; (4) cases of chronic cystitis with infection of the upper urinary passages. The treatment varies in each case to a certain degree.

Nervous Cases.—This class comprises cases of hysteria, neurosis, and vesical hyperaemia due to pelvic engorgement. The hysterical cases are very difficult to cure. Every effort should be made to cure them without resorting to so serious an operation as cystotomy, and chief among the therapeutic measures is suggestion. Hysteria is very amenable to this form of treatment, and sometimes a hysterical bladder will yield very readily under its influence. The chief cause of suffering is simply the desire to empty the bladder more frequently than usual. This symptom becomes after a while, a fixed idea, and the patient devotes her whole attention to brooding over this one organ. If all means of treatment fail, there is nothing else to do except to make an artificial opening into the vagina. The relief is instantaneous and the patient has no further trouble and has a chance to get well of her disease. After a time the opening may be closed, but before closing it the patient should be firmly impressed with the idea that there will be no further trouble. It is very difficult sometimes to differentiate between a purely nervous bladder, and one due to a definite lesion, for instance a long standing ureteritis. This latter disease is especially likely to be overlooked because the symptoms and the signs which characterize it are obscure.

The following case is illustrative of hysterical bladder.

Mrs. D., forty years old, was first seen in September, 1895. She had four children, the youngest four years old. She had always enjoyed previous good health.

[1] Read at the Annual Meeting of the American Urological Association, Boston, June 4-5, 1906.

Her vesical trouble began three years previous to her first visit. The complaint was that she had to pass water very often night and day, and there was always a constant desire to empty the bladder. Her history was that of a very nervous woman, who magnified her symptoms unintentionally, in fact she was of a distinctly neurotic type.

On examination the genital organs were not remarkable. With the cystoscope, the whole urethra was found to be much congested, but the bladder itself was normal, except that the trigonum and vesical neck were somewhat red. Examination of the urine showed nothing abnormal with the exception that there was a slight excess of epithelial cells.

She was put upon various sedatives and was told to pay as little attention as possible to her bladder trouble. Locally nitrate of silver was applied to the trigonum and vesical neck, with some relief.

She remained under treatment until November 24, 1895, then she became pregnant. At once all the bladder troubles were redoubled in intensity and relief was imperatively demanded at the end of the second month of pregnancy. So, although she was pregnant, a cystotomy had to be performed in order to relieve her. The operation was perfectly successful and she immediately experienced full relief. She was confined in June, 1896, without trouble, and the fistula in no way interfered with the confinement. She was last heard from in December of the same year, having fallen under the treatment of another physician, and she was then contemplating having the fistula closed.

This case was one of hysteria of the bladder. She had been examined by a neurologist, who reported that her field of vision was nearly down to fixation, and that she had various other stigmata of the disease.

Another form of neurosis is the intensely irritable bladder which is sometimes seen after certain pelvic operations, notably hysterectomy. Here we have pelvic engorgement and this engorgement is general throughout the pelvis, and affects the bladder as well as the rest of the pelvic organs. Simple hyperaemia of itself is enough to cause an irritable bladder, but there is likewise a strong nervous element in these cases. The patient becomes markedly nervous, has hot flashes, is intensely irritable, and if

she has vesical hyperaemia the calls to urinate will be much more frequent. These cases are sometimes very serious in that if they are not relieved the nervous system begins to be undermined, and something has to be done. Cystotomy here offers an immediate and permanent form of relief so long as the opening exists. The patient is immediately made comfortable. But as a curative measure it fails, for as soon as the fistula is closed, if it is closed before the termination of the artificial menopause, at once the symptoms are apt to return with their old intensity.

Mrs. W. was first seen October 25, 1895. She was thirty-three years old and had been married sixteen years. She had five children. After the last child was born she suffered from septicaemia, was in bed six weeks, and had been ill ever since that time. Previous history was negative as well as the family history. She suffered so much from pain in the pelvic region that the uterus and appendages had to be removed for severe inflammation of these organs. The operation was performed by Dr. E. W. Cushing in September, 1895. Immediately after the operation she suffered no more from pain, but there was a frequent, irresistible desire to empty the bladder, which persisted night and day.

On examination a tender cicatrix was found in the vagina on the right side. With the cystoscope it was seen that the urethra, vesical neck, and trigonum were intensely red and granular looking. Soon the symptom incontinence made its appearance, and this, with the constant desire to empty the bladder, made the patient's life miserable. The symptoms of menopause added to the discomfort, and after suffering eight months, during which time she was tormented continually day and night, a vesico-vaginal fistula was made. Complete relief followed at once, and she had no further trouble with the bladder. She was an intensely nervous, excitable, unreasonable woman, and at the end of four months from the time the fistula was made she insisted upon having the opening closed. At no time was there any pus in the urine, the sediment consisting of an excess of epithelial cells only.

The fistula was closed in November, 1896, and at once the old train of symptoms began with redoubled intensity. A peculiarity of her suffering was that at the time when she usually had her menstrual period the vesical irritability was very much more

severe. A gradual improvement appeared in February, 1897, and continued until the end of that year, when she was passing her water only four times a day, and not at all at night. In January, 1898, she had an attack of acute cystitis which lasted several months. Appropriate treatment was given for this and it finally disappeared. She was seen again in June, 1900, and then she reported herself entirely well, and there had been no return of the old symptoms. This case was undoubtedly one of simple vesical hyperaemia with a very large neurotic element. The hyperaemia was due to the increased pelvic congestion, the result of the operation, while the neurotic element came in part from the fact that she was undergoing artificial menopause. The great intensity of vesical symptoms at the usual time of the menstrual period was significant. While the fistula undoubtedly gave the patient a great deal of relief, yet it does not seem that it had much to do with the cure of the trouble, because the symptoms recurred immediately after the fistula was closed.

If the patient is an extremely neurotic woman and has suffered for a good while before the cystotomy has been done, the operation may sometimes fail and the failure here is due to intense spasm of the vaginal outlet which retains the urine in the vagina as it comes from the bladder. In such cases the only thing to do is to incise the vaginal septum from the meatus to the cervical junction, including the vesical neck. No fear need be felt in regard to the efficiency of an operation to close this extensive fistula, for there is no reason why the vesical neck should not heal if a proper operation has been done to close it. In one case in the author's experience the fistula remained open for a period of five years; then the operation for closure was performed with a most excellent result, the patient being able to retain her urine with very little incontinence at first, which soon disappeared.

Tubercular Cases.—Heretofore it has been thought to be unwise to do a vaginal cystotomy in cases of tubercular cystitis for the reason that when the disease has not been cured and an attempt made to close the fistula at the patient's urgent solicitation, the wound has not closed owing to the persistence of the tubercular disease in the bladder which prevents healing in a normal way. But if the tubercular disease has been thoroughly

eradicated from the bladder there is no reason at all why the opening should not close as it usually does. The cure of tubercular cystitis at present is by no means impossible. If the disease has not extended beyond the limits of the bladder, in other words if it has not extended to the ureters and kidneys, there is no reason why, if the case is properly treated, it should not get well. The first essential in the treatment of tubercular cystitis is to be sure therefore that there exists no tubercular inflammation of the passages above the bladder. If such inflammation exists a cystotomy is at best merely palliative. A tubercular kidney or a tubercular ureter should be removed by excision.

Tuberculosis of the bladder may be divided for convenience sake into three classes; (1) the incipient cases; (2) the long standing cases, and (3) the incurable cases.

There seems to have been a dread or at least a disinclination to do the operation, cystotomy, but in view of the immense relief which it gives this is difficult to understand. It is not meant that all cases of tuberculosis of the bladder should be treated by a cystotomy. The usual methods of treatment of the disease should be first tried, including the effects of hygiene and climate, as well as the treatment with corrosive sublimate and nitrate of silver. If this treatment fails, and it is very apt to, relief is demanded imperatively.

Another class of cases deserves mention, and that is cases of disease occurring in poor people who have to earn their own living, and who cannot devote their time to a long course of treatment. These patients can be immediately relieved by this simple operation, and it is particularly in this class that the operation finds its chief place. These patients can go about without pain, they can take the necessary after treatment at home, and above all they are perfectly comfortable and can occupy themselves with whatever they have to do.

It is not well to wait too long before resorting to this operation in any case. If, after a thorough trial of the ordinary method of treatment, it has failed, it is far wiser to proceed at once to a cystotomy rather than take the risk of having the disease extend to the upper passages, as it is very certain to do in time.

The after treatment of the patient who has had a cystotomy

is extremely simple. She takes two copious injections of boracic acid daily, observing strict antiseptic precautions, meanwhile wearing rubber gloves; in this way she keeps her hands free from the contamination with the germs and runs no risk of spreading infection. She has applications of nitrate of silver made to diseased areas of the bladder by her physician at occasional intervals, and she takes the Guyon treatment at home.

The disease will yield after a variable time, depending upon the extent and severity of the lesions. An out-of-door life is to be enjoined, the greatest care of the body taken, and sleeping in the open air is advisable. The rubber urinal which is worn in these cases collects every drop of urine as it drops from the bladder into the vagina, and keeps the patient in a state of cleanliness and dryness.

Miss F. was first seen March 23, 1904. She had always been well with the exception that seven years before she had a uterine displacement which was corrected and afterwards gave no further trouble. Her general health had always been good, and she never had any complaint except that with reference to the bladder. There were no chest symptoms. Two or three years before the first visit she had suffered from attacks of cramps, which were never severe, and lasted only a half hour or so; they were never severe enough to require the services of a physician. The catamenial history was not remarkable. The duration of the bladder trouble was seven years, and during that time she had been obliged to pass her water frequently, especially lately, when urination was necessary as many as thirty or forty times a day, and many times at night. The act of micturition was painless except when she had to retain the water in the bladder any length of time; then she suffered a good deal. There never had been any hematuria, nor was there any incontinence. The chief trouble was constant, irresistible desire to pass water.

On examination the abdomen was found to be quite soft. The urine showed a large amount of pus, many small round cells, a few squamous cells, a few granular casts of small diameter, some of which had blood corpuscles adhering to them, and many tubercle bacilli.

On April 2, 1904, the bladder was examined under ether with the following result: The whole urethra was very much

congested and red, but there were no ulcers. In the bladder, however, there were several ulcers, one on the trigonum, one on the posterior wall, one just behind the left ureteral orifice; they were all small, not more than two centimetres in diameter, somewhat punctate and with yellow bases. Over the left ureteral orifice there were scars which looked as though they represented the remains of an old process. The bladder as a whole held 10 oz. The left ureter after some trouble was catheterized and a catheter was put in it. Although it was left in the ureter for five hours no urine was obtained at all. The Harris instrument was equally unsuccessful. On the right side the urine flowed readily and was not remarkable on examination.

As this patient had to earn her own living from day to day, and had no means of support except through her own individual efforts, it was necessary to do something for her which would enable her to do her work. So, without much hope of doing more than to relieve her condition, and with the supposition at the time, that an artificial opening into the vagina would lead to secondary infection and possibly more serious local conditions than were then present, it was nevertheless determined to make a vesico-vaginal fistula. This was accordingly done.

She left the hospital at the end of two or three weeks, and was instructed in regard to the care of the bladder. She was fitted with a rubber urinal which collected all the urine as it came from the bladder into the vagina, and she was told to take two boracic acid douches a day, using a sterilized catheter. She kept her hands free from contact with the urine with a pair of rubber gloves, which were sterilized from day to day. Besides this she had applications of silver nitrate to the bladder through the cystoscope occasionally.

In July, 1904, she began to use corrosive sublimate herself at home, at first injecting fifteen drops twice a day of 1 to 1000 solution of the corrosive. The strength of the solution was gradually increased until after a few weeks she was using a 1 to 500 solution. This treatment was continued until June, 1905, a period of a whole year. She then had to stop it on account of irritation which the corrosive was causing; but she resumed it again in September of the same year, having occasional applications of the silver as before.

In February, 1906, she having worked every day bookkeeping since her operation, and having followed directions to the letter with the greatest care, she appeared to be entirely well, judging from the entire absence of pus in the urine, and from the absence of any symptom referable to the bladder. On April 16, 1906, the fistula was closed successfully, and she is now undergoing treatment for a contracted bladder which holds now 125 ccm. The disease seems to be cured.

Long-standing cases are particularly amenable to this form of treatment. The essentials required are persistency, patience and care in details. The patient washes out her bladder twice a day with boracic acid solution, she injects the corrosive sublimate drops, and she comes to the physician occasionally to have ulcers treated locally with the nitrate of silver. In case of mixed infection the injection of ichthyol and glycerine in equal parts is of great value. Time must not be considered in the treatment; it sometimes takes a number of years before the last traces of the disease have disappeared, but finally the patient gets well. Of course, cases in which there are serious complications of tuberculosis in other parts of the body will not do well, and some care must be exercised in selecting cases for this method of treatment. If, however, the patient is in a fair condition of health as regards the rest of the body a cure may be looked for.

The following case is illustrative:

The patient was first seen in June, 1896. Her father died of cancer of the stomach. Her mother was living, although of delicate health. She had always been of rather feeble constitution, and there was a scar on her neck, the result of an abscess, probably tubercular, in her early childhood. She was of a very nervous temperament, although well controlled. Lungs were negative. She had complained of a pain in the right kidney region for many years, and as a child could not run and jump about as other children did without having a good deal of pain. She suffered a good deal from this pain and at times it was very severe.

The urinary trouble began about a year before she was first seen. There was frequent micturition night and day, attended with severe pain, and there was a constant desire to empty the bladder. There were periods of intermission, during which she

was fairly comfortable, but at other times the suffering was intolerable.

She was of slight build, pale, and had little strength. With the cystoscope, under ether, the urethra was found to be much injected as well as the vesical neck. The bladder was intensely injected, and contained many red patches, some of which had granular tissue on them, and there was likewise an ulcer of large size in the vicinity of the right ureteral orifice. The ulcer was apparently a typical tubercular ulcer. The right kidney was somewhat enlarged and was tender. The urine was very cloudy and contained a great deal of pus, a few casts, various sized epithelial cells, some blood and many tubercle bacilli. The left ureteral urine was normal but the right was purulent and contained tubercle bacilli, casts and epithelia. Guinea pig tests were positive.

Lumbar nephrectomy was done June 20, 1896, and a kidney, containing a large tubercular abscess, was removed. Convalescence was fairly good, but there was no relief from the suffering from the bladder. The following month she was again etherized and the whole bladder was cauterized with nitrate of silver stick. Great relief followed, and this lasted for several months, during which time she suffered very little from her bladder. In August, 1897, she began to get worse again and she continued to decline until in February, 1898, it was necessary to make an artificial vaginal fistula. This remained open for five years, during which time she suffered no pain whatever, and was perfectly comfortable in every way. The treatment at this time consisted in washing out the bladder carefully twice a day in boracic acid solution, and occasionally making application of strong nitrate of silver solution, to the diseased areas. At times she likewise injected into the bladder a solution of ichthyol and glycerine, which seemed to do a great deal of good. There was no marked improvement, however, until the Guyon treatment was instituted. This had been tried before the fistula was made, but it failed on account of the intense pain. She stood it very well the second time and in eight months the bladder was entirely rid of all evidence of tubercular inflammation. In October, 1904, the fistula was closed with success and she had no further trouble with the bladder. There was some contraction of the bladder but this was expected; it was

dilated by gradual daily dilation so that it soon held six ounces. She is now comfortable and has been well two years.

In cases in which the bladder is incurable, the operation is palliative. Where a bladder reduced to a small capacity holds only an ounce or so, with thick cartilaginous walls, with a mucous membrane studded with ulcers, it is difficult to see how a cure could be expected, no matter with what form of treatment. In such cases the inflammation of the upper urinary passages is almost certain to be present and the most that can be done is to make the patient as comfortable as possible until she dies. Cystotomy, however, will relieve such a patient. The urine which is the source of irritation, drains away through the artificial opening and the pains and intolerable torments cease as soon as the fistula has been made.

Cases of Simple Chronic Cystitis Without Infection of the Upper Urinary Passages.—Here the main question is when to do the operation. At best, a vaginal fistula is uncomfortable, a source of annoyance, chiefly mental, however, and a nuisance. Patients do not like to contemplate the attendant trouble which is sure to come with a cystotomy and then will put it off as long as possible. Chronic cystitis, however, may well spread to the upper urinary passages, and it is not well to wait too long for fear that this may take place. The more virulent forms of the disease are particularly apt to invade the ureter, and among them, stands foremost gonorrheal inflammation. This form of inflammation gives rise to a great deal of suffering proceeding from the bladder, and one would be more apt to do a cystotomy in a case of gonorrheal cystitis than from a cystitis from some other form of infection. When the disease is due to the colon bacillus or to some of the milder germs, it is best to give the patient the benefit of the ordinary treatment for the disease as long as possible before resorting to cystotomy. Many cases will yield and get well in the course of time.

Mrs. P., sixty years old, was first seen in July, 1903. She had always enjoyed good health and her family history was negative. She had never had any trouble whatsoever with the bladder until a year before she was first seen. At that time a rectal polyp was removed, and during the convalescence from this trouble, she contracted cystitis. Since then she was obliged to

pass her water very frequently night and day, the act being attended with some pain and tenesmus. There was no history of renal colic nor of hematuria, nor of incontinence, nor of gravel. She suffered all the time from the constant desire to empty the bladder, but she had periods of temporary relief, during which she did not suffer quite so much.

On examination of the urine, the sediment was found to be made up of pus chiefly, numerous squamous, small round epithelial cells and a few blood corpuscles. Guinea pig tests were negative.

She was a large, stout woman, of robust constitution and nervous temperament. The perineum was lacerated and the uterus atrophied. Kidneys and ureters were negative. The urethra was very red and granular and the whole bladder intensely injected and contained numerous red patches, three or four centimeters in diameter, the patches being made up of granular tissue which bled very easily. There were no ulcers.

As she had been suffering for a long time and had had the benefit of the usual forms of treatment of this class of cases, a cystotomy was advised. The after treatment consisted of douches of boracic acid, and occasional applications of mild solution of nitrate of silver, and urotropin internally. The fistula remained open for two years, during which time she took the greatest care of herself. It was closed in January, 1905, and since that time she has been perfectly well.

Mrs. P., was seen April 11, 1897. She was a woman of forty-eight years, married, and her previous history was not remarkable with the exception that for many years she had suffered from a medium-sized fibroid tumor of the uterus. This had never given her very much trouble, and had been kept in check by the use of electricity.

Her urinary history began four weeks before she was first seen. The onset was sudden and the first symptom was frequent, painful micturition, increasing in severity and in frequency, until finally she was urinating every few minutes with the greatest agony. After a week or two, the number of urinations was reduced somewhat. But she suffered so much pain during and after the act of micturition, that relief was imperative. On examination under ether, the meatus was found patulous and the

mucous membrane which had been forced out by the enlargement of the lining of the canal behind. On pressing the urethra vaginally, yellow pus could be expressed from the meatus. Half way up the urethra there was an ulcer of small size, with a grayish base and two smaller ones at the neck of the bladder. The whole bladder was very much inflamed and the membrane was red, swollen and glistening. The case was evidently one of very acute cystitis, due to virulent infection, and, judging from the severity of the symptoms, seemed to be gonorrheal, which view was strengthened by finding Bartholini's gland on the right side enlarged. On pressing this gland, pus could be squeezed from its opening.

As the patient was suffering intense agony and demanded relief, a cystotomy was proposed and accepted. The operation was performed April 13, 1897.

Mild antiseptics were used as a bladder wash, and internally she took sedatives. There was a gradual allaying of the inflammation and the redness began to disappear.

In November, 1897, the bladder wall prolapsed into the fistula, having been pushed down doubtless by the pressure of the large tumor above.

This prolapse of a part of the bladder immediately above the fistula, finally became so pronounced that it threatened to be a serious complication, and forced an earlier closing of the fistula than would otherwise have been done. At the operation for closure, which was in March, 1898, the polyp was excised and the fistula closed. In June, 1898, she was very much better, was urinating every three hours by day and twice by night, without pain. There was still some vesical irritability and a little incontinence. This lasted for a few months and finally disappeared entirely and the patient was well and has remained so since then.

Cases of Cystitis (non-tubercular) with Infection of the Upper Urinary Passages.—Numerous diseases of the upper passages may be associated with cystitis; chief among them are ureteritis, strictured ureter with dilatation of the upper passages, pyelonephritis and calculous disease of the kidneys and ureter.

The cure of the disease of the upper passages goes a great way towards eradicating a cystitis, but there are many patients who will not submit to a serious kidney operation. In such cases

a cystotomy relieves the patient from her suffering in a great measure, and if the opening is allowed to remain, the kidney will, in same cases at least, atrophy, and then the fistula may be closed. The following are illustrative cases:

Mrs. M., was first seen September 28, 1898. She was a thin, spare woman, thirty-five years old and had been married seventeen years. There was a history of phthisis in the family, her brother having died of the disease. The family history was negative.

There had been a gradual loss of strength and flesh until she was finally reduced to a state of great exhaustion.

She suffered somewhat from headaches, dizziness, constipation, and she never had a good appetite. She had had one child during the first year of her married life.

The urinary disease began eighteen years before she was first seen. It was ushered in by a severe pain in the right kidney region, the pain radiating down the course of the ureter on that side. It was agonizing in character and required a large amount of morphine for its control; it lasted a week and was of such severity that the patient was unconscious half the time. The attack gradually subsided and she was well for a few months, at the end of which time there was another attack of renal colic, and this was succeeded by others which came on with more or less frequency for many years, and always in the right kidney region.

Frequency of micturition as a symptom began four years after the beginning of the disease and was a source of constant, harassing annoyance ever since then.

Sleep was disturbed and she never knew what it was to have a good night's rest. Urination averaged 10 or 20 times a day and 10 times at night.

In 1891 a vesical calculus was removed by Dr. J. R. Chadwick. This relieved her for a while, but a year later the cystitis had again become so troublesome that it was necessary to do a cystotomy for its relief. She endured the inconvenience and discomfort of this fistula for two or three years, and then decided that she preferred to suffer from the cystitis. Two or three attempts were then made by different physicians to close the wound, but they were unsuccessful.

When she was first examined in September, 1898, two small

fistulae were seen in the vagina just behind the vesical neck. With the cystoscope, the bladder was very red and there were two excavated ulcers at the side of the left ureteral orifice. The right ureteral eminence was normal in all respects.

The bladder urine contained a large amount of pus, free and in clumps, some blood, a few granular casts of small diameter and numerous bacteria. The right ureteral urine contained a very large amount of pus, a little blood, a few hyaline granular casts and a few epithelia of various sizes. The left ureteral urine contained a few casts but was otherwise negative. The urea percentage on the right side was .5%, while on the left side it was 1.1%. Guinea pig tests were negative.

Both kidneys were carefully palpated at this examination, with negative result, and this seemed quite remarkable in view of the fact that it contained stone, as was afterwards proved on operation.

The fistula was sewed up and the operation was successful. In January, 1899, she began to have a good deal of pain in the right hypochondriac region and a tumor appeared. She declined any operative interference and remained in this state until July, 1902, suffering more or less pain all the time.

At this time, while riding in an open car, the motorman was obliged to stop suddenly in order to avoid running over a child. The passengers were severely shaken up by the sudden stopping of the car, and the patient received a severe jolting which resulted in bursting the fistula, the bladder, unfortunately, having been full at the time.

On examination, a small fistula in the vagina was found occupying a portion of the old cicatrix. The right kidney region was very tender and sensitive on pressure, and the pain since the car accident, had been very much more severe than it had been previously. An X-ray picture was taken about this time with a positive result, shadows of stones in the kidney appearing clearly on the photographic plate. The patient declined to entertain the idea of nephrectomy at this time, and asked only to have the fistula closed. An attempt was made to close it therefore, but it failed entirely. In December, 1903, she was suffering so much from her kidney, that she finally consented to a nephrotomy. This operation was accordingly performed, and two large stones were

removed from the renal parenchyma. Great relief followed. In March, 1904, she came to the hospital, determined this time to undergo nephrectomy to remove the disorganized kidney, as a preliminary in attempt at closure of the fistula. It was found, however, that the left kidney had become diseased by this time, and on examination of the separate urines, pus was found coming from both kidneys. On applying the cryoscopic tests to the blood, a freezing point of .61 centigrade below zero was obtained. With this high freezing point it was thought better not to attempt nephrectomy.

Mrs. C. F. B., aged thirty-five years, was seen in September, 1898. She was a strong woman of rather nervous temperament, but under good control. There was a history of rheumatism and of rheumatic iritis. Symptoms on the part of the bladder had been of two years' duration. Frequent micturition attended with pain were the first symptoms noted. Desire to empty the bladder was constant, and urination was necessary every hour of the night and day. The general health was excellent.

On examination, some sensitiveness was discovered over the course of the left ureter at the pelvic brim and vaginally pressure over the same ureter was sensitive. On cystocopic examination the urethra and whole bladder were generally injected, especially the left hemisphere, and particularly about the left ureteral orifice. The left ureteral eminence was covered and apparently obliterated by cicatricial tissue; its orifice was not seen, and the ureter was not catheterized at this examination. At a subsequent examination the left ureter was entered and a tight stricture discovered about six centimeters from the ureteral orifice. Immediately on passing the stricture, there flowed from the catheter eighteen cubic centimeters of purulent urine. The right ureteral urine was not remarkable and showed a urea percentage of 1.77%. The left ureteral urine showed a urea percentage of .63%. It was of a pale, turbid color, containing trace of albumen and a sediment considerable in amount, consisting of pus, some medium-sized epithelia, a few round cells and granular detritis. No tubercle bacilli were found. Guinea pig tests were negative.

As the patient refused any serious operation, an artificial vesico-vaginal fistula was made. Complete relief followed, and this lasted uninterruptedly until August, 1899. At that time she

had an attack of renal colic on the left side and passed a large amount of gravel and a small stone. This was the only stone that was ever passed. In March, 1904, there was a good deal of vaginal irritation and on examination, it was seen that the edges of the fistula were eroded and that the bladder wall immediately surrounding the fistula opening had prolapsed into the vagina. An attempt was made to cause reduction by applying various astringents, but this was not successful, and in July, 1904, the redundant tissue was pared off. Another unusual phenomenon was the dropping into the vaginal opening of parts of the bladder immediately above the fistula, and they presented in the vagina as small stalactite-looking bodies with rounded tips. This peculiarity of prolapse of the membrane is observed only in people past middle age and is due undoubtedly to the laxity of the tissues. The relief gained by this operation was immediate and she remained quite comfortable until April, 1903, when the same condition recurred and it was necessary to pare the edges of the fistula again.

The relief from the second operation was of short duration, and in October, 1905, there were signs that the bladder was again coming down. As a third operation did not seem to be a wise thing to do, on account of the removel of so much bladder tissue on the two previous operations, although cystitis was not entirely well, it was thought best, in view of the fact that the left kidney had given no symptoms for a long time, to risk closing the fistula. Unfortunately the attempt to close the fistula failed and she is still in the same condition. The left kidney appears to be inactive at the present time.

Technique of the Vaginal Operation.—Kelly's method. (*Am. Jour. of Obstetrics and Diseases of Women and Children,* Jan. 1903, page 28), consists in putting the patient in the knee-breast position, opening the vagina with a speculum and incising the vesico-vaginal septum with a knife directly into the air-distended bladder. This method has certain advantages, in that it allows the surgeon to explore all parts of the bladder with the greatest ease. The membrane can be picked up with a pair of forceps and brought directly into the wound; ulcers can be curetted, small polypi can be removed, or any other operation upon the bladder wall may be performed with great ease. There is an artificial

anemia of the parts around the cystotomy wound, and bleeding, if it does occur, is not embarrassing because the blood drops to the fundus of the bladder from which place it can be easily removed at the end of the operation.

An ordinary case, however, may well be operated upon in the dorsal position, and it is applicable to most cases. Great care should be taken to begin the incision just behind the vesical sphincter, because if the opening is made too far back a small pocket sometimes forms between the vesical neck and the anterior angle of the fistula, and this pocket may serve as a reservoir for the collection of a small amount of urine which may become stagnant and lead to the multiplication of germs, and so to an indefinite continuance of the cystitis. An easy way to incise the bladder is to introduce a director into the meatus, push it as far back as necessary and cut down upon its grooved surface. It is not necessary to make too large a hole, and in fact it is better not to, because if too large the bladder membrane is very apt to fall through into the vagina and be subject to the constant friction of the vaginal walls, and subsequently ulcers may form. An opening not more than 1½ inches in length is sufficient. The edges of the open wound on either side are sewed together by interrupted sutures in such a way that the vesical and the vaginal mucous membrane are brought in contact. The best suture material is a fairly fine catgut, and it is not necessary that this should be chromicized, because it is better that it should not remain *in situ* too long for fear of collection of phosphatic salts upon the sutures.

At the same time that the operation is done, the bladder may be thoroughly explored; ulcers may be curetted or may be treated with the nitrate of silver stick; small polypi may be removed, or in fact any small minor operations may be done through the fistulus opening.

The after-treatment of the case is very simple. The nurse introduces a catheter into the urethra and gives a copious injection of warm boracic acid solution twice a day. These douches are very comfortable and are well borne. The patient stays in bed a week or ten days and then gets up gradually. Large doses of urotropin should be given for a week or two before the operation and for a long time after it has been done.

Convalescence is complete in two weeks. The patient may

then resume her usual occupation and suffer no longer from her bladder in any particular. She, herself, administers the boracic acid solution twice a day under strict aseptic precautions. At the same time she takes the greatest care of herself in regard to matter of daily life, has long hours of sleep, good food, and above all has an abundance of fresh air; hard work should be avoided, especially the kind involving lifting or straining. The fistula from now on should receive close attention, and should be examined at short intervals. The greatest cleanliness is to be observed and the utmost care taken not to introduce a new germ into the bladder and so complicate the infection.

When the fistula has lost all its tenderness, it is time to fit a urinal. If the urinal is not worn, there is a great deal of discomfort from the constant flowing of the urine over the body, necessitating frequent changes of dressings, and this can entirely be avoided by wearing one of these urinals.

The best kind of urinal consists of a simple rubber cup-shaped receptacle which fits into the vagina, and is fitted for each special case from a model, the dimensions of which are easily obtained by the surgeon. At its lower end is a small rubber tube which leads to a rubber reservoir and fastened to the thigh by an appropriate band. This urinal should be carefully cleansed every day, and it is essential that the vaginal portion of it should be thoroughly boiled each day. If the vaginal portion fits well, there will be no discomfort whatever.

Complications after Cystotomy.—The most frequent complication immediately after the operation has been performed, is the deposit of phosphates on the edges of the fistula, especially about the free ends of the sutures; if chromicized catgut has been used, these phosphates are much more apt to occur. They present as whitish masses on the edges of the fistula and of course irritate the membrane below to a great extent, causing a feeling of irritation and soreness which are more marked when the patient walks about or makes any movement. They are easily removed with a dressing forceps, and when removed, the base should be immediately cauterized with pure nitrate of silver. Several douches a day of boracic acid solution will usually prevent their occurrence. An occasional application of pure ichthyol sometimes hastens their healing.

Ulcerations of the edges of the fistula are quite frequently

seen. These may be due to improper care and to want of cleanliness on the part of the patient. On the other hand, in spite of the greatest care, they sometimes occur, and then they are probably due to the constant friction of the vagina below upon the delicate, and as yet unhealed edges of the fresh wound. They are also sometimes due to the friction of the rubber urinal, and it may be necessary to omit wearing it for a little while until the ulcers have a chance to heal. If they are not attended to at once, they sometimes spread to the vaginal wall, even as far as the cervix, and when they are as extensive as this, may cause a great deal of suffering. There is a constant irritation, pain, and discomfort. The treatment of these ulcers is cauterization with nitrate of silver, copious vaginal douches, frequently repeated, occasional applications of ichthyol, or aristol, and it may be necessary for a few days to confine the patient to bed until healing has begun.

Contact ulcers affecting the part of the bladder mucous membrane directly over the fistula are sometimes seen; they are caused by the friction of the vaginal wall or the rubber urinal below. They may be difficult to heal because of the constant presence of the cause. If extensive, rest in bed for a few days will promote healing processes. These contact ulcers are sometimes very obstinate and may last a good while, and even when it is time to close the fistula, it is not uncommon to find the bladder immediately above the opening red, congested and angry-looking.

Granulations of the edge of the fistula are of infrequent occurrence. They sometimes present as a rosy bunch of tissue occasionally with a pedicle, sometimes without. The best way to treat them is to excise them and burn their bases with nitrate of silver.

Prolapse of the bladder wall into the vagina through the fistula, is an occasional complication. There are two forms, first the prolapse of the edges, and second, prolapse of the summit of the bladder. There are three causes for this prolapse. In the first place they are rarely seen in women below thirty years of age, and they are more apt to occur in women past middle life; the cause here is laxity of the tissues. In a young person a fistula may be open many years without having this complication. The second cause for the prolapse is the pressure of the

tumor, for instance a fibroid of the uterus; as a result of this pressure, the bladder wall is forced into the fistulous opening and may present in the vagina as a little pedunculated tumor with a round tip. Finally, a lacerated perineum with a co-existing tendency to prolapse of the pelvic contents is usually attended with prolapse of the mucous membrane. In such a case it is essential that the perineum should be repaired before doing the cystotomy.

When the prolapse is confined to the edge of the fistula, the condition seen is that of eversion of the bladder mucous membrane into the vaginal vault. These edges readily become ulcerated and sore, bleed easily, are tender to the touch, and they give rise to a great deal of irritation, especially on walking or on exertion of any kind.

When the summit of the bladder prolapses into the vagina, it does so in the form of stalactites with rounded tips presenting small ulcerations at the tips. These stalactites may be one or several.

When this condition of prolapse is caused by a tumor pressing down from above, a real difficulty may be experienced, and it may lead to the closure of the fistula sooner than was contemplated.

The treatment of everted edges is an attempt to heal the ulcers with nitrate of silver, applications of ichthyol or aristol and avoidance of excision of the edges as long as possible. If, however, on account of their intractable nature, it is impossible to heal them, they must be excised.

When this complication has happened once, it is very apt to happen again, because the same cause exists, and it may be necessary to close the fistula before it is time to do so. The reason for this is, that if the operation of paring the fistula is done too many times, it will be at the sacrifice of additional mucous membrane of the bladder each time. The consequence will be that too large an amount of bladder tissue is sacrificed and there is danger of involving the ureteral orifices.

Stalactites may be excised with little danger of cutting through the whole wall of the bladder, as it is usually only the mucous membrane of the bladder and the parts immediately underneath it that are involved.

Hypertrophy of the vaginal walls about the fistula is sometimes seen. In this event the tissues of the septum as a whole

enlarge, and the cause of this enlargement is undoubtedly irritation caused by friction. The hypertrophied walls present as two little puffy rolls, one on each side. They are different from the rolls caused by prolapse of the bladder walls, and the difference is easily recognized. In the first place, prolapse of the bladder wall is found only past middle life. The color, presence of small ulcerations, and excessive tenderness, readily serve to differentiate the two. There may be some embarrassment caused by these rolls at the operation for closing the fistula, and some skill may be required in bringing the parts in close apposition, when the sutures are introduced.

A very infrequent complication of a cystotomy is retroversion of the uterus. This may be caused by contraction of the fistula, especially if the fistula has been made with a Paquelin cautery. Contraction after the use of the cautery is sometimes very marked. Then it leads to a great deal of secondary inflammation, sloughing and ulceration. Subsequently the tissues contract and the tendency is to pull the cervix forwards, which of course tips the fundus of the uterus backwards. The Paquelin cautery method should be condemned and the method of incision and sewing the edges of the fistula, in doing the cystotomy, is the one greatly to be preferred.

Closure of the Fistula.—If there is no pus in the urine and the mucous membrane appears to be clean, there is no question as to the advisability of closing the opening. It so happens that these cases are not infrequently complicated with a condition of phosphaturia; this has been observed numerous times. It is necessary, therefore, that urine, which is brought for examination, should be tested for the presence of phosphates, and it may be found that a cloudiness is due to precipitation of phosphates alone and not to pus. The fistula may have to remain open for one, two, or several years, depending upon the severity of the bladder inflammation. The tubercular cases are the most intractable as a rule, and in this class of cases particularly, it is necessary that every trace of the disease should be gone before closure is counseled.

The operation of closure is a very simple one. The only precaution is not to involve the ureter in the stitches. Preliminary examination of the bladder in order to determine the position

of the ureteral openings is essential, and if they are near the edges it is best to insert a small ureteral catheter into each one so that there may be a guide during the operation. The edges of the fistula are pared with scissors down to and not including the mucous membrane of the bladder, and sutures of silver wire or catgut are taken one centimeter apart, including the tissues, down to the edge of the bladder mucous membrane. The greatest care must be taken not to tie the sutures too tightly, for if they are so tied, the swelling of the tissues, subsequent to the operation, may pull through and lead to the formation of a small sinus into the bladder and so defeat the operation. Before putting the patient to bed, it is well to test the bladder by injecting some fluid into it. If the operation has been properly performed, the bladder ought to be water tight. The operation is completed by putting a bit of iodoform gauze into the vagina, which is changed daily. It is best that the bladder should be drained for the first twenty-four hours, and for this purpose a catheter with a large bore is the best one because it does not favor the formation of clots within it. It may be held in the bladder by means of rubber strips which are fastened to the thigh and pubis. During the first twenty-four hours morphia should be given in large doses. This is to keep the patient absolutely quiet in order to allow of the first union which takes place during the first hours after the operation. The catheter, draining the bladder as it does, also tends in the same direction. There may be a little leakage around the sides of the catheter at first, and this should not be interpreted as failure of the operation; it is simply due to the fact that the sphincter has become tired out and has relaxed, allowing the urine to flow around the sides of the catheter. After the catheter has been removed, the patient should be instructed to empty the bladder as often as she feels any desire to do so, and it is best that she should have a small porcelain urinal at her hand every moment of the time, so that she shall not have to wait for necessary attendance. Neglect to empty the bladder when needed has frequently resulted in failure of the operation. The bladder should be washed out twice a day, very gently with warm boracic acid solution, injecting a very small quantity each time. The best way to do this is to use a small glass syringe and catheter, for in this way pressure may be regulated much better than it can be with

a fountain syringe and there is much less danger of doing harm. As soon as the ether vomiting has ceased, the patient drinks plenty of water and milk, the bowels are regulated and she is careful in the selection of a diet. There is a good deal of irritation of the bladder after the operation, but this need not cause any alarm; it is simply due to increased congestion as a result of the operation and the irritation caused by the suture. It subsides in a few days.

The sutures are removed on the tenth or twelfth day, and the patient gets up in about two weeks.

It is by close attention to the many little details that success will be obtained. The greatest care in regard to asepsis is of chief importance, and it is better that the treatment immediately after operation should be given by the surgeon himself, rather than trust it to a nurse. If a ureter has been sewed in, symptoms on the part of the kidney will attract attention and require the removal of the sutures. The operation of course fails and will have to be done again. If the operation is to be a success there will be no leakage from the vagina at all, but if it is a failure, notice is given at once by vaginal dribbling. This is seen even if there is a very small hole; all the urine comes through it as it gradually leaks away. It does not mean that the operation is a complete failure, if the hole is a very small one, for if the patient is kept very quiet, sometimes nitrate of silver fused on the end of a probe and carefully applied to the fistula, will occasionally produce enough irritation to start up granulation and result in healing. Under no circumstances must a second operation be attempted immediately after the first one. The patient must have time to recuperate in the fresh air under favorable conditions. If the surgeon yields to the urgent solicitation of his patient to attempt a second operation, he must be prepared for failure, because the tissues will not heal well after the body has been through such a strain as that caused by prolonged stay in bed.

The contraction of the bladder subsequent to long disease, sometimes reduces its capacity so that it will hold only a small amount. This is not a serious difficulty, for by daily distention of the bladder with a syringe, under pressure, it can soon be brought up to a normal or nearly normal capacity.

397 Marlboro Street.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. OCTOBER, 1906. NO. 13

PRIMARY CARCINOMA OF THE URETERS.

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IN April, 1905, a case came under observation at the Surgical Clinic of Greifswald, which is of great clinical interest on account of the peculiarity of the symptoms presented, as well as the pathologic findings. A female, sixty years of age, gave the following history: At about the age of five or six, she had scarlet fever and measles. Married at seventeen, she did not become pregnant. Her husband died five years after marriage from pneumonia. At the age of twenty-seven years she married for the second time, going through two normal pregnancies, but after the first pregnancy she suffered from jaundice for about five or six years. During this time, in the summer months, she frequently complained of abdominal pain after hard work, but this, however, soon passed off and she did not feel ill in any other way. Since last summer she has again complained of constant pain in the abdomen. At the end of November, 1904, she fell, striking on the right side, since which time she has had constant pain, located in the back and extending towards the right side. At the end of March, 1905, her physician diagnosticated a right-sided nephroptosis; at the same time a tumor appeared in the right side of the abdomen, and as the latter increased in size and the pains increased, the patient came to the clinic.

She was a middle-sized, strongly-built woman, with well-developed muscles and considerable fat. The circumference of

the abdomen was 99 cm., the abdomen being much distended, the right half protruding more than the left. On the right side of the abdomen resistance was felt by palpation and by careful examination a tumor the size of a child's head was discovered, having an irregular surface. It occupied almost the entire right side of the abdomen from the costal border to the anterior superior iliac spine, causing some protrusion of the inguinal region. It extended somewhat towards the liver, did not move with respiration and did not continue into the small pelvis by a pedicle. Some amount of tenderness on pressure could be elicited in the upper part of the tumor under the right costal margin and the growth appeared to be slightly movable. On the left side of the abdomen, between the umbilicus and the iliac spine, some tenderness was produced on deep palpation and here a sensation of varying resistance could be made out.

The kidneys could not be palpated, as they were in their normal position and the abdominal wall was very thick.

Examination of the urine gave the following data: It was passed spontaneously in small quantities, being cloudy and slightly acid in reaction. Upon filtration, it was found to contain albumin, but no sugar. By centrifugation a good amount of flaky sediment was obtained, which contained numerous granular casts, flat epithelial cells, representing those coming from the vesical mucosa, and also a few red and white blood corpuscles.

The lungs were normal. The first sound over the cardiac apex was not clear, while the second aortic was accentuated.

On the left side of the forehead, over the frontal sinus, existed an exostosis the size of a hazelnut, having a smooth surface.

Both legs presented varicose veins, particularly marked on the right. These, however, gave rise to no symptoms.

Nothing of importance was found by vaginal examination. No connection could be detected between the tumor and the genital organs. Rectal examination negative.

Upon insufflation of the colon, it was found that the latter covered the tumor in front, also between the growth and the liver.

Cystoscopy gave the following results. The bladder was small, being only able to contain a little quantity of urine, hardly amounting to 100 cc., and could only hold the irrigation fluid for

a short time. The vesical mucosa was pale and the region of the ureters protruded. The left ureteral orifice projects markedly and from this urine occasionally bubbles out, which did not seem to be cloudy. In place of the right ureteral orifice a conical shaped growth, almost as large as a cherry, and having a smooth surface was seen and here no ureteral orifice could be distinguished. The tumor was evidently greatly prolapsed and edematous ureteral mucosa. The mucous membrane of the bladder in the neighborhood was also swollen and edematous. At no point, however, was there any marked vascular injection. The right ureter cannot be catheterized, but the left could, the instrument being pushed 25 cm. upward to the pelvis of the kidney. In three-quarters of an hour 28 cc. of slightly cloudy, dark yellow urine was obtained and during all this time not a single drop came from the right ureter. No calculous formation could be found in the protrusion of the right ureter.

Cryoscopic examination of the urine obtained from the left kidney showed a decrease in the freezing point, it being 0.98°.

On the day before the operation the patient constantly complained of pain in the right side of the abdomen, which at times was so severe that she was obliged to leave her bed, walk around, or sit, with the body bent over. The amount of urine voided in twenty-four hours varied between 400 and 520 cc.

A diagnosis of right-sided hydronephrosis, from obstruction of the right ureter, was made, the obstruction being thought to exist at the lower part of the latter and either resulting from a calculus lodged in the duct, a cicatricial stenosis or a neoplasm.

Six days after the patient's admission to the hospital, operation was undertaken. A long incision was made on the right side of the abdomen from the twelfth rib to the anterior superior iliac crest. The free extremity of the twelfth rib was resected to the extent of about 4 cm. in order to give more space. After the soft structures and the fatty capsule had been dissected off, a renal sac, quite as large as a child's head was brought forward, it being quite firmly adherent to the liver at its upper pole. Puncture of the sac gave exit to 1½ litres of a blackish brown fluid, holding in suspension numerous fibrin flakes. The renal sac, which consisted of two compartments, was then opened. The interior of these sacs was lined with numerous layers of fibrin. Little of the

renal parenchyma remained. The ureter was greatly dilated and at its lower part there existed a hard neoplastic thickening. Since this kidney had lost all its functions it was removed and upon separating the upper pole from the liver the peritoneum was torn at two points and at the same time a hard, circumscribed growth was removed, which occupied the upper renal pole. Upon cross section it was found that there were metastases in the liver and in the centre of a nodule, which was the size of a walnut, softening had occurred.

The ureter was completely removed and ligated at its lower end. Its lumen contained thick pus, while the neoplastic-like thickening at the lower end could not be reached through the incision, so that resection of this portion had to be postponed to a second operation, because the patient began to give evidence of weakening, and the operation had to be completed at once. Two strips of iodoform gauze were pushed down to the stump of the ureter and after the pedicle of the kidney had been tied off two clamps had to remain upon the stump. Apron tampons were pushed in over the wound in the liver and iodoform gauze was used as packing. At the end of the operation a litre of salt solution was given subcutaneously.

The patient returned to consciousness soon after the operation and did not complain of much pain, but about eight hours later sudden collapse occurred and she died with symptoms of embolus.

Autopsy. Medium size, strongly built, fat cadaver, of an elderly woman, abdomen somewhat pendulous; a large and perfectly fresh operative wound extending in the right lumbar region along the border of the ribs. Abdominal cavity opened. The omentum possessing much fat dips down in the pelvis. Its surface, as well as that of the intestinal coils lying underneath and parietal peritoneum is covered with a thin layer of fluid blood, several cubic centimetres of which had collected on the surface of the pelvic organs. On the right, underneath the liver, as well as on the mesocolon of the ascending colon, is covered by gauze filling up the abdominal space. The lower portion of the small gut was first separated from the ascending colon and coecum so that the large operative cavity was exposed. This was bounded above by the lower border of the right lobe of the liver; extending along the spine it passed near the inferior vena cava, while below it

reached the entrance of the pelvis. It was perfectly dry everywhere, containing neither blood nor pus, while no reaction in the tissues could be found.

The left ureter was then exposed, to the extent of 5 or 6 centimeters and was found normal in color and nowhere dilated. The left kidney and supra-renal capsule were in normal position. The left kidney was of medium size, measuring 13 cm. in length, 5 cm. in width and 3 1-3 cm. in thickness, so that it did not appear as if it alone performed the functions of both organs for any length of time. Its capsule was easily stripped and its surface was then found to be pale red, containing a surprisingly small amount of blood, but nowhere could any cloudiness be detected. The medullary substance was also light red and transparent, while the straight urinary tubules showed themselves in the form of distinct, delicate light grayish red stripes, reaching the points of the papillae. Fresh microscopic section showed a transparent condition of the convoluted urinary canals, while in the straight urinary tubules of the medullary substance were many casts and much blood pigment in the epithelium. The calices and renal pelvis were lined with a white mucous membrane.

The right kidney was absent, as well as a large portion of the upper part of the ureter. In order to examine the remainder of the tube, the bladder was opened in the median line, giving exit to some clear colorless urine. The vesical mucous membrane was very white and only in the region of the urethral orifice was there some slight vascular injection. The orifice of the left ureter appeared as a small opening on a level with the bladder wall, whereas, on the right a projection was seen, the size of a small hazelnut, very soft in consistency and through the centre of which a fine probe could be passed into the right ureter, the latter containing from ten to twelve cc. of urine, which made its exit when the instrument was pushed through the stump in the operative wound.

The soft medullary growth showed upon fresh microscopic sections an epithelium containing large oval nuclei and distinct nucleoli and represented large flat laminated epithelium, rich in protoplasm, and often supplied with pointed cell processes, among which transitional forms of cylinder cells could be distinguished.

On attempting to reach the bladder from above, through

the ureter, firm occlusions were met with which at first appeared to be of a calculous nature, but upon section, they were found to be thickened portions of the walls of the ureter in the form of small projections the size of a pea, around which existed a thick layer of cicatricial tissue. Extending about four to five cm. upward from the bladder the same milk-white neoplastic masses were found over the inner surface of the ureter, similar to the soft nodule appearing at the ureteral orifice and penetrating into cavity of the bladder. At a point about 12 cm. from the bladder and where a calculous had been suspected to exist, a thick hard substance similar in structure to a scirrhus could be traced up from the ureter into the fatty tissue.

The uterus contained several myomata the size of a walnut and many of these had become hardened, while others showed a firm, fascicular grayish white aspect on section. The vaginal walls were perfectly normal. A few mucous and small Naboth's glands projected in the portio vaginalis. The uterine mucosa was of a delicate grayish red. Rectum intact, its mucous membrane grayish red.

The right iliac vein, like all that portion of the inferior vena cava up to the liver was obstructed by hard, dark red and loose thrombi which, from their external aspect contained distinct whitish spiral lines.

The liver was 28 cm. in width, 21 cm. in height and $5\frac{1}{2}$ cm. in thickness. The gall bladder, which was almost completely filled with small sharp calculi rested upon the free border of the liver on the right in the neighborhood of the operative wound. The surface of the right lobe of the liver was adherent to the surrounding structures by many firm, fibrous adhesions. At this point near the wound was an irregular and quite deep laceration, $10\frac{1}{2}$ cm. in length and $3\frac{1}{2}$ cm. in width, filled with clotted blood. 6 cm. above at a point where the border of the liver came in contact with the diaphragm was found a flat, white carcinomatous nodule, its length being $4\frac{1}{2}$ cm., its center containing a marked depression, while it protruded above the surrounding structures to the extent of 1 cm. Upon cross sections of the liver carcinomatous nodules were found at many places, varying in size from a hazelnut to a pigeon's egg; they were bright red in color, of soft consistency, so that any line of demarcation from the hepatic

parenchyma was quite indistinct. There was also some yellow discoloration of the hepatic parenchyma. The left lobe extended unusually high up and like the right was adherent at several points. Six cm. to the right of the gall bladder was found a spot of hemorrhagic infiltration on the free border of the organ, where apparently, during the operation adherent fatty tissue had been dissected off and at this point a grayish red carcinomatous nodule, about the size of a cherry, was found, quite sharply defined from the surrounding parenchyma.

The spleen measured 11 cm. in length, $9\frac{1}{2}$ cm. in width and $3\frac{1}{2}$ cm. in thickness. It was everywhere dark red, of firm consistency and smooth on section.

The heart from base to apex measured 11 cm. the width of the aortic valve was $7\frac{1}{2}$ cm.; muscular tissue at the base 2 cm. in thickness, in the middle $1\frac{1}{2}$ cm. and at the apex 1 cm. Right ventrical; width of pulmonary valve $7\frac{1}{2}$ cm.; thickness of muscular tissue averaged about 5 mm.

The right lung contained on its posterior border about midway between the apex and the base, a soft grayish white carcinomatous nodule about the size of a walnut, otherwise both lungs were filled with air, hemorrhagic and somewhat edematous.

Section of the brain showed slight hemorrhage, otherwise no marked changes.

Around the abdominal aorta in the region of the lumbar vertebrae the tissues were of firm consistency so that when separating the vessel from the vertebral column no loose connective tissue could be found. Section through the lymphnodes and surrounding fat showed that the structures had been transformed into carcinomatous substance, gray in color and of the same nature as that described in the middle portion of the right ureter.

Anatomical diagnosis: Carcinoma medullare ostii dextri, carcinoma scirrhosum partis mediae ureteris dextri. Infiltratio carcinosa telae adiposae retroperitonealis lateris dextri et glandularum retroperitonealium regionis lumbalis. Carcinomata medullaria metastatica hepatis et metastasis pulmonis dextri. Ren dexter operatione remotus. Hypertrophia renis sinistri dubia, nephritis medullaris. Anaemia cerebri. Adipositas cordis, obesitas universalis.

Microscopical examination. Stained sections of the ureteral

neoplasm and hepatic metastases gave the following results. The sections included the ureteral neoplasm from the soft medullary portion to the hard scirrhous parts. It was then found that the medullary growth was composed of carcinomatous cells presenting great variety. They were closely crowded together so that no alveolar structure could be recognized. At several points cell masses could be distinguished from the surrounding cell elements in that at these points the cells had lost their shape, structure and staining properties, so that they could only be indistinctly made out, showing that death had taken place. These necrotic portions were surrounded by rapidly growing cell elements. The carcinomatous cells were of the large protoplasmic, epithelial type, with thick, oval nuclei. Their shape demonstrated beyond a doubt that they originated from the epithelium of the ureter. Just as is found in the epithelium of the ureter, so among the neoplastic cells, all varieties of transitional forms were found, from the flat cells with pointed offshoots, frequently resembling a tail, to the cubic, polymorphous and cylindrical cells. The nucleoli and the substance of the nucleus were very marked in the nuclei and at some portions of the section cell division was taking place.

Starting from the medullary substance a tissue zone was found where extension of the carcinoma was effected into the neighboring structures and here, instead of the large cell clusters, small ones are seen, separated from each other by narrow bands of tissue. Here the carcinomatous cells have apparently penetrated into the lymphatics and have filled them up by active cell growth. Therefore, according to whether section of the lymph space was made longitudinally or transversely, one sees carcinomatous nests or plugs. Further off, where the growth had not reached this development, alveoli and tube-like formations were met with. The nearer one reached the periphery of the growth, the smaller became the cell clusters and the larger the tissue spaces, until at last at certain isolated spots, a small number of carcinomatous cells were seen lying in circles or in rows.

It is of special importance to remark that similar formations of cancroid pearls occur distributed throughout the growth and which were very clearly demonstrated in sections stained by van Gieson's method. The borders of these formations had large

cubic cells possessing a distinct nucleus, while in the more central portions, flatter cell types existed, lying in concentric layers, while in the very center horny cells without a nucleus were present and which took a deep yellow stain.

The structure of the stroma of the growth was not uniform, and varied according to the extension of the neoplasm in the different zones.

In the immediate neighborhood of the centrally located medullary carcinoma foci, the tissue strands were very narrow, representing the transition between these and the larger clusters of carcinomatous cells. Further beyond, the clusters were separated from each other by loose, soft tissue. At this point many tissue cells were piled up in a loose network, which became wavy. In the periphery, however, which only contained isolated clusters of tumor cells, the character of the stroma was represented by firm fibrous tissue, while thick and wavy layers of tissue lay parallel and close together, including only a few isolated tissue cells. This part of the section represented the hard nodule which clinically was supposed to be a calculus lodged in the urethra, when the urethral catheter was passed.

As so frequently occurs in the development of carcinomata, there was in the case just reported some intermediate tissue where it borders on the rapidly growing neoplastic cells, during inflammatory reaction. The stroma was infiltrated with round cells, which were found wherever carcinomatous cells occurred, because they participated in the extension of the neoplasm.

From the macroscopic findings one might easily come to the conclusion that besides the medullary growth existing at the ureteral orifice, another type of cancer, namely scirrhus, had developed at some distance from and independently of the former. However, microscopically it was distinctly shown that both types of cancer were not sharply defined from each other and that a gradual transition from one type to the other occurred. The development of the scirrhus can be explained by the peculiar reaction of the tissue to advancing carcinomatous cells, becoming converted into firm, cicatricial tissue. The cells of the scirrhous portions were without any doubt derived from the medullary carcinoma.

This opinion is strongly supported by the microscopic findings in the metastases in the liver. They very closely resembled the primary growth, inasmuch as the structure of the new growth possessed no uniform character and here also all the transitional forms from medullary carcinoma to scirrhus were to be found. The cells perfectly resemble those of the primary growth, both in shape, arrangement and distribution. The formations resembling cancroid pearls also occurred. The stroma in the metatases was very marked. The development of this stroma can be explained from the fact that from the neoplastic cells a marked reactive overgrowth had taken place in the scant, but normal hepatic interstitial tissue, which, for the most part, had been converted into cicatricial tissue.

The case here reported is without doubt extremely rare. The ureter is certainly far less apt to give rise to primary tumors than the bladder or renal pelvis. When a primary ureteral growth occurs, it is generally in the form of a nodular tumor and it certainly rarely happens that these growths arise in the ureter and belong exclusively to it. As a rule malignant neoplasms originate in the renal pelvis and from this point extend down into the ureter. Under the head of nodular tumors of the ureter, benign fibromata are to be classed on the one hand, while sarcomata and carcinomata on the other. It often also happens that a papillary growth will be found of a carcinomatous nature upon section, while at another part it may still retain a benign character.

Von Lichtenheim was only able to collect a few instances of alveolar sarcoma, von Willutzki one instance of sarcoma of the upper portion of the ureter and von Ribbert one instance of polypous myosarcoma.

Nodular growths of the ureter are of more frequent occurrence. Israel mentions two instances; the first case was a growth the size of a cherry, arising from the mucosa of a dilated renal pelvis, the neoplasm consisting of papillae, closely crowded together and extended a little into the ureter. In the second case the renal pelvis was dilated to the size of a walnut and upon cross section the mucosa was found covered with nodular growths closely crowded together. Directly continuous with this was a nodular growth, occupying the entire upper pole and a portion of

the middle third of the renal parenchyma. At many points the growth invaded the cortex so that a layer of renal parenchyma, varying from two to three millimetres in thickness, separated the neoplasm from the capcule. The musoca of the dilated ureter was covered with many wartlike, pedunculated tumors, some being isolated, some collected in small clusters, while still others were arranged in a circular fashion around the entire circumference of the ureter, to such an extent that at a point 9 centimetres above the entrance of the ureter into the bladder, their development was so marked they must have caused obstruction. From this point downward the number and size again decreased so that only some small isolated papillary growths could be found on the vesical mucosa on the left. Microscopical examination in both cases showed that the growths were carcinomata, their cells having characteristics of transitional epithelium.

Busse has recorded two cases of malignant transformation of the entire urinary tract on one side. The first case represented numerous fibromata as well as benign nodular growths in the bladder, in the greatly distended ureter and in an enormously dilated renal pelvis. Twenty years previously the patient had noticed blood in the urine, this recurring at certain intervals. Pain in the right renal region caused him to come to the hospital and here a tumor was discovered. Operation showed that the kidney was also in a state of hydronephrosis, the renal pelvis being completely covered by papillary growths on its mucous membrane. Death occurred six weeks later from gangrene of the lung and at the autopsy nodular growths were also found in the lower end of the ureter as well as in the bladder.

The second case also occurred in a male, 55 years of age, who, for seven years had periodically passed blood in the urine and on account of the recent development of pain and pressure symptoms in the left renal region he entered the hospital. A large hydronephritic kidney, fully the size of an adult's head, was removed, as well as the surrounding tissue which had undergone purulent inflammatory changes. The mucosa of the renal pelvis was found covered with countless small warty growths, likewise the ureter. The patient lived five months after the operation, but continued to decline in health and finally died. At post-

mortem, a large infiltrating tumor was found in the walls of the bladder, while the ureter contained a large number of villous growths. Upon microscopic examination the tumors in the renal pelvis and ureter, likewise those in the bladder, were large-celled carcinomata.

Poll has described a case of multiple villous growths of the left ureter and renal pelvis. The entire mucosa of the renal pelvis was involved as well as the greater part of the ureter in the neighborhood of the kidney. The histological structure of the ureteral and renal pelvis growths was that of an ordinary papilloma, while on the other hand, the neoplasm had begun to undergo a malignant transformation in the calices.

Kohlhardt has described a benign multiple villous growth in the renal pelvis and ureter.

Albarran's teachings relative to primary epithelial new growths of the renal pelvis and ureter are practically as follows: Most frequently they are papillomata, Albarran having collected eighteen instances. They usually develop upon the base of the renal pelvis and then continue downward toward the ureter; primary carcinoma of the ureter is extremely rare. Papillomata of the renal pelvis and ureter resemble those encountered in the bladder; they are usually multiple. This authority was only able to collect thirteen cases which were not papillary epitheliomata. The origin of these growths is quite the same as that of papillomata. Usually they are alveolar, more rarely cylindrical celled epitheliomata.

In those cases where the papillary new growth is confined to the ureter, and consequently without doubt primarily arise therein, are of far greater rarity and relative to this I would quote a case related by Neelsen. On the right side were two ureters entering the bladder 5 cm. in front of the neck. The upper part of the two ureters originated from the greatly dilated hydronephritic upper renal pelvis and showed marked pathologic change at its upper portion, while the lower two-thirds of the ureters were normal in size, with thin walls and pale mucous membrane; the upper third was enlarged and funnel-shaped for about the extent of 6 cm. and before being opened it felt soft and elastic. Upon section, it was found that this increased consis-

tency was due to the presence of numerous papillary growths placed closely together and arising from the ureteral mucosa which corresponded in appearance with the ordinary vesical papillomata. Some of them formed flat, broad vegetations, while others were larger, thin, pedunculated and coxcomb-like, lobulated or irregularly branched growths having a grayish red color and a soft consistency. The growths grew superficially. Microscopically they were found to be benign fibromata.

A benign villous growth originating in the left ureter has been described by Jebens. I would also refer to a case described by Hasenmyer of a villous tumor the size of an apple, which surrounded the right ureteral orifice. This case was also a benign papillary fibroma.

Jona has published a case of a primary ureteral neoplasm of an epithelial nature, but not papillary in construction. The growth which was about the size of a large hazelnut was situated in the lower portion of the left ureter near its entrance into the bladder. It was attached to the ureteral wall by a pedicle about 1 cm. in length and had developed toward the abdominal cavity pushing the peritoneum in front of it and was enclosed in the latter quite like an intraperitoneal organ. At the centre of the cross section of the growth was found an opening about as large as a pin's head which, on longitudinal section, was found to be a thin tube running through the tumor mass and ended as a diverticulum with which it was connected by a pedicle. This diverticulum from which the growth had originated, owing to its origin, must be considered analogous to a double ureter. This authority also makes the statement that fissuring of the ureter, or conditions similar to those met with in his case, seem to predispose the structures to neoplastic development just as in Neelsen's case, where the villous polypi had developed in a double ureter. In Jona's case, microscopical examination showed that it was not one of true adenoma, but an epithelioma having a cystic arrangement.

Ureteral neoplasms having a decided carcinomatous nature are of extreme rarity. The majority of carcinomata of the ureter which have been published, did not develop primarily in the ureter, but have spread to it from the neighboring organs, such as the intestines, genitalia and so forth, an example of which has

been described by von Litten, in which the stomach was the starting point of the malignant tumor, the left ureter becoming secondarily involved.

A second case of primary carcinoma of the ureter was recorded in 1896 by Rundel. The tumor which measured 4″ by 2″ in diameter was situated in the lower portion of the right ureter, which it surrounded. It was adherent to the base and posterior vesical wall and it invaded both seminal vesicles and vasa differentia. In consistency it was soft and of a whitish color. Above the growth the lumen of the ureter was dilated, especially at its middle third. Nodules were seen on the mucous membrane, isolated and in clusters to within one inch of the renal pelvis. A pea-sized polypus was found projecting through the ureteral orifice into the bladder and was composed of small, closely connected papillae. Metastases of the growth were found in the liver, lungs and abdominal lymphnodes. Microscopically the growth and metastases represented the flat epithelial carcinoma, with granular degeneration in the central cells. This growth occurred in a male 46 years of age who entered the hospital with symptoms of hydronephrosis. As cachexia was present the diseased kidney was not removed.

The case I have reported shows marked differences from all others so far recorded. The papillary construction of the tumor was wanting, likewise the usual multiple villous, or papillary formations on the vesical mucosa, renal pelvis and upper part of the ureter. In character our case corresponds rather more to a gastric carcinoma, in that it grew by continuity and gave rise to metastases in distant organs. It originated in the vicinity of the ureteral orifice, beginning as a medullary sarcoma and extended towards the bladder in the form of a projection the size of a hazelnut and towards the kidney completely obstructing the lumen of the ureter and then it took on more the character of a carcinoma, extending to the upper portions of the ureter and surrounding fatty tissue.

In closing I would like to refer to the connection between carcinoma of the urinary tract and calculous formation. As to primary carcinoma of the gall bladder and the large bile ducts, it is generally admitted that gall stones are the etiological factor of the malignant growth. Now, it is admitted that by continuous

pressure of the stone upon the mucosa an irritation is produced, which causes the development of carcinoma, or, at least, favors it, and this theory rests upon the fact that gall stones and carcinoma frequently coincide. The gall bladder itself gives rise to the formation of the calculi and retains them for a long time, while, on the other hand, certain portions of the bile ducts are often involved when large stones become imbedded and produce severe pressure irritation with repeated attacks of colic.

These portions are, in the first place, the pars duodenalis of the choledochus at the point where its lumen becomes narrowed, as well as the point of union between the cystic and hepatic ducts, where the lumen is also less.

Uliszewski has expressed himself as follows: "The question of the etiology of carcinoma of the biliary tract is at present not settled. That at first the action of the calculi is considered, is evident, firstly because the large majority of carcinomata of the gall bladder occur in cholelithiasis and beside because primary cancer of the bile passages gives rise to small strictures of about the same extent as a local inflammation resulting from impaction of a calculus might bring about. These cases represent about 40% of the entire number where calculi are suspected from the symptoms, or are actually found at operation or autopsy. In the case of the bile ducts we have the same reason to suppose that calculi are the cause, as in cases of malignant disease of the gall bladder. Generalization is not permissible, however, because Devic and Gallavarbin have quite properly called attention to the fact that stones and cancer of the gall bladder frequently occur in females as a result of lacing, whereas, as many men as women are affected with carcinoma of the bile ducts. Microscopical examination, also, fails to give any light on the matter. If the cases which were first examined here in the Pathological Institute where there was metaplasia of the epithelium of the gall bladder into sclerotic flat cells produced by gall stones (Diss. Ohloff), then we would have a convenient means of deciding whether a calculus in the bile ducts could be the cause of carcinoma. The few statements made known at the present time (Weber, Diss. Würzburg) of this condition in the frequency of carcinoma of the gall bladder do not permit this conclusion."

The epithelial growths arising in the urinary tract including

the renal pelvis, ureter and bladder, have been mentioned as being produced by calculi. The chief reason for this is that upon several occasions vesical calculi have been found as well.

Wagner makes the following statement relative to this point. "Concerning the development of these tumors as little is known as about tumors in general; they usually occur between the ages of 40 and 60 years. The growths were found in males 24 times, 13 times in the female; 8 times calculi in the renal pelvis were observed." Those parts of the urinary tract above the bladder where stones are retained are the renal pelvis, the commencement of the ureter and its portion above the bladder where its lumen becomes narrowed. In those cases where primary growths are found at these points and in which calculi are present, it is very probable that the development of the tumor may be traced to pressure irritation from the concretion.

Such a case of renal epithelioma in which calculi were present has been reported by Shattock. He believes that the growth developed from the irritation of the calculi.

Le Dentu described a papilloma at the ureteral orifice complicated with a calculus: "After the kidney had been exposed by an incision the ureter was opened and a small calculus removed from it. Below this was a papilloma just allowing the passage of a sound past it, while a second similar growth was present near the bladder, completely obstructing the orifice."

Naturally, even these very important examples of the occurrence of tumors with stones are not proof of the development of the formation of the former from the latter. Even were it positive, one could not assume that every time that calculi are present, they are the cause of neoplasms in the renal pelvis and ureteral mucosa, because (1) the primary growths of the upper urinary tract rarely occur and in no way correspond with the frequency of calculus. This is especially true of the ureter. (2). Among the growths which have been observed, calculi have been present in only a few. (3). In our case, especially, the carcinoma developed at a spot in the ureter which certainly is very commonly the seat of impacted calculus, but no stones were found either during life or at the autopsy. (4). As to growths arising from the vesical mucosa, calculi cannot be held entirely respon-

sible, for the process can be traced back to the poisonous action of the various aniline dyes, because ulcer of the bladder is very frequently observed in employees of aniline factories (Rehn).

Therefore, we come to a conclusion similar to that reached by Uliszewski relative to the origin of primary carcinoma of the biliary tract and in closing I would say that the etiology of primary malignant tumors of the upper urinary passages is at present unknown like that of tumors in general.

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PROSTATIC ALBUMIN AND ALBUMOSE.

By Edgar G. Ballenger, M. D., Atlanta, Ga.

In the New York *Medical Journal* for Feb. 24th, 1906, I called attention to the fact that the diseased prostate, like the diseased kidney, secretes albumin, and showed that this secretion might escape through the deep urethra into the bladder and be mistaken for that of renal origin.

So uniformly have I found proteid in the urine passed after massage of the inflamed prostate and so reliable has it been in the diagnosis of this condition that it is with pleasure that I comply with the request of the Editor of the American Journal of Urology to present further details of the subject.

Recently I have been making the test for albumin and albumose as a routine examination of the urine passed after massage, and have found it present in 25 patients with inflamed prostates and seminal vesicles. In no case was it found when the prostate and vesicles were normal, the test being negative in 15 patients with healthy prostates. One patient with marked hypertrophy, but no inflammation of the gland, failed to show albumin, although it was dense and hard and resulted in almost complete obstruction to the passage of urine. Two patients with acute prostatitis, for a few days had as much as one per cent. of proteid in the urine without any renal involvment. This could be greatly increased by massage of the prostate. Numerous tests were made upon all of the patients.

As a simple method of diagnosing prostatic inflammation I think it has no superior and that it may be depended upon with as much certainty as renal albumin in disease of the kidney, with this advantage, that it is less difficult to determine accurately the origin of proteid from the prostate than that from the kidney.

The test is available whether a microscope is at hand or not and requires no skill or experience to make a positive diagnosis immediately, even when there are scarcely any shreds and very little cloudiness in the urine passed after massage, which would ordinarily mean inflammation. In practical experience I have

often had a feeling of uncertainty as to whether or not certain prostates were chronically inflamed, without making a careful microscopic examination of the débris, for the absence of macroscopic shreds or masses in the urine after massage does not necessarily mean that the prostate is normal. In patients with an inflammation of mild character there appears to exist an interesting relation between the threads and the proteid; if the shreds are numerous the amount of proteid is small, but when there are no shreds there is much more albumin and albumose. The only explanation I can give for this is that the proteid material seems to be appropriated in some way in the coagulation of the threads. There are many patients with chronic prostatitis where the epithelial lining of the ducts and follicles is chiefly involved and where there are no nodules or enlargement of the gland perceptible, and yet there will be albumin present in the secretion and a chronic or recurrent urethritis kept up by it. A mistaken idea is prevalent both among the patients and the medical profession that a palpable defect must be present in all chronically inflamed prostates. In not a few patients a feeling of fullness or discomfort and a little difficulty in urinating will be the main symptoms, the gland feeling normal by rectal examination and the amount of débris, etc., massaged into the urine will be so slight that one hesitates to make a diagnosis of prostatitis without a microscopical examination. It is in these obscure cases with only a mild inflammation that the presence of albumose and albumin is of particular value in the diagnosis.

Until after repeated examinations of normal prostates I thought the albumose of the seminal fluid might be expressed from healthy vesicles and give an albuminous reaction, but practically it is very unusual after ordinary massage of the prostate and vesicles to get enough seminal secretion to respond to the ordinary tests for proteid. The amount present in normal semen is small. Consequently I believe that when the urine after massage contains a large amount of albumin or albumose, it invariably means disease of the prostate or seminal vesicles.

The amount present at each treatment also furnishes exact information as to the progress being made.

The patient should urinate in two glasses and be requested to retain a few ounces in the bladder after massage. If difficulty

is experienced in voiding the remainder an irrigation may be given and enough solution introduced into the bladder to enable the patient to urinate. More urine may be retained at the next examination, but it must always be remembered that if there is only a slight inflammation the proteid will be so diluted by a large quantity of urine or irrigating fluid that it may not be detected by the ordinary tests.

The quantity can be easily ascertained by boiling the urine in a test tube and precipitating the proteid with nitric or citric and picric acid. After standing, the amount thrown down multiplied by the total quantity of urine voided gives the amount of proteid given off by the prostate and vesicles. This in many patients will be equal in volume to the whole amount of urine passed after massage. ($\frac{1}{2}$ to 4 ounces). The mild cases may only show a trace. The amount varies with the degree of the inflammation and the frequency of massage.

If the precipitate is due to albumose it will clear up when heated to the boiling point. This form of proteid seems to be constantly present in the secretion from prostates and vesicles when they are chronically inflamed. (A small amount of albumose being present in normal semen). The heat test will usually be negative probably on account of the albumose which is not precipitated by boiling, and to the formation of an alkaline albuminate of the serum albumin, as the secretion is always alkaline in reaction. If the urine be added drop by drop to a test tube of boiling water the little white clouds will show the presence of proteid.

All other tests are positive, but the one which gives the best results and the one upon which I rely, is Robert's solution, as modified by Boston, containing 1 part of nitric acid to 10 parts of a saturated solution of magnesium sulphate. This does not cause the dark ring of oxidation at the junction of the fluids and for this reason is more delicate.

In explaining the presence of albumin and albumose in fluid from a diseased prostate, a study of the secretion which exudes upon the dressings of open lesions, throws some light on the subject. If the dressings from ulcers, boils, cancers, blisters, wounds, etc., be immersed for a short time in a half glass of water, and then filtered to free from any débris or pus, a large amount of

proteid will be present and responds to any of the usual tests. The amount from an abscess came as a distinct surprise to me when I first made this test. Abscesses of the prostate nearly always rupture into the deep urethra and often persist for many months draining through this canal into the bladder or as a discharge from the meatus. From a consideration of these facts it does not seem unnatural that we should not infrequently have urine-contaminated proteid from the prostate, without spermatozoa or anything to suggest its origin, unless these facts be born in mind.

The first urine washing out an inflamed urethra, when filtered contains more albumin than can be accounted for by the pus present, showing that inflammation of a mucous membrane will cause the exudation of a proteid material along with the leucocytes and not dependent upon them. It is the same kind of an inflammation that passes back into the prostate and vesicles where the secretion is retained and probably by tissue digestion or the influence of the alkaline secretion albumoses are formed. Pressure or overflow may force this fluid out through the deep urethra into the bladder. The smaller the amount of pus present the greater would be the danger of overlooking the source of the proteid and the more is the likelihood of an error being made in the prognosis and treatment.

A nidus of inflammation in the prostate gland or the seminal vesicle is one of the most important of the factors that tend to perpetrate a chronic urethritis. Much less skill is required to detect albumin in these secretions and to make a positive diagnosis than is necessary for a microscopical examination.

There is a striking resemblance between renal casts and urethral threads. Both are made of the coagulation of a material which exudes from an irritated or inflamed surface. They correspond accurately as to varieties: mucous shreds to hyaline casts, and desquamated epithelial threads to epithelial casts (which are granular if the cells have degenerated). Pus or blood may be incorporated in either shreds or casts. We know from a study of accessible lesions that proteid escapes from desquamated or irritated surfaces. Does this not suggest that perhaps there is a closer and simpler relation in certain cases between the secretion of albumin from the kidneys and that from other inflamed or eroded surfaces than we have realized?

Posner claims that 100,000 pus corpuscles in a cubic centimeter of urine corresponds to about 1 per cent. of proteid.[1] This may hold good where there is nothing but an inflammation; if, however, there is an abscess of the prostate or an ulcer of the bladder, it would be entirely misleading to depend upon this ratio.

There are probably four kinds of proteid present in the secretion from diseased prostates; serum albumin, serum globulin, nucleo-albumin, and deuto-albumose. Acetic acid will precipitate the nucleo-albumin and give a white ring at the zone of contact if used in a layer test. If mixed with the urine a white precipitate collects at the bottom when it is allowed to stand for several hours. Soon after its being passed floculent masses of nucleo-albumin are seen to form about the center of the glass of urine.

The proportion of serum albumin and nucleo-albumin varies with the condition in the prostate; abscess cavities furnishing large amounts of serum albumin, while catarrhal inflammation of the lining membrane of its ducts and follicles give an excess of albumose and nucleo-albumin. Between these extremes will be found many grades of inflammation with a varying ratio and combination of the proteid. Nucleo-albumin is derived from the disintegrating cells and is very similar to mucin.

The presence of spermatozoa in albuminous urine should always suggest the possibility of the inflamed prostate or seminal vesicles being the source of the proteid. From considerable study of this subject I have reached the conclusion that spermatorrhoea, instead of being a neurosis or due to a patulousness of the ducts of the vesicles, as is claimed by most authorities, is really nothing more nor less than a low-grade inflammation of the mucous membrane of the seminal vesicles. The increased secretion formed by the inflamed surface distends the cavities and finally by pressure or overflow, the fluid is discharged into the bladder or at the meatus, carrying with it spermatozoa. The inflammation that reaches the vesicle is of exactly the same character as that which causes an urethral discharge or a prostatorrhoea. I see no reason for believing that when this inflammation attacks the mucous lining of the vesicles or the ampullations of the vas deferens, it should act differently and cease to produce an increase in the secretion. After the production of a vesicle full of fluid it does not

[1] Sahli; "Diagnostic Methods," 1905.

seem difficult to imagine that the expression of this secretion would take with it some of the spermatozoa. Why should we claim that spermatorrhoea is due to a dilatation or flabbiness of the seminal ducts any more than that a discharge from the urethra is due to a dilatation of the meatus or that a secretion from the prostate is due to the large caliber of its ducts? The causes of spermatorrhoea are exactly the same as those that produce prostatorrhoea and we all agree that this is an inflammation of the prostate.

In speaking of spermatorrhoea I mean only those cases in which spermatozoa can be demonstrated, with the microscope, in the discharge or urine, and not the patients in whom spermatophobia is an obsession and who believe every drop of clear mucous to be semen.

Many times the insidious onset of this inflammation makes the subjective symptoms and history of chronic prostatitis or vesiculitis worthless in the diagnosis.

To obtain the secretion from the prostate and vesicles separately the patient is requested to present himself with a full bladder, about three-fourths of the urine is voided, washing out the urethra. After this the prostate is thoroughly massaged leaving the vesicles untouched, its condition is shown by the remainder of urine which is now passed. The urethra and bladder are irrigated with a boric acid or normal salt solution, the vesicles are massaged and the fluid voided will show by its contents their condition. (An *excess* of proteid and pus cells if they are inflamed.)

I have seen several patients with a mild chronic vesiculitis in whom the amount of seminal fluid was too small to appear at the meatus or leak back into the bladder, but could be easily obtained by pressure on the lower part of the vesicles. The inflammation was apparent from the large amount of albumin, albuminose and pus cells present in the secretion swarming with spermatozoa. This condition a little more advanced results in a true spermatorrhoea.

In my former paper on this subject the periodic increase in the prostatic secretion every ten to thirty days, that was observed in patients with chronic prostatitis, led me to suggest the similarity between this condition and menstruation in women, as I consider the prostate the analogue of the uterus. In the discus-

sion before the Atlanta Medical Society one of the members thought my analogy "farfetched" as he believes the veru montanum and the womb analogous. My reasons for believing otherwise is that: there is too great disparity in the size of the veru montanum and the uterus and I do not see the reason for selecting this small central portion of the prostate and considering it the analogue of a much larger organ, the uterus, whose structure corresponds more accurately with the tissue of the prostate proper, both being composed largely of muscular and glandular tissue.

The prostate is the only organ situated between the bladder and the rectum in the male which could be considered the counterpart of the uterus. The course of the canals leading from the ovary to the womb, which corresponds to the vas deferens connecting the testicle with the prostate, apparently offers further confirmation of the view of the analogy.

Conclusions.

The presence of albumin and albumose in the urine voided after massage of the prostate, when that passed before is normal, is as reliable in the diagnosis of prostatitis, or an abscess draining into the urethra, as renal albumin is in the diagnosis of kidney disease. This was constantly found in twenty-five patients with inflamed prostates. In two of these, with acute prostatitis, the first urine for a few days, showed as much as 1 per cent. of proteid, without evidence of renal disease at *any* time. The test was negative in fifteen patients with healthy prostates and vesicles.

The recognition of this prostatic and vesicular proteid affords a very simple method of making a positive diagnosis of prostatitis and seminal vesiculitis (when in excess) and is available in mild obscure cases whether a microscope be at hand or not.

An overflow of the secretion from the prostate or vesicles may contaminate the urine and mislead one as to the significance of the proteid present. In doubtful cases it should be eliminated by obtaining urine for examination ten or fifteen minutes after massage of the prostate and vesicles and a thorough irrigation of the urethra and the bladder, or if this fails by the history,

the absence of symptoms of nephritis and casts, and if necessary by ureteral catheterization. An increase in the amount of the proteid after massage should always suggest the prostate or the vesicles as the source.

Owing to the alkalinity of the prostatic secretion and to the fact that a large part of the proteid is deutero-albumose, which is not precipitated by boiling, the heat test as ordinarily applied will not be satisfactory as many times no cloudiness will appear in the part of the urine boiled. Picric and citric acid will, however, produce a cloudiness or a precipitate when the urine is cool. This will disappear when heated if due to albumose. If the urine be added drop by drop to a test tube of boiling water the proteid can be readily detected by the little clouds formed as it mixes with the water.

Robert's solution, as modified by Boston, containing one part of nitric acid to ten parts of a saturated solution of magnesium sulphate applied as a layer test, will demonstrate still smaller quantities and is the method upon which I rely in routine examinations.

A study of these secretions has led me to the conclusion that spermatorrhoea, instead of being a neurosis or due to a patulousness of the seminal ducts, as most authorities claim, is really caused by a low-grade inflammation of the seminal vesicles and the ampullations of the vas deferens, which should be borne in mind in the treatment of these conditions. The inflammation causes an increase in the secretion which mechanically washes out the spermatozoa.

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OXALURIA AS A CAUSE OF PROSTATIC AND URETHRAL DISTURBANCE.*

By George Knowles Swinburne, M. D., New York.

DURING the past two years I have been so struck by the large number of patients in my practice as well as of those who have come to consult me after having received prolonged treatment at the hands of others without benefit, in whom a condition of oxaluria was either the sole cause of prostatic or urethral disturbance, or was the secondary cause of the continuance of the original trouble and had been overlooked, or if not overlooked, then ignored, that I have ventured to bring the subject to the notice of this Society.

Believing that this subject had not received the attention that it deserved, I made an examination of the latest text books at my command and found that this was so; I omitted, however, to make any search of recent literature, or I should have remembered an admirable paper read by Dr. Bransford Lewis of St. Louis, before the American Association of G. U. Surgeons in Washington on May 6, 1897, and published in the *Journal of Genito-Urinary and Cutaneous Diseases* in July, 1897, in which his findings are exactly similar to my own.

I suppose that every practitioner knows—theoretically at least—that a non-specific urethritis may be caused by oxaluria and yet, a physician whose practice is largely genito-urinary, wrote me a few years ago that for some two or three weeks he had been troubled by a muco-purulent discharge with burning on urination; he had at once recognized that it was not a gonorrhoea and furthermore, he had never had an attack, nor had there been an exposure. He wrote that he had been taking alkalies, but had obtained no relief. I wrote back asking him to make a microscopic examination of the urinary sediment; he answered that all he could find were a few crystals of oxalate of lime. I ad-

* Read at the annual meeting of the American Urological Association, Boston, June 5, 1906.

vised him then to try nitro-hydrochloric acid and shortly after received another letter thanking me for the advice and saying that he himself had quickly recovered from an unpleasant condition, and that curiously had recently been consulted by a former patient whom he had some time before treated for a gonorrhoea, whose condition was similar to his own recent trouble and that an examination of the urine disclosed oxalate of lime, and he had been able to clear up his condition quickly by administering the same prescription.

Late one evening a physician, about thirty-two years old, came to ask me if I could suggest anything to relieve his condition: for the past three months he had been having repeated nocturnal emissions which had been occurring with such frequency, lately every night, and even more frequently, that it had "gotten on his nerves." He was married, a college graduate, an unusually intelligent man and a very hard worker. He had never been given to sexual excess, had never had any venereal disease, and such a condition had never happened to him before. At times he had suffered a good deal from pruritus ani. Local examination showed nothing abnormal except a slight hyperaesthesia of the posterior urethra on passage of the Thompson searcher. The urine was perfectly clear and contained neither albumin nor sugar, but I omitted at the time to make a microscopic examination. Appetite was not especially good and there was a slight tendency to constipation. I told him I thought his condition came from the condition of the alimentary tract and that his trouble would in my opinion clear if he attended to that. About two weeks later I met him and he told me that his indisposition had cleared entirely in a few days.

Not having examined the urine microscopically, I should not relate this case, were it not for its resemblance to the following case:

A. B., twenty-eight years old, an accountant, unmarried, had for six months previous to consulting me, been troubled by nocturnal emissions which had so increased in frequency in the last six weeks that he determined to have his condition examined into. He was a college graduate, had always been fond of athletic sports, but his business had recently kept him confined and he had little time for exercise, never had any venereal disease

and had always been continent, and at the present time was engaged to be married. There had been no sexual excitement of any kind. An examination of his urine showed numerous oxalate of lime crystals, and a single dose of calomel taken at night, followed by salts the following morning, together with dil. nitrohydrochloric acid taken after meals for a week or so, cleared up his case completely.

D. K., twenty-eight years old, a farmer, a large powerfully-built man with a clear ruddy complexion, the picture of good health, came in the winter, two years ago, complaining of sexual weakness. As a boy had masturbated to some extent and later on coming to the city to live had had intercourse several times, but had escaped venereal disease. While here, had consulted an advertising quack who had passed sounds for the supposed sexual weakness. He left the city after having lived here for a year or so, and returned to farm life. But he had always regarded himself as sexually weak and it troubled him that slight provocation would cause the exudation of a glairy mucous discharge. Examination showed some prostatic congestion, but I advised him to do his best to make a success of farming and not let his mind run on sexual matters, and get himself in a position to get married. Early this past winter he came again and said that at times his condition had become much worse, he could not drive, sitting in seat of his farm wagon without having, as he expressed it, seminal losses, which were weakening him, they being of daily recurrence, and he seriously asked if he could not go to a hospital and have his testes removed, his present condition being unbearable. I made as careful an examination of him as possible and found that he had a real condition of prostatitis. Through the urethroscope the deep urethra appeared much congested, but the urine was loaded with oxalate of lime crystals. I gave a single dose of calomel and sodium bicarbonate aa gr. X, at night, followed by sulphate of magnesia the following morning and nitrohydrochloric acid after meals. When he returned two weeks later, his condition had improved markedly; he could sit on the seat of his farm wagon without being obliged to sit forward on the very edge of the seat. Also his mental attitude had changed. I then treated his prostate by massage, and made a few applications, swabbing the deep urethra through the urethro-

scope with 10% Ag No. 3 solution, and tried to show him how to take care of himself in the future.

A. G., fifty-five years old, a baker, came to the dispensary, complaining of burning urination and of frequency, both day and night. The urine was clear. He completely emptied the bladder, so there was no residual urine. The urine showed numerous crystals of oxalate of lime. His prostate was normal. He had a heavily coated tongue and was of a constipated habit. He was under treatment for several weeks and finally seemed to do best on one of the Dispensary formulae of dil. nitrohydrochloric acid and essence of pepsin. The crystals finally left the urine and he felt perfectly well again.

W. T., tall and spare, but good build, forty-five years old, for two months had been having a muco-purulent discharge, had had several attacks of gonorrhoea, but not for many years. He first noticed the present trouble a few days after an intercourse, consulted a prominent physician in Toronto where he was living at the time, who without making any examination told him he had a gonorrhoea and prescribed Santal oil. The discharge remained the same, neither diminished nor increased, and on coming to New York to live went to a physician near his home who treated him with irrigations of permanganate of potassium. His condition remained unchanged and he was referred to me for treatment. I found his prostate soft and boggy and expressed considerable material on massage. No gonococci could be found. The bladder urine was clear. Under massage and irrigation with argyrol the condition of the prostate improved, but he complained of a condition that was annoying him exceedingly and consisted of attacks of heat and pain, deep seated in the canal. They came on independently of urination, would last several minutes and then pass off, and in their manner of onset resembled attacks of pruritus. The deep urethra was treated through the urethroscope. In the beginning the urethra was so congested that it bled freely after the insertion of the urethroscope, which treatment by the way I limit to weekly applications. After each application there was less bleeding, till after four to six sittings under such treatment the urethra had returned to a normal condition. But he still complained of these attacks of heat and pain and was becoming neurasthenic. The muco-purulent discharge had prac-

tically ceased. I then for the first time made a microscopic examination of the urine and found a marked condition of oxaluria. The calomel and saline were followed by the nitrohydrochloric acid. I saw him once after that, when he stated he had experienced considerable relief and was going away to the seashore. I have not seen him since.

I will relate but one more case. A. M., thirty-five, came to the Dispensary about five years ago for a chronic gonorrhoea; had been laid up in the hospital with epididymitis. He came for about three months, and I remembered the case well, because it was one of the first on which I had used my posterior urethroscope and discovered a large swelling with a granulating surface about the middle of the verumontanum; on withdrawing the instrument it had curetted the surface and the small tumor was found in the window of the instrument, followed by some little bleeding. At that time several applications were made and then the patient disappeared. I did not see him again till this past winter, when he came to see if he could be cured of a condition that had persisted since he had left the Dispensary. This consisted of attacks coming on independently of urination of a stabbing pain in the region of the prostate and deep urethra, which would last from a few moments to over an hour, after which he felt weak. Sometimes he would go for several weeks without an attack, and sometimes they were quite frequent; when severe and prolonged, he would have only one attack during the day, and sometimes, when milder, they might persist throughout the day. At the time he left the Dispensary, his urine was very cloudy, but now was perfectly clear except for a long mucous shred which at first floated and then gradually sank to the bottom of the first glass. The prostate, which before had been large and somewhat nodular (I remember I feared at one time the possibility of tuberculosis), was now perfectly normal and regular on palpation, no material being expressed. The deep urethra was congested. The urine showed an oxaluria. The treatment has been largely directed toward the alimentary tract. He has been under observation during the better part of six months. At times he has no trouble whatever and then an attack will come on, but they have diminished in severity. When he feels well, there is no oxaluria and after such an attack I have always found it present.

Now, in the past year I have had twenty-six cases of oxaluria, presenting a variety of symptoms such as I have stated, but the greater number of these cases show the same general set of symptoms. There is a history of a previous gonorrhoea of a recent or remote date; ever since the attack there has been a persistent burning pain in the canal, usually at the end of urination, sometimes quite sharp and of a nagging character. Some have been the victims of every sort of application their physicians could think of and have been their despair. There may or may not be present a muco-purulent discharge; generally they show nothing but a few shreds in the urine. Such patients have been told it was their imagination, that they were cured. They all have oxaluria; some have yielded readily, others persist with their symptoms and their oxaluria in varying degree, sometimes better and sometimes worse.

I think I cannot better conclude than by quoting the summing up of Dr. Lewis's article:

"(1). Both oxalic and uric acid may appear in the urine, either in a physiological or a pathological manner.

"(2). When pathological, they may exert certain injurious effects on the genito-urinary organs.

"(3). These effects may be either the inciting of disease where there has been previous health, or they may act by rendering more serious and resistant to ordinary methods of treatment other inflammations and disorders (gonorrhoeal, etc.), of those organs.

"(4). When either the oxalic or uric acid element is acting injuriously in the ways mentioned, systemic treatment (dietary, medicinal and hygienic) is demanded, and may even take precedence over the local measures that are usually considered sufficient in such inflammations or disorders."

This, however, is not all. It seems to me that these cases are worthy of study and are cases for the general practitioner. Some of these cases are apt to develop renal calculus, and I think that a previous gonorrhoea may predispose to this condition, as also may an invasion of the urinary tract by the colon bacillus. They are due to faulty metabolism.

64 East 56th Street.

Discussion.

Dr. E. L. Keyes, Jr., New York: It seems to me that in many of these instances of general debility or neurotic habit and irritability of the posterior urethra showing itself in various ways, the two conditions are due to a common cause rather than one due to the other. I think the danger in most of these cases is in overdoing local treatment and not turning the man out to grass sooner.

Dr. Swinburne (Closing). There is nothing to add. Some of these cases, I might say most of them, have been rather difficult, but I hoped to get some light on the best methods of treatment. Of course the treatment must be in a measure, systemic, and I agree with one thing Dr. Keyes said, which was, that instead of the oxaluria causing some of these symptoms, it as well as the urinary and prostatic symptoms may both be due to an underlying cause.

CHRONIC CATARRHAL NEPHRITIS.[1]

By I. N. Danforth, A. M., M. D., Chicago.

IN the month of May, 1885, I read a paper before the Illinois State Medical Society, entitled "Simple Renal Catarrh," which commenced as follows: "More than ten years ago, my attention was attracted to a peculiar and quite common form of renal irritation, which receives no distinct recognition in our text books." It is therefore at the present time more than thirty years since I began to observe the condition which I then called "Simple Renal Catarrh," but which I now call Catarrhal Nephritis, because from long observation and experience, I am satisfied that it merits the dignity of a name of its own, and a place of its own in our catalogue of diseases. What then is meant by "Catarrhal Nephritis"? As I stated, twenty years ago, "it is essentially a catarrhal inflammation, or an inflammatory process of very low degree, which has its seat mainly in the renal tubules." I will now qualify that statement by saying that its pathologic consequences are mainly manifested upon the epithelial *cells* of the renal tubules. It may commence in any portion of the tubuli uriniferi, from the capsule of Bowman to the papillary terminals of these tubules; yet my belief is that in the majority of cases, it has its origin in the convoluted portions of the tubes, because

[1] Read by title at the annual meeting of the American Urological Association, Boston, June 4-5, 1906.

the exciting causes are most commonly found in these tubules, as I shall presently show. In exceptional cases, as in neglected or ill-treated instances of bladder infection, the maladroit use of ureteral catheters or instruments for bladder exploration, the cause of renal catarrh may come from below and travel upward to the renal parenchyma, as true instances of so-called "upward infection."

The changes in the renal cells are quite characteristic. They become swollen and cloudy, and somewhat opaque; in other words, they manifest the usual appearances of cloudy swelling, and they secrete an abnormal amount of thick glassy mucus, which renders the urine more or less turbid, according as the mucus is greater or less in quantity. The whole kidney is generally hyperemic, sometimes to a very slight degree, sometimes very markedly so. The organ generally presents a swollen appearance, so that the capsule seems drawn very tight, and if the latter is incised for an inch or two, on the convex border, the kidney structure will bulge through the opening, as though the organ had outgrown its capsule. If microscopic sections of the kidney are made, they will show cloudy, swollen epithelial cells, crystals of urinary salts, and strings of thick sticky mucus—provided, of course, the sections are made from kidneys removed from the body very soon after death, and are examined at once, without special staining, or other preparation.

Symptoms. Catarrhal Nephritis has no distinctive subjective symptoms. If associated with lithuria, phosphuria or oxaluria, the characteristic symptoms of either of these conditions will suggest the presence of renal catarrh, and of course the necessary investigation will follow. Or, if there is a history of chronic bladder or vaginal infection, it is probable that the kidneys will be implicated. Such cases as these present tangible and definite causes, and one has no difficulty in arriving at a reasonable conclusion by a process of "diagnostic induction." But there remains a large group of cases which seem to arise without any appreciable cause, and which are likely to elude a painstaking diagnostician, unless he is alive to the fact that catarrhal nephritis is a very common malady, and may be present when least expected. Whenever a case presents itself with impaired digestion, a coated tongue, foul breath, fickle appetite, flatulence, con-

stipation and a general demoralization of the gastro-intestinal tract, it may safely and easily be predicated that imperfect elimination, and consequent toxemia are important and probably primary factors in the causation of the symptoms noted. Of course the next question will be what is responsible for the imperfect elimination, and generally it will be laid to the liver, and I may add, not without reason. But it is likewise true that in a great many cases, the liver is not the only, nor yet the chief sinner; but the renal function is imperfect and faulty, and an examination of the urine will reveal the presence of catarrhal nephritis. In other words, the existence of the symptom complex which I have noted, should suggest the possibility of renal failure, and an examination of the urine. Sometimes patients will complain of backache, which will be called lumbago; or of frequent urination, which is likely to be attributed to "catarrh of the bladder," and very properly, because the bladder is provoked and irritated by the presence of morbid urine, sent down by morbid kidneys. The patient has no temperature, does not lose flesh, is not disabled from business, yet is languid, and lacks his accustomed vigor, albeit there are many cases without any symptoms, local or otherwise, of sufficient positiveness to attract the attention of patient or physician, yet both patient and physician are aware that the health of the former is not quite perfect.

But an examination of the urine will furnish evidence sufficient for the establishment of a positive diagnosis in practically every case, provided a proper and careful examination is made. I have long abandoned the practice of telling my patients to bring me a specimen from the entire quantity passed in twenty-four hours, because such specimens are likely to become mixed with dust from sweepings or clothes brushings, or with some other person's urine, or with sputum, or they are likely to decompose in hot weather, or get too chilled in cold weather, and any or either of these accidents impair the reliability of the specimen. Let the patient save a twenty-four hour specimen, and report the quantity, but for chemical and microscopic examinations, something different is desirable. I am accustomed to tell patients to procure from the druggist two four-ounce bottles, be sure they are freshly washed, and freshly corked with clean, new corks; then to fill one of these bottles with the urine passed on going to

bed, and the other with the urine passed on rising the following morning, both specimens to be brought to me the same forenoon. If these two specimens are mixed in equal quantities, the result will be a specimen which will fairly represent the average daily work of the kidneys. And what shall we find, if the case be one of catarrhal nephritis? As regards quantity, it is likely to be markedly in excess, or markedly deficient; in exceptional cases, normal in amount. The color may be light or dark, according as the quantity is large or small; the reaction is generally acid in fresh specimens, sometimes sharply, sometimes feebly so; in specimens not strictly fresh, the reaction is likely to be alkaline; the specific gravity may be as low as 1005, or as high as 1030, and this is closely related to the volume or amount of urine. The specimens are usually turbid or cloudy, but may be clear and beset with crystals which sparkle when the urine is held between the eye and a strong light, solar or artificial. When the urine stands for any length of time, a thick deposit falls to the bottom of the bottle, which is composed mainly of a thick, clear, glassy, transparent mucus, quite unlike that of vesical catarrh; in fact, I think this peculiarly glassy mucus may be regarded as characteristic of renal catarrh. Albumen may be present in small amount—generally only "a trace," if any; or it may be absent; or it may be present at one time and absent at another; or again, it may be present all the time in one case, and absent all the time in another. In most cases, it will be present in a barely appreciable quantity, when the patient is actively at work, and absent during his hours of absolute rest. No general rule can be laid down; each case must be classed by itself, but almost every case has slight albuminuria at some period of its course. It seems scarcely necessary to say that the testing must be done with delicacy and skill, if reliable results are to be expected. The microscope will show plenty of epithelial cells from the renal tubuli and pelvis, and some patches of squamous cells from the bladder; also many leucocytes, and probably various forms of crystals of uric acid and other saline deposits, as sodium urate or calcium oxalate, or if the urine is alkaline, mixed phosphates. There will be present the so-called "cylindroid casts," which, I think, may be regarded as characteristic of renal catarrh. The name "cylindroid" is not a happy one, because it means nothing. The casts in question are long,

wavy, rather irregular strings of mucus, or more correctly mucin, which have been formed in the renal tubules, and washed or floated away by the stream of urine accumulating behind them. They are more or less perfect casts of the tubes in which they were formed; hence they vary much in size, form, length and general appearance. They are structureless and have a somewhat high refractive power; hence they are often difficult to find, and may escape notice altogether, unless the observer is very familiar with their appearance. It is a good plan to add a couple of drops of Loeffler's alkaline blue to a suspected specimen of urine, a few moments before centrifuging, so as to stain the casts and other organic bodies. These casts or "cylindroids" are the product of the catarrhal process; they are the fruit of a morbid secretion by the epithelia of the renal tubules; but they must not be regarded as the product of an exudation directly from the blood vessels, like the fibrinous casts of parenchymatous and interstitial nephritis. A few blood-globules may be present, but it would be a temporary incident, and not a legitimate event, if the case is one of uncomplicated catarrhal nephritis. Colon bacilli are almost always present; gonococci are liable to be present, if the case is one of upward infection, and of course the ordinary pus germs are liable to appear at any time.

The causes of catarrhal nephritis are mainly toxic or septic. Under the head of toxic causes, I would include uric acid and its allies, calcium oxalate, the phosphatic compounds, and, rarely cystinuria; including, of course, the various complex combinations of these bodies, which are constantly taking place either in the blood, or the renal parenchyma. When the saline elements of the urine are very much in excess of the normal amount, they are pretty sure to be precipitated in the renal tubes, in the form of crystals or granules or both, and these particles, with their sharp angles or rough surfaces, are certain to prove seriously irritating to the tubules and particularly to their delicate epithelia. The first result will be the development of a catarrhal inflammation in the tubes so invaded, and the subsequent appearance of the symptoms and phenomena already described. These cases find their counterpart in the numerous instances of catarrhal bronchitis, produced by inhalations of dust particles, and their irritating effects on the bronchial mucous membrane. The most frequent and potent of

the toxic causes of catarrhal nephritis, is unquestionably uric acid, which is so prone to precipitate along the course of the renal tubes, and form little irritating masses, which promptly provoke a response in the shape of renal catarrh. As this precipitation almost always occurs in the convoluted tubes of the kidney, simply because these tubes are chiefly the functional portions of the organ, it follows that toxic catarrhal nephritis is most likely to have its origin in the so-called "labyrinth" of the kidney. Of course the urates, phosphates, and oxalates are equally capable of doing similar mischief, but they are, at least, not so frequently detected in the very act, as is uric acid. But they are certainly frequent and efficient accomplices in the production of renal catarrh, and other lesions of the kidney, after uric acid has paved the way.

The septic causes of renal catarrh are chiefly instances of "upward infection," in which septic germs travel upward from the bladder. Among these germs, the gonococcus undoubtedly holds first rank, although the various pus germs are perhaps no less certain as regards results, but they are much slower in their migration, much less serious as to consequences, and much more easily eradicated than the malevolent gonococcus. In females, examples of upward infection and consequent catarrhal nephritis are exceedingly common, the infection being communicated from the vagina to the bladder, and thence along the ureter to the kidney. I have seen a great many cases, in which the history pointed unmistakably to the chain of events just described; a gonorrheal infection being followed in due time by an infected bladder, and then by infected kidneys. Of course many of these cases develop into suppurative pyelitis or pyelo-nephritis, but in quite a proportion of them, the infection of the kidney is of a very mild type, and may be arrested in the catarrhal stage, if detected in season. But not all cases of septic catarrhal nephritis are due to upward infection. In fact, abundant clinical experience has proven that infection of the kidney may be communicated through the blood, from any portion of the body. It is not at all uncommon as a result of pneumonia, severe attacks of typhoid fever, diphtheria, and violent attacks of the eruptive fevers. I have seen many cases of renal catarrh occur during or following severe attacks of the epidemic influenza, which goes by the name of "la grippe." In fact, any long severe illness, which is of itself of a toxic or

septic nature, may provoke an attack of renal catarrh as one of its sequelae. In such cases, however, it is not always possible to decide whether they should be regarded as septic or toxic; nor is it a question of any great practical importance, from a clinical standpoint. There yet remains a group of cases, neither very large nor very frequent, for which no causes can be assigned. They are generally said to result from cold, exposure, stormy weather, overwork, intemperance, etc., and it is probable that, once in a while at least, one or more of these conjectures may hit the nail on the head.

The prognosis of catarrhal nephritis ought always to be favorable, and so it would be, if an early and correct diagnosis could be made. But unfortunately we physicians depend too much upon "symptoms" and as I have already said, the disease under consideration has no symptoms that are positive and characteristic, except those derived from examinations of the urine, and such examinations are oftener the exception than the rule. In clinical experience, it will be found that a considerable group of very mild cases develop, run their course of a few days or weeks, and get well spontaneously, without recognition or treatment. I make this statement as a result of my own observations of many cases, during the past twenty years. Another group of cases of greater severity, but which are fortunate enough to be diagnosticated early and treated wisely, make good and perfect recoveries, after a period varying from one to three months. Still another group of cases, which are of unusual severity from the start, or do not happen to be promptly recognized, and are not judiciously treated, will eventuate in true Bright's disease, or pyonephrosis, or renal calculus, or some combination or complication of these various lesions, thus transforming a very simple and easily-cured hyperplasia of the renal epithelia, into a very grave and possibly incurable disease, which extends its ravages to the whole kidney. Of course the resources of surgery are capable of reaching and curing many of the cases indicated, but an early diagnosis in every case of catarrhal nephritis, would, in my judgment, reduce the operations upon the kidney very materially.

In view of the astonishing prevalence of therapeutic agnosticism at the present time, one almost hesitates to say anything about the employment of therapeutic measures, lest he be deemed

"old-fashioned" and "out of date." Yet one cannot utterly cast aside the cumulative teachings of experience, common sense and science, even at the somewhat dogmatic dictates of "modern medicine." There is no better field for the exercise of rational therapeutics, than in the treatment of catarrhal nephritis, and its importance, considered from the standpoint of "preventive medicine," can hardly be overestimated. It is mainly a question of the removal of the causes, after which the disease gets well of itself. In all forms of renal catarrh, the first thing in order is a proper regulation of the diet. Proteids must be cut down to a limited amount, once a day, although I have long ceased to forbid flesh diet altogether, because a certain amount of nitrogenous food seems necessary for perfect nutrition. Milk, cereals of all kinds, fruits and vegetables are allowed in reasonable amount. Tea and coffee are permitted sparingly. All forms of alcoholic stimulants are forbidden; tobacco is generally interdicted, but an old and inveterate smoker is allowed two mild cigars a day. The patient is admonished to masticate his food thoroughly, or "eat slowly," and this I regard as of no trifling importance, and I generally accentuate my advice by reminding the patient that he is not provided with a gizzard, like a chicken, to grind his food after he has swallowed it. If his teeth are not capable of efficient mastication, he is referred to his dentist. Not long ago it was the fashion among medical men to direct their patients with renal lesions of any kind, to drink "all the water they could," and quite too many of them tried to obey. At the various watering places it got to be a matter of emulation among visitors, to see who could drink the greatest quantity of water. I have seen many cases of nephritis of various forms, but especially catarrhal nephritis, which I believed to be directly due to the water-logged condition of the kidneys, consequent upon unreasoning devotion to the water-drinking fad. A somewhat liberal use of water—if it is pure water—is unquestionably beneficial in all inflammatory lesions of the kidneys, but when it is pushed to the extreme of overloading the blood vessels, and forcing the kidneys to act more like safety valves than like eliminating organs, it is time to call a halt. Violent exercise, like "strenuous" athletics, should be forbidden, but plenty of mild exercise, out of doors, is beneficial. Frequent tepid salt baths,

followed by vigorous body friction, will be helpful. As to medicines, if we are dealing with a case of uric acid poisoning, the administration of the potassium, sodium or lithium salts (citrates or carbonates are the best), in doses of ten to thirty grains, four times a day and always when the stomach is empty, will generally bring about satisfactory results. The remedy should always be given in a large glass of water, and if the water is quite warm, it is all the better. Many cases are benefited by sodium salicylate or aspirin, and a combination of sodium salicylate with potassium carbonate, in doses of ten grains of the former to twenty grains of the latter, three or four times a day speedily benefits many cases. Nearly every case of uric acid poisoning will yield to combinations of the salts of potassium sodium and lithium, but it is frequently necessary to use them for considerable periods of time, and patients with a pronounced uric acid diathesis, need a repetition of the treatment at longer or shorter intervals.

The condition known as oxaluria, or the oxalic acid diathesis (first described by Donné in 1838), is frequently associated with lithemia, and is to a considerable extent, at least, dependent upon the same causes. Its chief interest, for present purposes, lies in the great liability of the sharp-angled crystals to deposit in the renal tubules, and start a catarrhal process by mechanical irritation. The presence of oxaluria generally depends upon impaired digestion, indicated by the symptoms of "nervous dyspepsia." In addition to, or in modification of the treatment for lithemia, the patient usually needs a few doses of calomel, followed by strychnine, nux vomica, vegetable bitters or pepsin, such selections or combinations being made as are indicated by the particular case under treatment.

Phosphatic deposits in the urine may be either alkaline (sodium and potassium), or earthy (calcium and magnesium). (In decomposed urine, of course, the ammonio-magnesium or triple phosphate may be found, but that does not concern us in this connection.) The common alkaline and earthy phosphates are very frequent in dyspeptics, neurasthenics, victims of hysteria and other "functional" nervous affections, and all the wasting diseases, and the indications for treatment must be deduced from the underlying pathology of the case in hand. Patients with phosphaturia are frequently overworked business men, clergy-

men, lawyers and the like, and they are very numerous in these days of the "strenuous life." Very many of them have renal catarrh as an accompaniment or complication of the phosphaturia. A few weeks of absolute rest and recreation is all that many such patients need, but unfortunately it is just what most of them cannot have. We must therefore do the best we can for them, just as we find them. Faulty habits as to eating and drinking should be corrected; the bowels should be unloaded and kept thoroughly evacuated; the functions of the skin as an eliminating organ must be attended to, and the patient ought to be advised again and again as to the importance of daily, but moderate exercise in the open air. As to medicines, digestives and tonics addressed to the nervous system, will cover the ground. The mineral acids, especially the phosphoric, strychnine or nux vomica, and the vegetable bitters, like gentian, will be found useful. Cod-liver oil, the malt preparations, and the preparations of organic iron will also find their respective places in cases attended with anemia or "wasting." But, of course, these medicines must be regarded only as adjuncts to proper diet, correct habits and modes of life, including, so far as possible, the all-important let up from business and professional cares and worries.

In treating septic catarrhal nephritis, it is first necessary to determine what form or forms of sepsis we are dealing with, and next to ascertain its or their sources. Most cases will be examples of "upward infection," the septic germs making their way upward from the bladder, and in females many cases may be traced to a vaginal discharge, due to endometritis, which in turn is due to unhealed cervical lacerations. In all septic cases of renal catarrh, the cause must be hunted down and removed, else medical treatment will be little else than palliative. Unhealed cervical or perineal lacerations, hemorrhoids, anal fistulae, rectal ulcers, and all such sources of pus germs, must be explored and remedied, before any treatment addressed to the urinary tract will be of much value. In males, a chronic balanitis due to filthy habits or phimosis, a stricture which gives little or no discomfort to the patient, a prostatorrhea or cystitis, of which the patient may be unaware, or the presence of a few venerable gonococci in the urethral lacunae, and which now and then renew their youth and vigor, or some rectal lesion, slight in itself, yet sufficient to en-

courage the growth of septic germs; any one of these, as well as various other sources of infection, may install and perpetuate a renal catarrh, which will surely become a grave renal lesion, if not arrested in the catarrhal stage. Therefore, I repeat, seek out and get rid of the sources of infection, after which the infected kidneys may be treated with large prospects of success. The rules as to diet, habits, etc., already enunciated, apply here without modification or exception. The particular medical treatment of septic catarrhal nephritis, reduces itself to the persistent employment of any one of several remedies, and the selection must be left to the judgment of the physician, and his views of the case in hand. Urotropin, cystogen, aminoform, boric acid, benzoic acid, salol and benzosol are each and all very useful remedies in catarrhal nephritis, if there is a septic factor in the case. The one selected should be given in 5 grain doses, along with a glass of hot water, at least half an hour before each meal, and at bedtime, so that the remedy may, so far as possible, escape admixture with the food, and the effects of gastric digestion, and may enter the blood and reach its destination as rapidly as possible. Of course this is rather a finespun theory; yet I am sure that I get more prompt and positive effects from remedies destined to modify the renal apparatus, if given in this way, hence I insist upon its importance. In very obstinate cases, with profuse discharge of stringy mucus, I have derived great help from creosote, or Canada balsam, or capaiba, or sandal oil, given persistently, in doses not exceeding 5 minims, four times daily, freely diluted. There are plenty of remedies besides those mentioned, which are equally valuable, but it is better to be thoroughly acquainted with a few remedies, than to half know a larger number. The cure of any one of the chronic renal diseases—if they are curable at all—is not a question of polypharmacy, but rather a matter of a few remedies, wisely but persistently administered, and, at the same time the enforcement of proper regulations as to diet, dress, and all other matters, which promote health.

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. NOVEMBER, 1906. NO. 14

REPORT OF TWO CASES OF GONORRHOEAL INVASION OF THE KIDNEY AND RENAL PELVIS.[1]

By A. RAVOGLI, M. D., Cincinnati.

THE rare occurrence of the gonorrhoeal complication of the kidney, gives some interest to any report of these cases. Suppurative inflammation of the kidney and of the renal pelvis always results from microbic origin.

From the different kinds of micro-organisms causing the disease, it has been divided and classified. Micro-organisms causing inflammation are often together, and as a result they produce cases of mixed infection, which cannot be easily distinguished.

The gonococcus, a pus producing germ, can make its way to the renal pelvis and to the kidney, causing gonorrhoeal pyelitis and nephritis as complications of gonorrhoea.

CASE I.—An Italian fruit vender, twenty-three, of poor physique, in delicate health, came to take treatment for an acute gonorrhoeal anterior urethritis. He received irrigations with solution 1 to 5000 of permanganate of potassium, and salol tablets internally. He did not come back to report, as he stated that he was much better. Four weeks after we were called to his house on account of an acute pain in the left side of the lumbar region, which prevented him from walking and compelled him to remain in bed. Two nights before he had been at a dance, where he had danced until morning. When he came out he was in a perspiration, exposing himself to the cold air of a winter morning.

The pain was in the region of the left loin, which was somewhat swollen, and exceedingly tender to pressure, the pain ir-

[1] Read at the Annual Meeting of the American Urological Association, Boston, June 4-5, 1906.

radiating towards the abdominal side. He had fever, 102° F., nausea and vomiting, and a general rheumatic condition.

The urine was somewhat diminished in quantity, as it was less than two pints in 24 hours, turbid and thick. Reaction was neutral, specific gravity 1016, albumin abundant.

Microscopic examination showed blood corpuscles, pus cells, and a large amount of renal casts. The sediment of the urine obtained by the centrifuge and stained with methel blue, showed in the casts different bacteria, but more often a large quantity of gonococci. Thus it was proved beyond a doubt that the nephritis was from the gonorrhoeal invasion of the tubular system.

The fever subsided, the urine began to clear up, the acute pain to grow dull, and gradually within three weeks the patient was able to sit up. The urine turned acid, with a specific gravity of 1020, of a yellowish dark color, with some mucous sediment. The microscopic examination showed in the sediment some pus cells, epithelial cells, amorphous phosphate salts, but no more casts.

The treatment consisted in the administration of calomel, saline purgatives, and large doses of salol, from 30 to 40 grains per day, and then urotropin.

The other case occurred in a Greek, a waiter in a restaurant. A young man of twenty-four, of good physique, in excellent health. He came to consult us for an acute gonorrhoeal anterior urethritis. He, too, received permanganate irrigations and salol internally. The patient continued his treatment and was not seen again. We were called to attend the same patient some six weeks after in his house, on account of a violent pain in the right lumbar region, irradiating towards the abdominal side. The pain was so severe that the patient could not remain quiet in bed, and the subcutaneous use of morphine was necessary to keep him there.

He attributed the pain to a strain while waiting at a banquet and carrying around a large quantity of dishes. After serving at the banquet, he was freely perspiring and went home, exposing himself to cold air in mid-winter.

He had fever ranging between 101° and 103° F., nausea, vomiting, and also pains in the joints. When reminded of his gonorrhoea, he said that he thought he was well, as he did not see any more discharge.

The examination of the urine showed it to be scanty in quantity, acid in reaction, with a specific gravity of 1012, thick and turbid, with an abundant white creamy sediment falling to the bottom of the glass like sand.

It contained albumin in abundance. Under the microscope it showed a large quantity of casts containing pus cells, epithelia, studded with gonococci.

The fever and the acute pain gradually subsided, the tongue began to return to a moist condition, and the pain dull in character, was gradually progressing towards the abdomen. The urine began to increase in quantity, the specific gravity to augment, and the purulent sediment to become less. The treatment, as in the first case, rested mostly on the use of salol, urotropin, and in the application of hot fomentations on the lumbar region.

In both cases, we find that the nephritis and pyelonephritis is the complication of gonorrhea, that it is an extension of the gonorrhoeal invasion. We find that this invasion comes between the fourth and the sixth week from the first urethral gonorrhoeal infection. In this regard, we find our observations somewhat different from those of Rendu [1] of Coats, and Carlslaw [2] and of Wladimirsky,[3] who have found in their cases a long interval of time between the infection and the onset of nephritis. In the case of Rendu, the patient was suffering with gonorrhoea for over a year, and nephritis was at first considered the result of santol, copahib and cubeb, with which the patient was fed.

We believe that too often cases of gonorrhoeal nephritis and pyelo-nephritis have been attributed to the use of balsams, or of urinary disinfectants, as urotropin, salol, etc. We must see in our cases not only a urogenital infection in the sense of Küster and Wagner,[4] where the gonococci from the posterior urethra have travelled to the bladder, and through the ureters to the renal pelvis and to the kidney, but also a hematogenic reason of infection.

[1] Rendu Nephrite mixte de nature blenorrhagique. *Gaz. des hopit.,* 1889-97. Ref. *Arch. Derm. und Syphil.*

[2] Coats and Carlslaw. *The Glasgow Med. Journ.,* vol. 39, No. 6, June, 1893.

[3] Wladimirsky, M. Die Gonorrhoische Pyelitis und Nephropyelitis. *Derm. Zeitsch.* Bd. X, p. 320.

[4] Wagner, P. Handbuch der Urologie. *Frisch und Zuckerhandl,* Bd. II, p. 178.

There has also to be taken into consideration the presence of other microbes, which in consequence of a long-standing gonorrhoeal inflammation, find good ground for their development in all parts of the urogenital tract. The presence of these micro-organisms has not much influence on the mucosa of the bladder or of the ureters when it is in perfect condition. But when the mucous membrane is wounded, is abraded, inflamed by the presence of the gonococci, the other micro-organisms find places for their development. The presence of bacteria in the bladder is usually the cause of alteration of the urine which causes catarrhal inflammation of the organ. This catarrhal condition starting from the bladder, progresses to the ureters from which the gonococci find their way to the renal pelvis and to the kidney.

In our cases different bacteria have been found in the urine, which suggests the possibility of a mixed bacterial and gonorrhoeal infection. In every case of pyelonephritis there have been found staphylococcus pyogenes, streptococcus pyogenes, bacterium coli commune, proteus vulgaris Hauseri, etc.

In both cases, however, the gonococci were prevalent. For this reason we incline much more to consider it a mixed infection. Pure gonococcus infection is difficult to be conceived on account of the long distance between the urethra and the renal pelvis. Moreover, in both cases there cannot be excluded an hematogenal infection from the gonococci. Both patients were exposed to violent exercise, both in full perspiration underwent an abrupt change of temperature. The influence of the intense change of temperature from heat to cold, brought on the peripheral circulation towards the center, which may have played an important rôle in the production of the inflammatory process of the renal pelvis and of the kidney. Both patients were suddenly taken ill with local pain in the loin, nausea, vomiting, pains in the joints, and fever. In both cases the onset of the disease shows characters of a general infectious disease with localization in the kidney.

As Finger[5] states, the diagnosis of gonorrhoeal pyelitis is often improperly made. In cases of acute gonorrhoea, pain in one or both loins, tenesmus, some albumin in the urine, together

[5] Finger, E. Blenorrhoea of the Sexual Organs and Its Complications, 1894, p. 270.

PLATE VIII.—To Illustrate the Article by Dr. A. Ravogli.

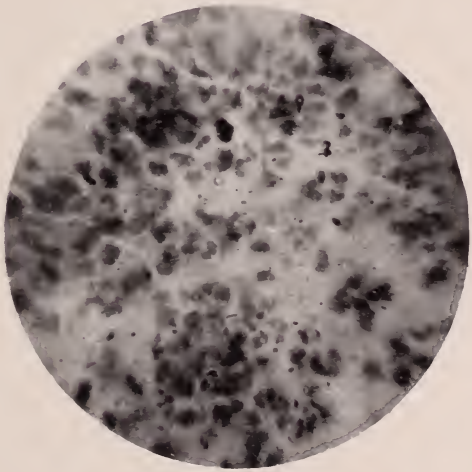

Fig. 1.

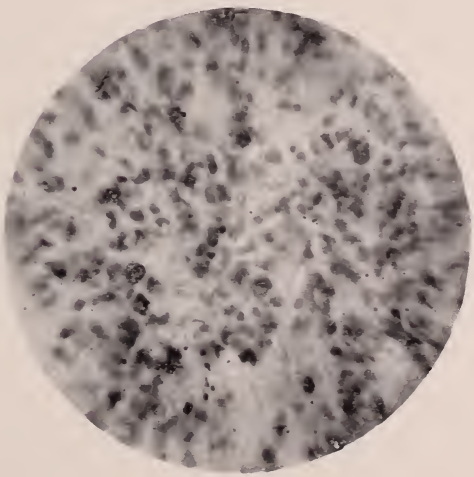

Fig. 2.

with pus, do not constitute a case of nephropyelitis, but it is only a reflex symptom. When the tenesmus is ameliorated, the albumin diminishes at once. In cases of pyelonephritis, the amount of albumin is larger than that of the pus, and there is the presence of casts and of epithelium of the straight urinary tubules in the sediment.

Several cases of gonorrhoeal pyelonephritis have been reported by Fuerbringer, where in consequence of an attack of cystitis, chills and fever developed, with polyuria, pain and tenderness in the region of one kidney, vomiting and headache. The presence of casts in the sediment of the urine confirmed the diagnosis.

These cases lasted for some time, but finally terminated without consequences. Both our cases have recovered after several weeks, without leaving complications.

In regard to treatment, it would be very appropriate to use antiseptic solutions in the urethra and in the bladder to prevent the septic condition. This can be done with irrigations with warm mild solutions of 1% boric or salicylic acid in sterilized water. In the acute stage, however, of the pyelonephritis, the application of irrigation is not always possible, on account of the violent pain. It is better in these cases to limit ourselves to hot applications in the region of the loin, to afford relief to the acute pain.

Internally, in both cases, we have relied on the antiparasitic action of salol and of urotropin. Both remedies have the remarkable property of diminishing the quantity of pus, and prevent the fermentation of the urine.

By the administration of these remedies we saw our patients improve and gradually recover from this complication of gonorrhoea.

DISCUSSION OF DR. CUMSTON'S PAPER (SEE JULY ISSUE OF JOURNAL) AND DR. RAVOGLI'S PAPER.

DR EDGAR GARCEAU, Boston: Anuria is one of the most alarming symptoms that can arise in connection with diseases of the urinary tract, but it is fortunate that it is seldom immediately fatal. This gives an opportunity for its relief. The temptation has been to wait too long, however, before resorting to surgical measures, in the hope that the urine will begin to flow once more. The tendency nowadays is to operate much earlier.

The following cases illustrate some of the phases of the trouble. Slight opera-

tions on the lower urinary passages will sometimes give rise to the affection, even most trivial surgical interference. This was illustrated in a case in which I passed the ureteral catheters in the course of an ordinary examination of the upper passages. The woman was about forty years old, and she was suffering from tuberculosis of the urinary organs. The examination presented no unusual difficulties and the catheters were introduced into the ureters without any special trouble. She had complete cessation of urinary secretion for a period of three days, during which time the usual means for starting the urine was tried, but without avail, until some dry cups were put to the lumbar region. I suppose these must have exerted a favorable influence, for the urine began to flow about ten minutes after the cups had been applied. It was interesting in this case to notice that while the urine no longer flowed over the vesical mucous membrane, the patient was perfectly comfortable and had no pain nor vesical irritability whatever.

Anuria following nephrectomy is the most serious form that can be encountered, for it means either that the remaining kidney has ceased to work, perhaps temporarily only, or that the remaining kidney is damaged and cannot take upon itself the increased strain, a condition that has not been recognized. This last condition must be eliminated by every careful surgeon.

There is a condition, however, which may affect a kidney supposedly sound that is most difficult of diagnosis and in some cases impossible of diagnosis. The following case is illustrative:

Mrs. C., twenty-two years old, had been married two years, and had one miscarriage. Three months before she was first seen she had an attack of pleurisy, with an indefinite history of an abscess, which she stated "opened inside." She had lost a good deal of flesh and appeared to be a sick woman. The chief complaint was a severe pain in the left lumbar region from which she had suffered for two years or more. There never had been any pain whatever in the right kidney region nor had there been any symptom or sign on the right side which called attention to it. The chief source of complaint was the frequent painful micturition which gave her no rest night or day. There had never been any hematuria.

On examination a large kidney was easily made out on the left side, and over it the abdominal muscles were quite resistant. There was also a large kidney on the right side, which, judging from the history of the case, was supposed to be due to compensatory hypertrophy.

Under ether, the bladder was seen to contain a few ulcers, which were afterwards shown to be tubercular by the guinea pig test; there was also evidence of severe vesical inflammation. Both ureteral orifices were not remarkable. As there was some risk in introducing a catheter into the ureters the Harris instrument was used, and with this instrument, a small amount of urine was obtained from the right side, and none at all from the left side. The urine from the right kidney was clear, contained no pus, and had a urea percentage of .63. It was thought that this low percentage on the right, as well as the anuria on the left, might well be explained by the nervous element which was present as well as by the effect of the ether. The blood freezing point was -.58 below zero centigrade.

As the patient was suffering very severe pain in the left kidney, which had been present for two years, and as she demanded relief imperatively, it was determined to make an exploratory on the left side. This was accordingly done, and a large tuberculous kidney was found which was removed.

She had immediate anuria which could not be relieved by ordinary means, and

at the end of five days a nephrotomy was performed on the right kidney. The large size of kidney was at once seen to be due to a polycystic condition. She died the next day in a uraemic convulsion.

At the autopsy the right kidney was found to be three times the normal size and to be made up of numerous cysts; there was considerable normal kidney tissue left, enough to secrete the urine obtained at examination. A small amount of urine found in the kidney contained exactly the same amount of urea as was found on this side before operation.

This case illustrates the extreme difficulty of making a correct estimation of the soundness of a supposedly healthy kidney, and it also is an argument in favor of Edebohl's plan of making a double lumbar incision in these cases.

Dr. Bransford Lewis, St Louis, Mo.: I wish to speak on two points. One, as to the propriety of operating on a sole remaining kidney presenting stone. In a case of mine in which the left kidney was reduced to an inert mass, the right kidney eliminated the urine alone and was proved to possess a stone about half the size of a pigeon's egg. I explained the precarious situation to the patient, saying that I thought the outcome would be less serious if he were operated upon. I did a nephro-lithotomy, and the same kidney has been acting satisfactorily since then. I wish also to mention a case, the like of which, demonstrated during life, I never heard of before. A patient suffered for five years with recurrent attacks of gonorrhoea. He had been the rounds of the profession in the East as well as in the West. I had tried for three weeks but could not get rid of the gonococci; then I determined to catheterize the ureters for further information as to the source of the infection. I found on the right side of the trigone, one ureteral opening and on the left side two openings. I passed ureter catheters into the two openings on the left side; then, taking out my cystoscope, I drained the two ureters and found two different urines from this one, left side. One was clear and the other loaded with pus and gonococci. Later, I catheterized the right ureter and obtained healthy urine. These observations led to the conclusion that the inner ureter on the left side was infected with gonococci. I washed it with a three per cent. argyrol solution and the pus markedly decreased. With three catheters armed with stylets passed into the three ureters, I took an X-ray picture and had an excellent result, showing two ureters on the left side, and one on the right. It is probable there is one kidney on the left side, divided into two parts by elemental tissue, one part giving rise to infected and one to non-infected urine. I take it to be the first time on record in which this condition has been demonstrated in the living subject.

Dr. A. Ernest Gallant, New York, N. Y.: The subject of anuria was painfully brought to my attention last month, by the sudden death of a woman from whom I had removed a kidney. She was suffering from aortic stenosis, with mitral insufficiency. She left the hospital four weeks after operation, in excellent health. The next day anuria developed, and she died within five hours. Was death due to the kidney or was the anuria due to the cardiac lesion?

Dr. M. W. Ware, New York, N. Y.: I don't wish to cast any doubt on the correctness of the diagnosis of Dr. Ravogli's cases, but I think that in such rare cases as these, we are entitled to have some explanation. If there was evidence whether the gonococcus reached the kidney by an ascending process or not, we want some pathological picture of the ureteral orifice and before we can definitely state that the urine containing pus came from both kidneys, we must know whether they could not reach the urine in some other way. These facts have been withheld from us.

Dr. George K. Swinburne, New York, N. Y.: I don't know what Dr. Ravogli's answer is going to be, but some of these cases must necessarily be incomplete because of our hesitancy to use the cystoscope in a man very ill with this condition. I had a case, a man with a chronic prostatitis of six months' standing, and in the course of a few days' treatment he began to feel sick and his temperature ran up, and his appearance was that of a man coming down with typhoid. I referred him to his family physician. His family was out of town and he went to them. He did not react to the Widal test. His temperature increased daily until it reached nearly 105, when it began gradually to drop until it reached normal. He made a complete recovery. He evidently had some gonorrheal infection of the kidney, but just what proof there was I don't know, but his symptoms during that time led the physician attending him to make that diagnosis. A cystoscopic examination, however, on a man in his condition, I believe to be entirely out of the question. When he returned to me about six weeks later, all his symptoms had cleared up, and to have used the cystoscope then would have been an unnecessary performance.

Dr. A. Ravogli, Cincinnati, Ohio. (Closing): In reference to the use of the cystoscope, both the patients were in such terrible agony that I never thought it possible to apply it in that condition; furthermore in infectious diseases, I would never advise the use of an instrument, which can carry and spread infection. When I found the casts studded with gonococci it was sign enough for me that I had gonorrheal infection of the kidney.

MOVABLE RIGHT KIDNEY THE MOST COMMON CAUSE OF CHRONIC APPENDICITIS IN WOMEN.[1]

By W. P. Manton, M. D., Detroit.

SEVERAL years ago, in a published paper, I ventured the assertion that movable right kidney in women is the most common cause of chronic appendicitis. This statement has, as far as I know, remained unchallenged, save in the monumental work of Dr. Kelly on Appendicitis, where it is averred that such had not been the experience of that writer, nor of another surgeon whose statistics are there cited. So frequently, however, have I since met with the associated conditions under discussion, that the truth of my former statement becomes more and more evident, and I am glad of this opportunity to reiterate what I have already placed on record. In order to put before you facts and not theories, I have carefully gone over five hundred cases noted in my private records. These were all office patients who had come for the relief of various genesic ailments, and on whom

[1] Read at the Annual Meeting of the American Urological Association, Boston, June 4-5, 1906.

a systematic abdominal examination was carried out. Among the five hundred women, chronic appendicitis was diagnosed in *287 or 57 per cent.* Abnormal mobility of the right kidney, varying from a downward movement of a few inches to a ptosis into the pelvis, was found in *208 or 41 per cent.* Appendicitis was diagnosed alone in *159 or 55 per cent.*, and associated with loose kidney in *123 or 42 per cent.* Of the total number of cases suffering from chronic appendicitis, *86 or 29 per cent.* underwent operation, *32 or 37 per cent.* of these being complicated by loose right kidney. The appendices removed in the associated conditions were nearly all subjected to microscopical examination and in every instance a report of chronic appendicitis, frequently combined with acute changes, was rendered by the pathologist. From the foregoing it appears that, in the writer's experience, loose right kidney is associated with chronic disease of the appendix in 42 per cent. of cases coming under observation. The relationship of the two conditions is evidently brought about through circulatory disturbances initiated by the abnormal mobility of the kidney, and probably arises in different ways, according to the degree of kidney displacement: First, as was suggested by Edebohles, through pressure of the superior mesenteric vessels by the kidney against the head of the pancreas, second, possibly, by the stretching and displacement of the mesenteric branches themselves, thus interfering with the circulation of the organ and giving rise to stasis in the efferent vessels, and, third, as pointed out by Carl Beck, by direct pressure of the kidney on the appendix itself.

32 Adams, Ave., West.

DISCUSSION.

Dr. Edward Reynolds, Boston: I find that I can hardly agree with my friend Dr. Manton as to loose right kidney being the most common cause of appendicitis in women. It seems to me that appendicitis is in my experience, more common than mobility of the right kidney, to a degree which one can call pathological. A very large number of cases in which loose kidney is noted, have sufficient appendicitis to be a cause of symptoms, but my impression of the etiological relationship between the two has taken rather the reverse side from his. I think this is a pathological point that has not yet been worked out to the point of demonstration, but of which we can judge by analogy. We know that the fold of peritoneum which forms the meso-appendix is at an early stage of development, the same fold which forms the meso-colon on the right side. We know that they have common lymphatics. We know that the kidney is originally included in the same fold. We also know that

there is a very general association between chronic appendicitis and the low right kidney, and I have been inclined to believe that the analogy could be carried on a step further, that absorption by the lymphatics of the meso-appendix in inflammatory conditions of the appendix is an etiological cause of the movable or low right kidney. Certainly I feel that if one has occasion to operate on a movable right kidney, he should think carefully about whether it is not necessary to remove the appendix at the same time.

W. P. MANTON, Detroit. (Closing): I have nothing further to add. I want to emphasize, however, that chronic appendicitis is produced very frequently by a loose kidney. The only objection I can see to Dr. Reynolds' theory is that in very many of these cases where the kidney can be held up by a simple belt, the appendix, unless the change has gone too far, is often entirely relieved. If the condition arises from below in the pelvis the condition of the appendix itself being dependent upon the kidney, we would not get that result; and yet I find in very many cases complex relief of the appendicitis results from holding the kidney in place by the belt, even in the presence of pelvic lesions.

RUPTURE OF THE URETHRA: A REPORT OF CASES.[1]

By FREDERIC J. COTTON, M. D., Boston.

THIS list of ruptured urethrae is but a short one—only four; a short series to reason from, but one which chances to include most of the possible conditions and most of the probable results.

CASE 1. D. O'N., was seen at the Relief Station, August 7, '03; it was the usual typical case—traumatic rupture in a previously sound individual. He had fallen into the hold of a vessel, struck on his feet, so he said, and then on his buttocks. There was an ankle fracture on the right, a sprain of the left ankle. He had bleeding from the meatus. He could pass a stream of urine—bloody—but the house officer could not pass a sound.

He was etherized and a perineal incision made onto a sound. There was free intra-urethral bleeding: after opening into the urethra, exploration showed tearing of the mucous membrane on the floor of the membranous portion. Nowhere was the urethra torn through. The urethra was irrigated and a permanent catheter tied in. Over the catheter the urethral wall was very loosely sutured with cat gut and the outer structures lightly sutured with silk worm gut. The subsequent course was that usual in

[1] Read at the Annual Meeting of the American Urological Association, Boston, June 4-5, 1906.

such cases; on the removal of the catheter after five days, there was some purulent discharge. That night he had a chill and a temperature of 106°; next morning (after gr. x of quinin) the temperature fell to normal and stayed there. The wound was healing by granulation when he was discharged.

It is fair to assume that a traumatic stricture resulted in this case, requiring the persistent use of sounds to keep it open. When he was discharged from the hospital, healing had progressed to something like a closure of the fistula—probably a permanent closure.

Case 2. Garabed S., was a rupture in coitu, seen February 13, '04. He had had some venereal trouble three months previous. There was very profuse hemorrhage for one day, producing marked reaction of pulse, etc., but without local external signs of definite character. It seemed safe at the time to assume that the tear was incomplete essentially of the mucous membrane alone. At all events, no operation was done.

A catheter was tied in. The hemorrhage ceased. The next day there was "urethral" fever reaching 103° which yielded promptly to irrigations in bulk, and the patient was shortly, at his request, against advice, discharged. He believed himself cured —at all events, there was no extravasation, no chance of trouble unless from subsequent cicatricial contraction. The catheter pressure had promptly relieved the bleeding. After five days he went home. I have no later data on this case.

Case 3. J. T., was really interesting. It concerned a man of sixty-two years, previously healthy so far as the uropoietic system goes, and in good general condition.

He was first seen at the City Hospital Relief Station, February 13, 1906, in the evening. He had that morning fallen, while at work, across the edge of a manhole hatchway, one leg in and one outside, in such fashion as to strike his perineum, somewhat toward the right side, according to his story. He had kept at work through the morning, though there had been free bleeding from the urethra. Only late in the afternoon did the inability to pass urine impress him as something worth attending to, and he came to the Relief Station.

I saw him late in the evening. There was still some drip

from the meatus. There was obvious ecchymosis in the perineum with a somewhat boggy mass about 1x2 inches in size. He had not succeeded in passing urine in any quantity, but had passed fluid and clotted blood.

Operation was advised and accepted.

Under ether the usual incision was made in the middle of the perineum over the haematoma. On cutting down to the Wheelhouse sound which had been inserted, a considerable cavity, lined with clot and with fluid blood, was found just in front of, and at the anterior end of the bulb. On sponging this out the urethra was found to be torn to shreds at the front end of the bulb—the tear extending for an inch in length and encircling the whole urethra except about one-tenth of an inch on the upper side. A sound could be passed to the bladder without any trouble, but there was a good deal of difficulty in arranging the torn urethra. The sound was removed and fine silk sutures placed to repair the upper portion of the tear, these being tied. Other sutures were placed so as to bring the torn edges into proper apposition, but were left loose. A catheter of 30 French caliber was then inserted into the bladder, the urethral wall arranged over it and the loose sutures tied. No preliminary dissection of the urethra from the surrounding tissues was necessary except at one point behind. When the suture was completed, the lower wall was formed in part of a long triangular strip, with the apex forward, about seven-eighths of an inch long, and at its base including one-half the circumference of the urethra. A few accessory stitches were placed in the urethral wall. The wound was again irrigated and catgut stitches were inserted, bringing the tissues together layer by layer. A small wick was left in at the back end of the wound. The rest of the skin wound was closed by interrupted sutures. The usual siphon drainage was established. There was no considerable shock.

On February 15 the wick was removed and was followed by a few drops of serum, but no urine. The catheter was not removed at all until the 21st, eight days after the operation. At this time, the wound was apparently healed, and from this time the urine was all discharged by the meatus.

For a week after the removal of the catheter occasional ef-

forts to pass sounds failed, but on the 28th a 29 French sound was passed without trouble by exerting traction on the scrotum and perineum upward and forward during its passage. There was no trouble after this and on March 5, three weeks after the time of operation, the patient was discharged, entirely well, with the wound closed.

He was examined from time to time after this and there was no difficulty in passing sounds up to 29 French, and no trouble with the stream.

When last seen, about six weeks after the accident, it was impossible to feel, with the sound in the urethra, any thickening whatever about the point of suture.

In reply to a criticism that has been made, I would say that silk sutures were used in the deep layer in this case simply because so many had to be used that the mere bulk of cat gut constituted a distinct disadvantage. The silk seems to have done no harm.

CASE 4. D. C., was that of a teamster aged forty, alcoholic, having previously had gonorrhoea twenty years ago, and some trouble since.

The history obtained after the operation was that he had for three or four years noticed that his stream of urine had been getting small. He also gave an account of having had an abscess in the perineum, but could give no further data. This history was not obtained before operation.

He was seen February 17, 1906, at the Relief Station. The history was that he had been unloading a team that morning, when a box from the load struck one end of a skid in such fashion as to throw the other end against him, hitting him a severe blow in the perineum. He did not quit work, although the injury was painful. He could pass water, but with some blood admixed. When he entered the hospital, the bladder dullness extended two fingers above the pubes. He was passing bloody urine in small amounts. Operation was advised and accepted.

After he was under ether there was discovered a scar on the right side about an inch and one-half in front of the anus, and about this and extending toward the middle line was a good deal of scar tissue. A Wheelhouse sound was passed and a median incision made onto it in the middle of the perineum. The usual

hematoma was found into which projected the end of the front part of the torn urethra. A search for the posterior end showed only dense fibrous tissue in which no opening could be found. This evidently was the scar tissue belonging to the periurethral abscess (or Cowperitis) which produced the external scar. After wasting some time in searching, this scar mass was split in the middle line, but nothing was found save dense scar tissue. It was finally necessary to cut anatomically [2] for the membranous urethra as I have at times been forced to do in impassable strictures. The urethra was found without trouble behind the scar and followed forward for an inch and a half or thereabouts. The urethra was only the size of a filiform bougie, and displaced to the left. At the front edge of the scar tissue it ended. No attempt was made to dissect out much of this scar tissue or to do a formal plastic operation. A catheter was passed from the meatus to the bladder, and more room made for it where the strictured urethra traversed the scar. Cat gut sutures were applied so as to approximate the tissues loosely over the catheter with intervals for drainage. A wick was left in the lower end of the wound.

The later course of this case was that of the usual urethrotomy for stricture with mild sepsis. Some of the stitches had to be removed on the second day to get better drainage. The catheter was retained for a week. At the end of ten days some urine was passing by the penis. On the twenty-third day he was discharged, passing nearly three-fourths of the urine by the penis and with the wound nearly closed in.

The case is interesting because the trauma had acted not to rupture the urethra against bone or across ligamentus attachments in the classic way, but to tear off a relatively sound anterior urethra from a strictured posterior portion rigidly held in scar tissue. This combination of pathological lesion with a later trauma is apparently unique.

CONCLUSIONS.

As to conclusions from these cases. Case 1 was treated by the methods usually prescribed, and, as I now think, badly treated. There is no reason why this case should not have been more care-

[2] This means not the obsolete Cock operation, but a careful dissection in the middle line, till the membranous portion is found.

fully and closely sutured as was the third with at least as good a result, because the tear was not a complete one.

Case 2 illustrates only that a diagnosis of rupture of the mucous coat of the urethra does not always call for any operative interference.

Case 3 represents what I believe to be the proper treatment of this class of cases where the urethra has previously been normal. There is no reason why such a case, if seen reasonably soon after the accident, should not admit of a careful tight suturing of the urethra and a moderately close approximation of the other tissues. The course in this instance was so thoroughly favorable, the advantages of avoiding or minimizing a later stricture by this treatment so obvious, that I should feel myself negligent in not repeating this operation in any like case I might meet with in the future.

Case 4 is interesting only as a curiosity. So far as a cursory examination of the literature goes, careful and deliberate work in this class of cases seems rare. The descriptions of such procedure in the text-books (save occasionally in such texts as Hartmann's) are so vague as to discourage the attempt. The text-books still discuss the question of mortality. Mortality in these cases can hardly result except from grave coincident injury or from the foolish conservatism and delay of an older surgery. The problem to-day is not of saving patients, but of avoiding strictures, and the writer believes that this is best to be done by prompt and radical operative work.

DISCUSSION.

F. R. Hagner, Washington, D. C.: I enjoyed the doctor's report of cases and he is to be congratulated on the first case. Only one thing, and that is in the use of silk in sewing up the urethra. It has always been my practice to use twenty day cat gut in those cases.

E. L. Keyes, Jr., New York: I must say I have found some difficulty in sounding stricture after urethrotomy, and I have been surprised at the result I got by using gentle dilatation at first or even omitting dilatation for a time, as the writer of the paper has so successfully done.

RENAL LAVAGE IN PYELITIS AND CERTAIN FORMS OF NEPHRITIS.[1]

By F. M. Johnson. M. D., Boston.

IN this paper your attention is invited to a discussion limited to the subjects of pyelitis and certain stages of chronic parenchymatous nephritis. Since I began my investigations and studies to determine the possibilities of local medication when added to the ordinary remedial measures, a number of cases have been followed a sufficient length of time to enable me to arrive at certain fairly definite conclusions. In general the statement can be made that diseases of the kidney most certainly furnish a large field in which renal lavage may be employed with marked advantage.

Cystoscopic examination and catheterization of the kidney pelvis has been frowned upon by some who consider it dangerous and fraught with entirely too many chances of conveying infection from the bladder to the structure of the kidney. My own views regarding the safety of renal catheterization, based upon its employment more than 600 times, can be briefly stated. I am convinced that no other surgical procedure demands quite such extreme delicacy and gentleness, as are in this required, both in the handling of the instruments and in making the injections through the catheter. It is quite as necessary to use all the precautions for obtaining absolute antisepsis and asepsis, both as regards the operator and the instruments, and to a certain extent, the patient, as it is to employ them in preparation for major surgical operations. If adherence to these rules is made absolute, then the patient remains well guarded from all injury by this minor interference. From the beginning to the end of the procedure, patience is always a necessity. In cases in which the need for intervention is not urgent and consequently the required time is permissible, it is wise first to treat the urethra and to accustom that canal to tolerate the passage of sounds of a larger caliber than

[1] Read at the annual meeting of the American Urological Association, Boston, June 4-5, 1906.

is the cystoscope. The details of the technic have been fully described by many able writers and are doubtless well known to each of you. I realize fully while making these statements regarding the procedure, that, if performed by one who has not had proper training, much harm can thereby be done.

Turning now to the first of the conditions, I wish specially to consider, pyelitis has come to be recognized as a definite affection, and one that in frequency is not uncommon. Kelly of Baltimore, has aptly called it a danger signal. In this I fully coincide with him, and believe we should heed its warning significance. Ayers of New York, has been specially interested in this subject and regarding it has made careful investigations extending over a number of years. My own experiences have corroborated in every particular the deductions he has drawn.

Suppurative pyelitis is due to an ascending infection. Suppuration begins in the pelvis of the kidney, which finally becomes distended with pus. If the ureter is blocked so this material cannot be discharged into the bladder, by pressure and extension it encroaches upon the substance of the kidney until eventually almost the entire renal structure may be destroyed. In these extreme cases the organ becomes converted into a mere shell, supported by its capsule and filled with pus, a condition known as pyonephrosis.

Predisposing Causes—Inveterate cystitis from urinary retention. The urine becomes dammed back upon the kidneys, causing distention and, what is more serious, infection by bacteria which under these circumstances may pass along the ureteral mucosa from the bladder. Urethral stricture and enlargement of the prostate are well known elements causative of this condition. Infected emboli formed during the course of sepsis, or the infectious fevers may be carried by the blood stream and deposited in the kidney. Usually these produce suppurative foci limited to the kidney, but in some instances bacteria pass to the pelvis and pyelitis results. Renal calculi irritate the kidney and its pelvis, lower the resisting power, and invite the localization of microorganisms.

The urine in these cases is cloudy and deposits a heavy sediment. In this may be demonstrated by the microscope, a large

number of pus corpuscles, many epithelial cells from the renal tubules and a varying number of red blood corpuscles. The kidney epithelia are usually from both the convoluted and the straight collecting tubules. Connective tissue shreds in moderate or large amounts vary according to the destructive process in the kidney. Epithelia from the renal pelvis are also generally found. If a calculus be present, crystals of uric acid, gravel, or triple phosphates will be discovered. Albumin is commonly present in large amounts.

Symptoms—An acute abscess is ushered in by a pronounced chill, followed by a rise in temperature. Pain is generally present. Acute symptoms as a rule gradually subside, although a slight fever remains and pain or tenderness over the kidney, and in the inguinal region, testicles or legs becomes a constant feature. There may be emaciation or progressive deterioration of the general health.

The diagnosis is not difficult, but the condition is to be differentiated from cystitis. In pyonephrosis, pain and tenderness over the kidney, acid urine which remains persistently acid after it has been passed, and sudden fluctuations in the quantity of pus in the urine, are points that should be noted. If the pus be ropy and accompanied by considerable mucus, it comes from the bladder. If the kidneys are catheterized and the two specimens of urine collected separately, the diagnosis becomes absolute. It may be said in passing, that if at this time there be discovered a marked cystitis, it should be treated and controlled before other procedures are begun.

Prognosis—If both kidneys are involved, the termination is apt to be fatal. Acute purulent pyelitis as a rule, rapidly extends to the kidneys, producing suppurative nephritis or possibly perinephritic abscess. Chronic purulent pyelitis may exist for some time without involvement of the renal tissue, but sooner or later the infection spreads and destruction of the kidney follows.

Treatment—From the medical aspect, respite from arduous labor, a change of climate, rest in bed, an appropriate diet, the administration of salol, urotropin, cystogen, or potassium citrate with the free use of distilled or mineral waters. From the surgical side, removal of any obstruction to the free escape of urine,

relief of the cystitis, removal of renal calculi and evacuation of the pus. Briefly, nephrotomy or nephroctomy would appear to summarize the treatment agreed upon by most observers. This, however, must be characterized as a hasty conclusion, and before one of the major operations is decided upon an attempt to save the kidney by lavage should be made, unless the organ is known to be practically destroyed. This point can be emphasized in no better way than by giving the notes of a case in which that procedure was adopted.

Case 1. Mr. L., aged forty-five. For a period of more than two years he had constant pain in the back over the region of the kidneys and also in the thighs and down the legs. At times these pains were so severe that hypodermatic injections of morphine alone would give relief. He lost flesh and strength, and finally became unable to continue his work. The urine was decidedly cloudy, intensely acid, and filled with pus. Cystoscopic examination of the bladder showed only a mild catarrhal cystitis, chronic in character. The urine from the left kidney was fairly normal and the ureter admitted the catheter with ease. The urine from the right kidney, as it flowed into the test tube, presented a milky appearance, and was made up largely of pus cells with a few red blood cells, shreds of connective tissue, and epithelia from the pelvis, convoluted and straight collecting tubules. Casts were not present. The first lavage of this kidney was made with warm boracic acid solution. It was introduced with difficulty, as a stricture of the ureter, a short distance from the bladder was encountered. After this was dilated, there was no subsequent difficulty. The first washing out caused an attack of colic that lasted not over ten minutes. Lavage was continued once a week for a period of some three months, and after that only occasionally. Mild silver nitrate and boracic acid solutions were the remedies that gave the greatest relief. During this time the man did not lose one day from his work, and the pains soon began to lessen and finally to disappear. After treatments were entirely stopped, the patient reported occasionally, but there has been no further demand for lavage of the kidney, as the pus entirely disappeared and not a trace of albumin can be found. He has kept in this almost normal condition for more than a year without any

special internal treatment. He has gained in weight and reports always as feeling very well.

The cause of the suppuration in this case was never discovered, but the condition as described was verified by a number of physicians, and microscopic examination of the urine was made by several men, all of whom reached the same conclusion. I believe that all were surprised at the rather remarkable results of lavage in this case. The apparent eradication of the disease and restoration to an almost normal condition that has been maintained for more than a year, shows, in my opinion, that lavage given in time, is a powerful remedial factor when added to the usual treatment. The case is rather unique, in that rest from daily labor during treatment was not possible. This one case is sufficient to prove certain points. At present I have charge of six or seven cases of like character, and all of them show marked improvement as a result of lavage.

Catarrhal pyelitis is much more common than is the purulent type. An extension of inflammation from the neck of the bladder may induce the lesion, infection from either a purulent cystitis, or a catarrh of the vesical trigone ascending the ureters to the renal pelves. Inflammation affecting the kidney may invade the pelvis of that organ. Long continued irritation from uric acid crystals, gravel, oxalate of lime crystals, or a combination of both as seen in stubborn lithemia, may produce pyelitis as also a nephritis. A renal calculus is deemed a causative element, yet as Ayres has pointed out, it is probable that pyelitis may be present before the appearance of a calculus, and even act as a contributing element in the formation of the latter. If a catheter that is not absolutely sterile be passed into the ureter through an infected bladder, it may start a pyelitis, or change a catarrhal into the suppurative type. Infection by micro-organisms from the general circulation and from interference in the flow of urine, are also considered to be causes of pyelitis. It is probable that the origin of many cases of nephritis arising without ascertainable cause, lies in a catarrhal pyelitis that has escaped detection.

Symptoms—There is usually increased frequency of micturition, more often during the day, but at times during the night. In some cases spasmodic symptoms prevail. If pain is noticed, it

is as a rule, in the region of the kidneys. Cloudiness of the second specimen of urine, especially if it be persistent, should direct attention to the possibility of pyelitis; often the bladder or the prostate has received treatment which should have been directed to the renal pelvis.

Diagnosis—If after attention to diet and the administration of the usual urinary antiseptics, pelvic epithelia be constantly found in repeated examination of the urine, catarrhal pyelitis must be suspected. If the epithelia be closely studied and cells from the deeper layers be found, this, in conjunction with the subjective symptoms, will enable one to make the diagnosis of true inflammation of the renal pelvis. Chief among these symptoms is pain, especially along the course of the ureter, or in the testicle, or in the back; in the latter instance lumbago must be eliminated.

History of the Disease—Under internal treatment the trouble may disappear, but the rule is persistence of the lesion and eventually invasion of the tubules of the kidney. Progress may be very slow or exposure may determine a superadded attack of acute or subacute nephritis.

In contradistinction to this usual course, is the history of cases that have been treated by lavage. I refer now to cases of chronic catarrhal pyelitis in which the diagnosis was as positive as can be made, my diagnosis in a certain number of them simply supporting that of other physicians. Of such cases, my records show 57 that in addition to the usual treatment received lavage of the pelves, with absolute relief from distressing symptoms and disappearance of signs of inflammation in those structures. Boracic acid, silver nitrate in dilute solutions, protargol, argyrol, and albargin, also essence of gomonol, were the medicaments employed. All were used in very mild strengths. Internal medication and the general plan of treatment were about the same as were used in the treatment of the purulent form of the affection.

Howard Kelly, Winfield Ayres, Tuckerman and Lewis, of the United States, Reginald Harrison, Casper, Albarran, Desnos, Hamonic, von Illyes and Lang, of Europe, and many others are earnest workers in this newer and extensive field of medical investigation and treatment. Local medication as an addendum to the ordinary remedial measures used in certain forms

of nephritis and pyelitis, is the specific object of study. The subject appeals strongly to me, gentlemen, as one that should be encouraged and investigated. While no absolute claims are made by any one of these observers, this procedure which is non-dangerous when proper care is exercised, gives us results that are certainly encouraging. They are particularly gratifying to the patients, all of whom are given relief without surgery under ether. In reality, the improved conditions are better and more forcibly manifested by the patients, than they can be explained by the theories of physicians, as those who are treated certainly know and realize when relief is obtained. I have now under treatment a number of patients, both males and females, in whom gonorrhoea and its complications appear to have been slowly burning fires, never thoroughly eradicated, always ascending in character, which have resulted in certain manifestations uncontrolled by ordinary measures. They are, however, controlled or absolutely eradicated by the potent influence of lavage when that expedient has been added to the therapeutic armamentorium.

Regarding this first subject of my paper, I would submit for your consideration these conclusions:

1. Pyelitis, both catarrhal and purulent, should receive more careful consideration by the profession.

2. More frequent and careful examinations of urine are required in order that pyelitis be more quickly recognized and the kidney thus safeguarded.

3. Lavage of the renal pelves should be better known and more extended recognition accorded to its merits.

4. Lavage is a procedure that is not only justifiable, but one that is positively and urgently indicated in all cases of pyelitis, except those that are tuberculous or due to a calculus, when diet, rest and ordinary internal medication fail to afford relief.

We turn now to the consideration of chronic parenchymatous nephritis. When this type of kidney lesion has not reached the stage of contraction, or small white kidney, a wonderfully improved condition can be established by appropriate lavage of the renal pelves. A glance at the causative elements in this disease as given by various authorities, shows that they include circulatory changes, as in heart disease, poisons or irritants in the blood as in certain drugs, a faulty metabolism as shown in lithemia, and

other irritants not yet determined. Another cause is extension of inflammation from the renal pelves. This type of inflammatory extension in which pyelitis is the originating factor, has not yet received the attention that is due to it, and in the future should receive closer observation. In a paper entitled "Lavage of the Renal Pelves in the Treatment of Bright's Disease," Ayres has detailed experiences which I find very similar to my own. The histories of a certain proportion of my 100 cases, are exactly as indefinite as were his in regard to causation of nephritis. Tyson believes that a long continued cystitis, especially that following gonorrhoea, is a factor in producing inflammatory changes in the kidney subsequent to extension of the process up the ureter to the pelvis and thence to the intertubular tissue. From as careful observations as it has been possible for me to make, it appears that this ascending inflammation is a causative element much more often than is usually thought to be possible. A catarrhal pyelitis often exists for a long time without causing any marked discomfort, and such symptoms as are complained of may wrongly be ascribed to rheumatism, lumbago or even indigestion. In cases of catarrhal pyelitis with slight invasion of the kidney, there will later on, in all probability, develop the interstitial changes that are found in advanced disease. When on repeated examinations of the urine there are found degenerated epithelial cells and albumin, the indications point to a beginning of nephritis. The presence of certain epithelia that are at times noticed in the urine, are due to the irritating effects of crystals, either uric acid or oxalate of lime; when they are eliminated, such epithelia disappear, showing that nephritis is not present.

Microscopic findings in subacute parenchymatous nephritis: Some of the epithelial cells forming casts degenerate and break down into granules, thus forming epithelial-granular casts. Another change produces epithelial-granular-fatty casts and finally free fat globules. Albumin is present, generally in large amount. The total quantity of urine is usually decreased and the specific gravity is consequently apt to be high, though the amount of solids is commonly decreased. As the disease becomes chronic, the amount of urine becomes more abundant and the specific gravity is lowered; the color also becomes paler. The diagnosis of chronic parenchymatous nephritis must always be based upon

the presence in the urine of casts, pus corpuscles, and kidney epithelia, the last not alone from the convoluted and narrow tubules, but frequently from the straight collecting tubules as well. The variety and the size of the casts are of marked importance from both a diagnostic and a prognostic standpoint. Severity of the renal lesion can be determined by the size of the casts. When the smaller types from the narrow tubules are present and in small numbers, the disease is mild in character.

The clinical symptoms are in the beginning insidious, consisting of digestive disturbances, as loss of appetite, or even nausea, anemia, waxy appearance of the skin, loss of strength and emaciation. Puffiness of the face and swelling of the feet finally develop and later anasarca may become general. Dull, aching pain in the lumbar region is also a symptom, but uremic manifestations are not so frequent in chronic parenchymatous nephritis as in the acute type. It is impossible to depict the exact clinical features or to state what the microscope shows in the urine in each and every case, but as I am dealing alone with the milder forms, I have dwelt upon the characters more common to them than to the more advanced types of the disease.

Treatment consists in putting the patient under correct hygienic influences, seeing that suitable clothing is worn and that rest is taken, giving nourishing foods, including a moderate amount of milk, the prescribing of iron, quinin and strychnin, and the judicious use of aperients. By most authorities, no measures are considered directly curative, and accordingly it would appear that the most that can be done is to place the patient in a condition most favorable for nature to aid, and to eliminate both mechanical and poisonous products that interfere with recovery. In lavage, however, we possess a means which is capable in many cases of affording positive relief.

Four patients suffering from the disease, had been discharged by their physicians as incurable, and later came to me in hope that something might be done to aid them. As the disease was well advanced, lavage was instituted without the promise of much benefit, although I did not regard any of the four as suffering from a nephritis so marked that they were in reality hopeless cases. To our great satisfaction, however, relief of the symptoms for which they consulted me, came fairly quickly under the in-

fluence of weekly lavage. Within a year all of them were discharged, albumin and casts having entirely disappeared from the urine. All of the patients have since reported from time to time, but the gains made under treatment appear to be permanent, as there has been return of neither albumin or casts. How long the present condition will be maintained I do not know, nor will I venture an opinion, but I am certain that the clinical aspect is one entirely different from that at the beginning of treatment; the patients themselves are fully aware of the change for the better.

Some seven or eight cases of advanced chronic parenchymatous nephritis were greatly relieved symptomatically, and their renal condition improved by the same method of treatment. All of fifty cases of the milder type have been made a great deal better. A few now need no treatment, some are still under treatment. The majority of the remainder, with the exception of five, now show but a trace or no albumin at all and the casts seem to have gone. A certain number are still receiving treatment for a pyelitis that remains. One of the most severe and stubborn cases I have watched more than two years, although for the past six months I have used lavage but once, as the patient has no annoying symptoms whatever. Out of the entire number of cases I have seen, there were only two who came directly after having been refused as risks by insurance companies, and in whom I found a mild type of parenchymatous nephritis, chronic in character. Consequently it can be said that practically all of my series had first been treated by the remedies that are in common use. Most of them came to me through the kindness of other physicians, a few direct from hospitals. As they all were private patients, each could be watched very closely. Five cases of rather advanced interstitial nephritis were not improved, at least while I was in attendance.

The natural query that arises is why beneficial action is exercised upon the kidney by lavage, which does not extend above the renal pelves? This result may be due to the cleansing of the pelves of the products of inflammation, also to the fact that better drainage for the kidney is established, and again that counter-irritation in the pelvis is produced by the warm solutions employed. A certain amount of the antiseptic solution may be taken up and carried through that organ. The exact modus operandi

is not known, but the fact that an improvement in all aspects takes place in certain selected cases, cannot be set aside even if the method by which the beneficial action is produced is hazy. Ayres, in the article to which reference has already been made (*Medical News,* July 1, 1905), has gone over this ground very carefully and cites six cases illustrative of the good effects of lavage. Case No. VI.—well advanced interstitial nephritis—was not improved by two treatments. In his other cases the results were excellent. I have followed out Dr. Ayres' method of treatment, my cases being also of a like character, and the results have been far beyond my expectations. I will not enumerate the cases in detail, for this paper is already longer than I intended making it.

When employing lavage, I prefer to use injections of warm materials, as they are better borne. Two to four ounces of the solution should be used on each side. The solution is slowly forced in until the patient experiences a sense of fullness over the kidneys, or one-half to one drachm at a time. For the bladder, I prefer to use distilled water, and it is much better tolerated when not heated. All solutions are freshly made when used, the medicaments being dissolved in distilled water. Protargol and albargin are used in the strength of one-half of one per cent.; silver nitrate, 1 to 10000, increasing up to 1 to 2000; argyrol freshly prepared at about five per cent., and essence of gomonol, 2 c. c. to the liter. This can be made in quantity and heated when used. I find it soothing in effect and also markedly stimulating. At first, renal colic was occasionally produced, but for a long time this has not occurred. I believe that too strong a solution of silver nitrate was at first employed.

Conclusions—1. If lavage be a justifiable procedure, and this now appears to be conclusively demonstrated, it is applicable in selected cases of nephritis.

2. If a beginning nephritis is due to the extension of inflammatory changes in the renal pelves, lavage may confidently be expected to cure the condition.

3. In subacute and chronic parenchymatous nephritis, when the stage of connective tissue contraction has not been reached, lavage will stop the inroads of the disease and general improvement will follow its use.

43 Tremont Street.

DISCUSSION OF DR. GALLANT'S PAPER (SEE AUGUST ISSUE OF JOURNAL) AND DR. JOHNSON'S PAPER

DR. AYRES: I was very much interested in Dr. Gallant's paper. His S-shaped formation of the ureter producing an obstruction is new. I have never heard of a case just like it before. With the ureteral catheter, I made a diagnosis of a high attached ureter, but was unable to prove the diagnosis correct, because the opposite kidney had been destroyed by a pyonephrosis of fourteen years' standing. I made the diagnosis on these grounds. The amount of urine collected from the ureter in five minutes, was 4 c. c., while the amount collected from the renal pelvis in the same time was 10 c. c. The urine collected from the ureter was comparatively clear as was also the first portion of that collected from the renal pelvis, but as the pelvis became emptied, a considerable amount of pus was seen coming through the ureteral catheter. There was absolutely no nephroptosis as the cause of the residual urine, therefore, the only explanation is a high attached ureter. She had consulted me for hematuria. I found the hematuria was from the left side and was probably due to concretions in the renal pelvis, the kidney being in very good condition. A very large per cent. of pus and very little urea in the fluid was collected from the right side. As the patient is in pretty good physical condition, nothing has been done for her.

Regarding Dr. Johnson's paper, I was much interested because I believe I was the first to perform lavage of the renal pelves for nonmicrobic nephritis. I have reported several cases that correspond closely to those whose histories Dr. Johnson read, and I want to speak of one woman that I have under observation. She came to my office in July, 1905, and gave the following history: Five years ago she had general neuritis followed by paralysis of the bladder and rectum. A catheter was passed to draw the urine, and almost immediately she got up a cystitis. After some time her physician recognized inflammation of the kidney as well. At the time she came to me she had cystitis, pyelitis, nephritis and mucous entero-colitis. I treated her three months, twice a week by lavage of the renal pelves. At the present time there is not a trace of albumin in her urine, neither is there a cast, pelvic nor tubule cell to be found. She still has mucous entero-colitis and is at present under the care of Dr. A. A. Smith.

There is no question that if the proper cases of nephritis are selected for treatment by lavage of the renal pelves, a certain number will be cured and a larger number will be benefited. It is not to be expected that lavage will benefit all cases.

FOLLEN CABOT, New York, N. Y.: Regarding Dr. Gallant's paper, I had a case similar in the character of the symptoms and the condition of the kidney produced by stricture of the ureter, and where operation showed destruction of the kidney tissue.

Regarding Dr. Johnson's paper, the subject is of extreme interest. I personally am trying to put on the brakes about the treatment of those diseases that have extended beyond the pelvis of the kidney. The dangers of renal lavage, where there is a cystitis, must be considered. Damage may be done by washing out kidney pelves in those cases which have an infected bladder. I also use pelvic lavage twice a week, where much pus is present, with good results in pyelitis. I am inclined to think that the dilatation of the ureter is the chief cause of the improvement in these cases, and not the lavage. I have seen cases suggesting beginning hydronephrosis where dilatation of the ureter once a week produced improvement. Free drainage is in this way obtained and we frequently get good results. I also be-

lieve, regarding nephritis of any kind, that by the time we get evidences that a nephritis exists, we are too late in getting at the proper treatment; we should treat the preliminary pyelitis. Some of these cases of impending nephritis can undoubtedly be prevented by lavage of the kidney. We cannot tell much as to the extent of the process by the amount of pus or by the size of the casts in these cases. I do not mean to say that renal pelvic lavage is of no value, because I have used it with success in many cases, but in my opinion it is limited mainly to conditions in the renal pelvis or ureter where there is some tightening to be overcome or in those infections found localized in the pelvis or ureter.

Dr. Bransford Lewis, St. Louis, Mo.: The limitations that have been placed upon this treatment by Dr. Cabot are good in respect to the prophylaxis in just such conditions. I have seen two cases illustrative of hydronephrosis or uronephrosis, that might have been absolutely prevented and the kidney saved by the use of ureteral catheterization and dilatation. We have this magnificent means of meeting these conditions, both in respect to prophylaxis and cure; not waiting until after they have reached this late condition, because then radical surgical procedure is necessary.

As to Dr. Johnson's paper, the subject is very important. We are investigating it now, but I think sufficient has been proven to show that brilliant results can be obtained. I have obtained absolute proof of the efficiency of treating pyelitis with these methods, but I have not had sufficient experience to say that nephritis is remediable by this means.

A. Ernest Gallant, New York. (Closing): We know it is difficult for urine to regurgitate from a full bladder, so that while Dr. Ayres' catheter can go up into the ureter and drain its pelvis fairly well, one cannot always completely empty the pelvis, and we have to deal with a constant retention. Though I have had but scanty opportunity for the use of pelvic lavage in pyelitis, its efficacy is, to my mind, unquestioned in appropriate cases. Drainage in all surgery is the one great advance of the last quarter century; and if we dilate the stricture, overcome the obstruction, wash out the pus and debris, and leave a clean channel through which the urine can freely pass, retention will cease, inflammation subside, and the patient be cured. Referring to my own case: as you look at the kidney which has been passing around, you will no doubt get the impression that this kidney still has considerable working tissue. It is surprising to see the change which has taken place since it was placed in formalin solution, contracting the thin, sacculated kidney to its present size.

F. M. Johnson, Boston, Mass. (Closing): As far as mere discussion of the paper goes, I would rather rest content with the condition of the patients who are now under treatment, compared with their condition when they first came to me, before lavage has been tried at all, and to say from the standpoint of the layman that we do not care what measures are employed as long as they do the proper good. If patients are ill they know it, and they wish to get well. We can theorize too much. We are working on a line of thought that is still somewhat vague, but is certainly in the right direction.

PROLAPSE OF THE KIDNEY FROM THE GYNECOLOGICAL POINT OF VIEW.[1]

AUGUSTIN H. GOELET, M. D., New York.

GYNECOLOGY is no longer the restricted specialty it was a few years ago when practically it was limited to diseases of the female pelvic organs approachable through the vagina. To-day it includes everything within the abdomen of women, because it is now recognized that diseases of the abdominal organs have frequently an important bearing upon conditions in the pelvis and they are correlated.

The gynecologist of to-day is, or should be, also a genito-urinary surgeon, as well as an abdominal surgeon, because it is not possible to divorce diseased conditions of the urinary tract from those of the pelvic organs usually regarded as his sphere. But the kidneys in their relation to pelvic disease, were not given the attention they deserve before the organization of this Urological Association. Its founders at the outset, recognized this, and invited gynecologists to join their ranks. At the first annual meeting, it was my privilege to present a paper, and I believe I have contributed one every year since.

The mass of the profession is not, however, alive to the necessity of thus extending the field of gynecology. To illustrate the attitude of special bodies of gynecologists and the narrow view they hold even to-day, papers on prolapse of the kidney and other kidney conditions have been excluded from the section on Gynecology of the American Medical Association. At the New Orleans meeting, when I presented a paper describing in detail the technique of nephropexy, objection was made that it was a surgical and not a gynecological paper and should have been read before the surgical section. It was voted at that meeting to exclude all but strictly gynecological papers in future. The question arises: Do they know what constitutes gynecology in the broad acceptance of the term?

[1] Read at the Annual Meeting of the American Urological Association, Boston, June 4-5, 1906.

At the Saratoga meeting of the American Medical Association the year before (in 1902), I presented to the Gynecological Section, a carefully prepared paper pointing out the influence of prolapse of the kidney in causing and maintaining disease of the female pelvic organs. The discussion that followed, was mainly in opposition to the views presented, and I have seen no very general appreciation of my efforts to broaden the field of gynecology. Certainly I have been given no credit for my efforts. I do know, however, that many more are now operating for prolapse of the kidney.

About two years after presenting the paper referred to above, I met in my city, a gynecologist, who stated he had observed a recurrent hemorrhagic endometritis in five cases where there was also prolapse of the kidney, which did not yield permanently to repeated curettage, and were only cured after fixing the kidney. He saw an important relation in these conditions and regarded it as a new observation, and proposed to write a paper on the subject. I told him of my paper published two years before and sent him a copy. I asked him to publish his observations, as it would be a valuable corroboration of my views on the subject, but he has never done so. No doubt others have made similar observations along this line, but for reasons best known to themselves, they have been kept buried, which is neither just, nor in the interest of science.

That the views therein advanced, which I believe are original, shall not be forgotten, I will at the risk of wearying some of my hearers, repeat here the contentions emphasized in the paper referred to, the title of which was, "The Influence of Prolapse of the Kidney on the Production of Diseases of the Female Pelvic Organs." [2]

My contention was then, and it is borne out by recent and more extended observations, that the prolapsed kidney, under certain existing conditions, obstructs the return circulation from the pelvis through the ovarian vein chiefly, and thus maintains a congestion that necessarily operates in causing diseased or abnormal

[2] Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Obstetrics and Diseases of Women, and published in the *Journal* of the Association, August 23, 1902.

states of those organs. That hence prolapse of the kidney may be regarded as one of the causes of endometritis, metritis, uterine displacements, uterine hemorrhages (menorrhoea and metrorrhagia), ovaritis, salpingitis and cystitis. That prolapse of the kidney may be either a direct or an indirect cause of those conditions, and, while infection is essential for the development of inflammatory states here as elsewhere, a maintained congestion lessens the resistive power of these structures and thus affords a fertile field which might otherwise prove sterile.

As to the *modus operandi* of the kidney in causing obstruction to the return circulation from the pelvis, it is chiefly by direct compression of the ovarian vein as it ascends along the spine. The lower pole of the kidney swings inward towards the median when the kidney descends and overlaps the ovarian vein and ureter: therefore, when the waist is constricted by corsets or clothing, the kidney is forced backward against the spine and the vein is caught between. Thus compression of the ovarian vein is certain and unavoidable with the prevailing methods of dress.

The ovarian vein may also be constricted by the ureter bending over it when the kidney descends, since the vein crosses the ureter in front of it. Constriction of the ovarian vein may also occur from distention of the ureter above the point of flexure when the kidney is prolapsed.

It is fortunate that these sources of compression of the ovarian vein operate only for a part of every twenty-four hours, when the patient is on her feet or in the erect position; for they cease when she assumes the recumbent posture for rest, because the kidney then assumes its normal position; otherwise the consequences would be more pronounced. But we must not lose sight of the fact that the erect position is maintained throughout the greater part of the twenty-four hours, and during that time the kidney is down and pelvic congestion is more or less constant under the prevailing conditions.

It is a very well recognized fact that maintained pelvic congestion from other sources is a cause of disease of these organs; then why not from this? It has been shown very conclusively that prolapse of the kidney may cause and maintain congestion of all the structures of the pelvis.

The association of pelvic disease in some form with prolapse of the kidney, is of such frequent occurrence that it must be more than coincident; moreover, a cure is frequently impossible until the displacement of the kidney is permanently corrected by operation that secures fixation in its normal position.

The similarity of some of the symptoms produced by prolapse of the kidney and pelvic disease, should be sufficient to induce the gynecologist to associate them clinically, and it is difficult to comprehend how he can do otherwise. Yet it is a condition frequently overlooked and when discovered, it is often disregarded. It is so common among women, especially those who consult the gynecologist and neurologist, and its bearing upon both gynecologist and neurological affections is so important, that it is very necessary always to ascertain when the kidney is displaced and when it occupies its normal position. If examination for this condition is included as a routine measure in the diagnosis of all these cases, a great many displaced kidneys will be found that would otherwise be overlooked, and if proper attention is given them, there would be fewer chronic invalids among women, going from one physician to another seeking relief that they do not get. Fully one-third of all gynecological patients have prolapse of the kidney, and it is a low estimate to say that 50% of the female patients of the neurologist are similarly afflicted.

I frequently have women come to me after gynecological operations have failed to effect the anticipated cure, the symptoms being caused by prolapse of the kidney that has been overlooked, and when they submit to operation for correction of the kidney displacement, a cure is established. I must therefore insist that when operations upon the pelvic organs are necessary, and one or both kidneys are found to be prolapsed, they should receive proper attention also, for in this way only is full justice done these patients. I am so confident that the kidney displacement is responsible for many of the pelvic conditions encountered, or the symptoms they apparently produce, that I should refuse to be held responsible for the result if operation for its correction was declined.

RENAL CALCULUS AND GYNECOLOGICAL CONDITIONS SIMULATING URETERAL DISEASE.[1]

By Edgar Garceau, M. D., Boston, Mass.

URETERITIS is a disease which is very easy to overlook. Situated in the middle of the body, beyond the reach of inspection, the ureter offers peculiar difficulties in the diagnosis of its diseases.

Owing to the course of the ureter under the broad ligament, it is natural that pelvic conditions should exercise a decided influence in the etiology of ureteritis. Of these conditions the inflammations are the principal ones. Inflamed pelvic lymphatic glands lying close to the ureter have been known to cause an infection of the canal, the germs gaining access to it through the lymphatic vessels by direct continuity. An inflamed Fallopian tube may likewise cause infection in the same way. This is true also of metritis. Among the chief causes, however, is ovaritis with adhesions. An inflamed prolapsed ovary lying next to the ureter, sometimes for many months or years, frequently gives rise to ureteritis. Lacerations of the cervix involving the vaginal walls, may extend as far as the ureter. Ureteritis follows in some cases. The occurrence of pyelitis, so frequent in the latter months of pregnancy, suggests pressure of the child's head on the ureter as it crosses the pelvic brim, bruising of the ureter, subsequent ureteritis, and infection ascending to the kidney above. Among the less frequent causes of the disease may be mentioned uterine cancer, ovarian or parovarian tumors, uterine fibromata, and prolapse of the uterus which pulls on the ureter. Another pelvic condition giving rise to the disease is an appendiceal abscess. This may explain the symptom of frequent micturition at times observed in cases of appendicitis.

The symptoms of ureteritis are few, and unless one is on the lookout for the trouble, they may readily be overlooked. The chief symptom is frequent micturition, usually not attended with pain. The patient has to pass her water many times day and

1 Read before the American Urological Association, New York, April 3, 1906.

night, and there is a constant nagging desire to empty the bladder. Tenesmus may or may not be present. The most important sign on vaginal examination is the great tenderness of the affected ureter when pressed upon, and with this pressure there is a coincident extreme desire to urinate. If the ureter has been diseased a long time, it is possible that there may be some enlargement which may be appreciated on vaginal examination, but it is never very marked. Pressure on the abdomen along the course of the ureter sometimes elicits pain, especially pressure at the pelvic brim. The cystoscope shows a congested trigonum and there may be red streaks leading from the affected ureteral orifice. Swelling of the ureteral eminences is a pretty constant sign. The bladder urine in these cases usually shows very little alteration provided there is not much cystitis, as may be the case. The separated urines, however, give a great deal of information. The best way to collect these urines is by placing the patient in the knee-breast position and catching the urine with Kelly's oblique cystoscope as it drops from the ureteral orifice. The urine coming from the diseased side is always a little cloudy as compared with the urine of the opposite side, and on microscopic examination an excess of desquamated epithelium will always be found. It is curious to note that in cases of simple ureteritis, the presence of a large amount of pus is not an important sign. Sometimes there may be only a few pus corpuscles and sometimes pus may be absent.

The symptoms just described are met with both in case of simple ureteritis and in case of ureteritis with a slight stricture, which does not give rise to dilatation of the canal above.

It is easy to see how a simple ureteritis may be overlooked. It is well known that any pelvic condition such as salpingitis, giving rise to general congestion of the pelvic cavity, may have associated with it the symptom frequent micturition. This symptom, in such cases, is usually supposed to be the result of vesical hyperemia, a part of the general pelvic engorgement. This may be the case. Hyperemia of the vesicle neck and trigonum produces great sensitiveness of the vesical orifice and consequently an increased desire to empty the bladder. As increased desire to empty the bladder is practically the only subjective symptom of ureteritis, it is seen how readily the affection may be confounded

with simple vesical hyperemia, especially in view of the very meager information given by the examination of the bladder urine. A urine which contains merely a slight excess of epithelium and a very few pus corpuscles, may well be thought to be due to vesical hyperemia. The differential diagnosis is to be made only by a careful physical examination, which will include separation of the ureteral urines. At the same time it is to be borne in mind that ureteritis is a frequent association of a prolapsed ovary or pus tube, and that careful examination will discover its existence in a large number of cases.

In cases of ureteritis due to and associated with a narrowing of the caliber of the canal, we have a far different clinical picture. If the narrowing is slight, the symptoms are those of chronic ureteritis, but if we have to do with a tight stricture, symptoms dependent upon enlargement of the upper passages assume prominence. The diagnosis of stricture with dilatation is usually an easy one. Symptoms on the part of the kidney are marked. Pain of a colicky character, soreness on pressure and enlargement of the kidney are readily appreciated. On examination with ureteral catheters, the stricture is detected, and on passing it we get at once a gush of urine which may amount to many cubic centimeters.

A dilated ureter, situated above a stricture low down in the pelvis, has been mistaken for a purulent salpingitis, and incision into the supposed pus tube has resulted in a permanent vaginal fistula. The differential diagnosis between these two conditions should be easy. Symptoms on the part of the kidney should not be overlooked, and the passage of the ureteral catheter at once clears up the diagnosis.

The differential diagnosis of calculus in the ureter presents peculiar difficulties. When the stone can be felt, however, the diagnosis is easy. Sometimes the stone can be felt on vaginal examination, as a hard little body readily appreciated by the examining finger. Pressure on the stone elicits pain, whether through the vagina or through the abdomen. The separated urines give a great deal of information, and here again the knee-breast position is the one which should be used for the collection of the urine. Kelly's oblique cystoscope should be selected in

order to get the urine free from adventitious blood. It is difficult to see how the introduction of a catheter, however skillfully passed, can avoid the possibility of starting a slight microscopic hemorrhage. Cystoscopic appearances are sometimes helpful, and the bladder lesions, such as small ulcers and patches of inflamed mucous membrane, may be found grouped about the orifice of the affected side. The X-ray may give valuable help in diagnosis, and so also may the wax-tipped bougies.

The differential diagnosis is not always easy. The passage of sand and blood clots may simulate stone and may give rise to the same train of symptoms. Obstructive lesions may also lead to the wrong diagnosis. Appendicitis has also been known to simulate stone in the ureter and the X-ray has shown a shadow of the concretion in the appendiceal region. Tuffier proposes to pass a ureteral catheter with a wire in it, and then take the X-ray picture. The different positions of the wire and the concretion upon the photographic plate is indicative of the kind of lesion.

The symptoms of simple ureteritis and of ureteritis from calculus are identical, and here the correct diagnosis may be a difficult matter. Careful attention to the history of the case, the method of onset, and a thorough physical examination will often clear up the diagnosis.

Stricture of the ureter is also misleading, and here the symptoms may be identical. Passage of bougies, especially the wax-tipped bougie, will sometimes clear up the case.

The association of an old pus tube, or a prolapsed adherent ovary with stricture of the ureter, is to be borne in mind. Here we may have evidence of cystitis, or at least of an irritable bladder, and in these cases most of the mistakes will be made. A most careful vesical examination is necessary, and also the passage of graduated bougies. The separated urines will give valuable evidence. A prolapsed and adherent ovary has associated with it periodic attacks of pain with the menstrual flow. The feel of a hard body in the vaginal wall with its long axis corresponding with the direction of the ureter is suggestive of stone. An adherent ovary is in the peritoneal cavity, in Douglass's pouch or behind the broad ligament. In the latter case it would have a greater thickness of tissue between it and the examining finger than would

a calculus. The greater hardness and thickness of calculus and its distinct mobility in the direction of its long axis, is further evidence. Besides this there may be evidence of an old peritonitis in the case of an inflamed ovary.

Cancer of the sigmoid, cancer of the uterus, and old adhesions, may involve the ureter and cause a stricture with subsequent dilatation of the upper passages. This is not at all rare, especially in the case of cancer of the uterus, and it is quite a frequent cause of death in this disease. The presence of demonstrable cancer is sufficient to suggest the true nature of the conditions, and puts one on the right track at once. In the case of old adhesions there are usually signs of an old pelvic inflammation.

397 Marlboro Street

EXPLOSIVE RUPTURE OF THE TESTICLE FROM TRAUMA.

By Frederic J. Cotton, M. D., Boston.

J. J. C. entered the City Hospital Relief Station August 27, 1904. He was forty-seven years old; had previously been in good health, but has had a left-sided varicocele and a right inguinal hernia.

During the latter part of the afternoon, while he was a spectator at a local ball game, he had been struck in the scrotum by a batted ball. There was a moderate amount of shock and excruciating pain which subsided within a short time.

The writer saw him about 9:15 P. M. There was then a large and steadily increasing tumor of the scrotum, mainly on the left side. It was then the size of a musk-melon, of a purple black color with actual infiltration of the skin itself, tense, but only moderately tender. The discoloration had then extended for an inch on the under side of the penis, and there was swelling, not as yet discolored, up into the left groin. During the few minutes of examination and preparation, there was a definite increase in the tumor and a blackening of the lower portion of the scrotum.

Nothing could be palpated in the mass and the provisional diagnosis was made of a ruptured left-sided varicocele. The patient would not give even a conditional consent to castration, but wished an operation.

Ether was given, and an incision made anteriorly. The subcutaneous tissue was infiltrated with blood an inch thick. Then the dartos was reached and cut, and under it was more infiltrated cellular tissue; beneath this an already existing rent about an inch long in the tunica vaginalis was found and enlarged. In the cavity of the tunica were four to six ounces of clots; on removal of these, shreds of testicle tissue followed, and there was fresh bleeding from a tear in the spermatic artery about one inch above the testis, and also arterial bleeding from what had been the base of the epididymis, next the testis near the globus minor. There was nothing left of the testis but shreds adherent to the tunica albuginea. It had evidently exploded under the swift impact as a full bladder bursts under a blow. The tunica albuginea was torn completely across in irregular lines. The epididymis showed but little damage. The cord was undamaged save for rupture of some of the varicose veins, which bled moderately.

The two bleeding arterial points were ligatured with catgut, as was the ruptured vein in the cord.

Incisions were made (from inside the first cut) into the cellular tissues, and all removable blood squeezed out.

The right side of the scrotom was intact save that it contained some blood evidently forced over from the left side under a pressure that the septum could not withstand.

After removal of clots and irrigation, the tissues were sewed up layer by layer with catgut without drainage, and a light pressure applied.

There was discoloration the next day extending up onto the abdomen, and into the perineum, but no swelling.

Convalescence was uneventful. He was transferred from the Relief Station to the main hospital and at six days after the accident was up without symptoms and was discharged well on the eighth day. The wound was then healed. There was no swelling and the discoloration had largely disappeared.

425 Marlborough Street.

EDITORIALS.

URETHRITIS IN YOUNG BOYS.

THE urethritides encountered in young boys may be divided into two classes, namely, the non-gonococcic urethritis and the urethritides in which it is possible to demonstrate the presence of Neisser's organism, no matter what may be the mode of transmission of the pathogenic agent.

Among the various causes of non-gonococcic urethritis, such as a metastatic localzation during an infectious disease, for example, as mumps, diathesic influences due to gout, a lymphatic constitution, a dermatosis of the external genital organs, occasionally traumatism or masturbation, there exists one which dominates all others on account of its importance; we refer to tuberculosis of the urethra. Tuberculosis of the anterior uretha when it has fully developed gives rise to a purulent or puriform discharge generally slight in amount, but more often of a serous nature, in no way resembling the discharge encountered in ordinary gonorrhoea. Bacteriology alone will settle the diagnosis and as far as treatment is concerned it should be above all a general one. When properly carried out a cure may be obtained.

Gonorrhoeal urethritis can be contracted without venereal contagion, or, on the contrary, the contagion may be direct. The former would seem to be rather rare, because a child's glans is usually covered over by the prepuce. However, an erection, which is always a possibility, may partially expose the glans, so that direct contact with objects recently contaminated with gonorrhoeal pus may give rise to a typical gonorrhoeal urethritis in young subjects. For example, a case has been reported by Fraser-Harris of a boy fourteen years of age who contracted a very severe urethritis by wearing a pair of contaminated drawers.

Urethritis resulting from sexual intercourse in young boys, although not frequently met with, appears to be becoming less rare. Cases of coitus in children are certainly becoming quite numerous, even in subjects from five to ten years of age, as in

instances reported by Merk, Zambaco, Stekel, and others, the sexual act being accomplished normally, or, on the contrary, penetration may not have gone beyond the vulva, which, for that matter, is quite sufficient for inoculation to take place. A premature awakening of the sexual instinct, perversion and vice are the natural causes.

Sexual relations may be established between children among themselves, but more particularly in the same family preferably between brother and sister, and for this reason it is most irrational to allow small girls and boys to occupy the same bed. Among the poor the father and mother are frequently in a bed nearby, so that the children imitate what they suppose is being done by their parents. In other cases a small boy will be outraged by various persons, such as nurses or governesses who occupy the same bed as the child, but there are occasionally instances where, in spite of the most minute inquest, the etiology will remain doubtful.

The symptoms offer nothing particular. The pus is thick and greenish yellow, deeply spotting the linen, but little by little it becomes lighter in color and the discharge lessens. Micturition is more or less painful, and during the acute period one will usually find an edema of the prepuce. The balano-preputial mucosa becomes irritated and phimosis or paraphimosis may result.

Serious complications may arise, such as cystitis and particularly stricture of the urethra. Epididymitis and gonorrhoeal rheumatism have been met with exceptionally, but a case of generalized gonococcic infection has been reported by Esmarch.

The treatment should be prophylactic and curative. The first consists of moral education and the prevention of dangerous promiscuity. As to the local treatment the usual methods employed for gonorrhoea in the male are to be resorted to, although injections should be at least one-third weaker than the strength employed in the adult.

THE ACTION OF NEPHROTOMY IN NEPHRORRHAGIA

THE action of nephrotomy on hematuria appears evident when the operation has allowed one to recognize and do away with the cause of the hemorrhage, but it is a difficult matter to explain the cases where nephrotomy has failed to reveal any renal lesion, but, nevertheless, causes the hemorrhages to cease as if by enchantment. Hematuria has three factors, namely congestion, the action of the nervous system, and some lesion, occasionally unrecognizable. Dieulafoy, in considering the question of hematuria due to nephritis, also admits the part played by congestion and the nervous system, and he points out that hypertension of the blood, intense congestion arising in certain cases of acute nephritis, congestion of nervous origin which occasionally is present at the commencement of Bright's disease, may be sufficiently intense so as to give rise to a very abundant hematuria.

Now nephrotomy directly acts on each of these factors of hematuria. Albarran explains the good effects of the intervention by its reflex action on the nervous system, as well as on the renal congestion. The incision of the parenchyma, on account of the large amount of blood to which it gives issue, does away with the renal congestion and produces a diminution of the intrarenal tension more completely than any other conservative operation.

By lowering the vascular pressure, it regularizes the circulation and puts a stop to blood extravasation. Malherbe and Legueu also admit this influence over the congestion and believe that nephrotomy attains its curative results in hematuria by the intense derivation which ensues.

The nervous system plays a part in the production of the congestion and consequently of the hematuria, either because its action is provoked by a change in the blood or nervous system, or that it consists in a reflex produced by the presence of some lesion, and it is in reality only by a reflex action opposed to the nervous cause, that one may explain the results obtained by a simple cystotomy in a case recorded by Passet, and ureteral

catherization in one of Potherat's patients. The success obtained by Picqué was only temporary, perhaps because the cystotomy, having merely acted on the nervous system, and having no effect upon the lesion, the latter, after a certain time, again provoked the nervous influence which in its turn set up congestion, which was followed by hematuria.

Since operations performed on the urinary system at some distance from the source of the hemorrhage have been known to provoke a favorable reflex action, nephrotomy still more, acting directly on the renal parenchyma, may probably give rise to this nervous action, which will aid in stopping the hematuria.

Nephrotomy also allows one to directly attack the causal lesion of the hematuria. In lithiasis the calculus giving rise to the hemorrhage can be removed, and Pousson even believes that it puts an end to the spasm which prevents the calculus to progress down the ureter, giving rise to retention. It also acts spontaneously over the lesions of sclerosis and it is well-known that these lesions, which, alone, may give rise to hematuria, generally accompany all the other causes of hemorrhage and that they may combine their hemorrhagiparous action to that of the already existing cause, thus making the kidney bleed.

Now, nephrotomy by producing a retrogression of the sclerotic lesions assures a more or less permanent cure. The manner of action of simple nephrotomy, which one would believe merely temporary, assumes a permanent aspect in many cases. The explanation of this may be found, perhaps, in the fact that frequently those lesions of nephritis which are accompanied by hematuria are limited and for this reason they may retrogress, or, on the other hand, undergo cystic transformation or the formation of fibrous islets, while the neighboring portions of the parenchyma undergo compensation hypertrophy.

CORRESPONDENCE

NEW YORK, September 7th, 1906.

DR. CHAS. G. CUMSTON,

Editor American Journal of Urology.

Dear Doctor:—In the August issue of the JOURNAL there is an error, in the article on "Intra-vesical Operations with the Aid of the Cystoscope," by Dr. Henry Meyer, of San Francisco, which does me an injustice, althought I am sure that it was unintentional on Dr. Meyer's part.

The instruments designated "Fig. 1, Fig. 1X, Fig. 2, Fig. 2X," are, in the former, my modification of Prof. Nitze's cystoscopic lithotrite (and, as in the present form it has displaced the former type, I may assume it to be also an improvement on the original); the second instrument, the foreign-body forceps, is after my *original model,* and the late Prof. Nitze had no connection whatsoever with its construction.

Dr. Meyer's mistake arose from the fact that the firm of Louis and H. Loewenstein, of Berlin, who manufactured the instruments for me, issued them, in their catalogue, as parts of the Nitze operating cystoscope, without any reference to my work. Upon my calling their attention to the omission, they promised to rectify the error in the next issue of their catalogue.

The instruments were first described by me in the *Journal of Cutaneous and Genito-Urinary Diseases,"* of March, 1901, and will also be found *properly* catalogued in the catalogue of the Kny-Scheerer Co., of New York.

I am willing to ask no credit for the improvement of the lithotrite; but I must insist upon the credit for the foreign-body forceps.

May I ask you, in view of the facts, to give this letter a place in the next issue of the JOURNAL OF UROLOGY?

Very truly yours,

FREDERIC BIERHOFF, M. D.

SAN FRANCISCO, Sept. 12, 1906.

CHAS. G. CUMSTON, ESQ., M. D.

Dear Doctor:—It is a source of regret to me to learn that I have made the error described. I wrote to Dr. Bierhoff, explaining to him that in Europe, these instruments which I described as the operation cystoscope, are known as Nitze instruments; that the manufacturers, Messrs. Loewen-

stein, in Berlin, catalogue and sell the same as such; that I really had no reason to have presumed they were not, until I was so informed by Dr. Bierhoff. Since receiving this communication, I feel desirous of rectifying any error which I may have made unconsciously, and while I cannot very well enter into any discussion bearing on this subject, I am naturally desirous of doing what seems right, and for this reason, I would request that in view of the statements presented by Dr. Bierhoff, that a correction should be made, so that the readers of the JOURNAL will know that the instruments described as No. 1 and No. 1X in my article should have been described as Dr. Bierhoff's modification of Prof. Nitze's instruments and that the instruments described as No. 2 and No. 2X is an original model of Dr. Bierhoff's. This seems to me to be the proper course to pursue, and if you will make a statement to that effect, I believe it will satisfy Dr. Bierhoff and at the same time be right. You will understand that it is not possible for me to know why some of these instruments should be known as Nitze instruments and sold as such by the European manufacturers, when in reality they are not. I presume, however, that these questions occasionally arise and I am desirous of having it appear correct, and trust you will be good enough to do so. I will write to the manufacturer for an explanation and obtain his version, for my own personal satisfaction, as I believe they should rectify any errors they have made. I am,

Yours very truly,

HENRY MEYER.

2298 BRODERICK STREET

THE AMERICAN JOURNAL OF UROLOGY

VOL. II. DECEMBER. 1906. No. 15

REMARKS ON THE CHOICE BETWEEN WATER AND AIR AS DISTENDING MEDIA IN CYSTOSCOPY; (2) PRESENTATION OF A NEW EXAMINING AND CATHETERIZING CYSTOSCOPE.[1]

By BRANSFORD LEWIS, M. D., St. Louis.

A SURVEY of the writings on cystoscopy of the last two or three years shows a considerable variety of views as to the choice between air and water as a distending medium in employing that splendid adjuvant for urinary diagnosis, the cystoscope. In the very active discussion of the subject, a middle ground is hardly to be found. The position usually assumed is that of championing the one method, to the exclusion—almost the obliteration—of the other. It reminds one of the discussion of the operative treatment of prostatic hypertrophy that bestirred our journals a few years ago, wherein no self-respecting operator countenanced more than one method of operating for that condition, and condemned all the remainder. Further discussion, however, has brought order out of chaos; and it is now admitted that there is a place for two different avenues of approach for prostatectomy, as well as some restricted sphere for the modes of electro-incision. The tendency seems to be to adopt the operation to the patient, rather than make the patient fit the operation.

It would seem proper and fitting, likewise, to discuss the subject of air- and water-cystoscopy in an unprejudiced light, and if possible, reconcile the great differences between the two sides.

It must be granted, at the outset, that if it be simply a matter of choosing the most *comfortable* of the two media, the argument is altogether in favor of water. That is the medium natural to the bladder, to which it has been accustomed all its life, and which

[1] Read before the American Urological Association, at Boston, Mass., June, 1906.

does not shock its sensibilities save when introduced in too great quantity, or at an improper temperature. Whereas, air, even when warmed, is not borne with comfort, and in most cases (not all), must be used in connection with some form of (local) anesthetic.

But, in this as in other branches of surgery, disagreeable necessities sometimes arise, compelling the use of means or methods not relished by either surgeon or patient. Such a disagreeable necessity is occasioned when we meet with a case of such rapid bleeding into the bladder that the fluid medium is quickly clouded, promptly obscuring the field of search for ureter openings and requiring prolonged manipulations, repeated washings, or postponement until a later date, when there is less bleeding. In such a case I am firm in my belief that the air cystoscope is the appropriate one, and the one to simplify conditions and give prompt and reliable assistance.

It does not give the large cystoscopic picture offered by modern lens instruments, but that is not the prime object of the air cystoscope, at least not the one with which my name is associated. The main purpose of this instrument, as contended from the first, is to make ureter-catheterization a more reliable and successful procedure, especially in cases that would be difficult for water-medium instruments.

By far the larger majority of ureter-catheterizations that I have done in the past two or three years have been effected with straight-view, water-medium instruments; which is a sufficient indication where my own choice lies when it is only a matter of choice from the standpoint of comfort. And yet I have done synchronous double catheterism in a number of cases with the air-cystoscope that, I have been convinced, for the reasons mentioned, were beyond my ability with any form of water-medium instrument.

With reference to the objections raised by some against the use of air on account, as they say, "of the frequent necessity of swabbing the bladder to keep it dry," etc., these are merely questions of technique, to be overcome by greater familiarity with the method. In several years' use of it, I have not once tried to dry the bladder by means of the swab, but have always taken care of that by other means, such as the use of sufficient local anesthesia, posture, and bladder-dilatation.

To sum up, then, water-distention is the medium of choice where its use is feasible; but some difficult cases may make it highly desirable to have recourse to the air medium.

Operative Cystoscopy—When it comes to operative cystoscopy, the arguments in favor of air are much more weighty. Under the necessity of operating for some malady of the bladder or ureter, the differences between the two media in point of *comfort* are of but little moment; expediency and efficiency are then the deciding factors.

While efforts at catheterization, even when carried out in a water medium, seldom cause, per se, sufficient bleeding to prevent the accomplishment of that purpose, that cannot be said to be the case with reference to *operative measures* in the bladder or ureter. Prolonged instrumentation, cauterization, cutting of mucous membrane, or of ureter opening, rapid dilatation of the latter, and most operative manipulations are accompanied by bleeding that necessarily compromises the view, if fluid is the distending medium. The irrigation-channel provided in such water-medium instruments, is but poor compensation; the field gets cloudier and cloudier, until the operator has, perforce, to discontinue until another sitting.

In developing my *operative cystoscope,* herewith presented, I have adhered altogether to the air plan of distention. The first model of this instrument was completed in 1903; and since that time it has demonstrated its practical utility in a number of interesting cases.[1]

The utmost simplicity has been aimed at in designing the instrument. It consists of a straight tube, a handle at one end, a beak at the other, in which is located the cold electric lamp. After insertion of the instrument into the bladder and withdrawal of the obturator, a perforated window is fitted to the ocular end, through which the various instruments, forceps, dilators, etc., are manipulated while within the range of vision.

Accessories—For use in connection with the operative cystoscope, the following instruments have been constructed:

[1] "Ureter-catheterism: Its Purposes and Practicability," *Annals of Surgery,* January, 1903. "Report of Operative Work in the Ureter Through the Author's Catheterizing and Operative Cystoscopes," *Amer. Jour. of Urology,* January, 1905.

Strong alligator forceps, for intra-vesical work.
Slender, inflexible forceps, for intra-ureteral work.
Small flexible ureter-forceps.
Larger flexible ureter-forceps.
Ureter-dilators of two sizes.
Ureter-scissors.
Carrier-tube, for ureter catheter or dilating bougie, or flexible metal probe.
Carrier for platinum snare.

With the dilators presented, dilatation of a ureter opening is as definitely and certainly accomplished as is dilatation of a urethra with a Kollmann dilator; and I have had extremely gratifying results from treatment of such cases by this means.

While I was dubious, at first, as to how much could be expected of the flexible ureter-forceps, experience has shown that it can be manipulated with surprising ability within a ureter. I have introduced both the small and the large forceps of this pattern for a distance of three inches into each ureter, in one case, after dilating the ureter openings—not experimentally, but in search of calculi.

A Universal Cystoscope—In presenting the next candidate for cystoscopic favor, I do so with the full realization that there is no yawning vacancy in the cystoscopic field; that "there are others" already in the field; also that it is difficult to find anything really new and original, at this date, in the cystoscopic world; that most of the supposed "new" features are simply modified settings or assemblings of features already made use of. It is not desired to lay any especial claim to priority or originality in this instrument; utility is its basic principle.

Cystoscopes are made for various purposes: Some for examining only, others especially for catheterizing the ureters; some supply a good right-angle view, others an excellent retrospective view, and others, a direct (forward) view. This instrument is intended to fulfill all of these several objects. It is on that account named the Universal cystoscope.

It consists of a sheath, with ocular and illuminating ends; the lenses of the three periscopes furnishing the direct, the right-angle, and the retrospective views; the direct-view periscope carrying the two tubes for ureter catheters.

Notwithstanding the large field of vision and large quantity of light admitted through the lenses (this is a water-medium instrument, chiefly), the outside caliber is relatively small, being number 23, French.

For the purpose of illuminating the fields required for the several periscopes, the beak is fenestrated on both its concave and convex aspects. This not only permits the flooding of all parts of the bladder with light, but also affords ample protection from the breaking of the glass tip that covers the lamp, in some patterns of instrument aiming at the fulfillment of these purposes.

The retrospective view is secured by the same plan adopted in the building of the retrospective cystoscope made for me in 1901, by the Wappler Co., of New York (mentioned in my paper on "Operative Treatment of Prostatic Hypertrophy," read in 1902, before the meeting of the American Association of Genito-Urinary Surgeons, and appearing in the July issue of the *Journal of Cutaneous and Genito-Urinary Diseases,* 1902). The more than hemispherical lens is set on the concave side of the periscope so that its field of vision embraces the prostate and neck of the bladder. The view afforded is very satisfactory. It throws a flood of light on the exact form and size of prostatic outgrowths.

When one has finished looking with this lens, he may instantaneously replace it with the right-angle periscope, without removing the sheath from the bladder, and without the patient feeling any change. By then turning the cystoscope on its axis, a complete view of the lateral walls and of the bas fond is obtained. But, as a matter of fact, the retrospective periscope embraces such a large field that it will be unnecessary in many cases to make the change to the right-angle lens.

In the construction of the direct, catheter-carrying periscope several difficult problems had to be overcome. It was necessary to retain the small caliber for the whole instrument, to have the direct lenses as large as possible for the passage of sufficient light and the enlargement of the field, and at the same time to reserve room for the ureter catheter-tubes. In attacking the same combination problem, some designers of cystoscopes have supplied only one tube with a removable sliding cover, after the manner of Casper; others have made use of a sliding tube for passing a single catheter at a time and then pushing it out of the slot; while

still others have made use of a partition to separate the two compartments for the catheters. Whatever has been the method adopted with reference to the catheter carrying tubes, the same plan has been followed in all with respect to the use of the circular, disk-shaped lens; and in using it, a considerable amount of valuable space is wasted—space that if applied to the lens would materially enlarge its field and its light-carrying capacity. By changing the shape of the direct lens—an idea first suggested by my associate, Dr. C. E. Burford—we have been able to do much in the way desired.

DISCUSSION.

FOLLEN CABOT, New York: I have used the photographic cystoscope with poor results. I am not sure that I have a good instrument. Looking through the lens the picture would tend to converge to the side and not be straight across the field. It may be owing to my lack of experience in focussing. I have found difficulty in keeping the patient quiet a sufficient length of time to get a good picture. In a large villous growth I tried it, but could not get a clear picture. In this case there was some hemorrhage. Possibly if there had been an anesthetic employed it might have been more satisfactory. I consider the work very difficult, and congratulate Dr. O'Neil on his excellent photographs.

Dr. WINFIELD AYRES, New York, N. Y.: I want to congratulate Dr. Lewis on his operative work. I have read the article, and he speaks of extracting small calculi from the lower portion of the ureter, which I consider a great advance, as it obviates the necessity of opening the bladder. These little instruments for picking up small fragments are a distinct advance in the work. As to photography, almost everyone who has tried to do it has failed, and I want to congratulate Dr. O'Neil on his success.

Dr. M. W. WARE, New York, N. Y.: The question was raised yesterday as to the limitations in the use of the cystoscope, and that question was raised in connection with a class of septic cases of the bladder or urinary tract, and I refer to this merely to gain an expression of opinion of the use of this instrument in just such conditions. The limitation of this instrument seems to be narrowed down to a condition in which the bladder is extremely intolerant, and that is in cases of vesical tuberculosis, and even here, in a few exceptional cases. With regard to the value of the photographic cystoscope, I find this instrument so efficacious and clear that I can use it for ordinary observation, preceding the photography of the bladder. You can find out the time for exposure necessary, by testing this instrument before an ordinary plate in a holder previous to resorting to photography, which can be done in a dark room. Just flash the light from one to six seconds. Instead of the plates provided by the manufacturers, I use some of the films of domestic manufacture which are cut to the size of the plate holder. In order to make a rapid exposure, the light of the controller is turned on by yourself, or by an assistant.

S. L. ELSNER, Rochester, N. Y.: I wish to emphasize one point with regard to men not holding to one system. I was glad to hear Dr. Lewis say that we should select the method best adapted to the case in hand. My experience teaches me that there are a large number of cases that bleed a little when examined, and to resort to water as a medium, is dangerous, while air in these cases gives the best results.

PLATE IX—To Illustrate the Article by Dr. Lewis.

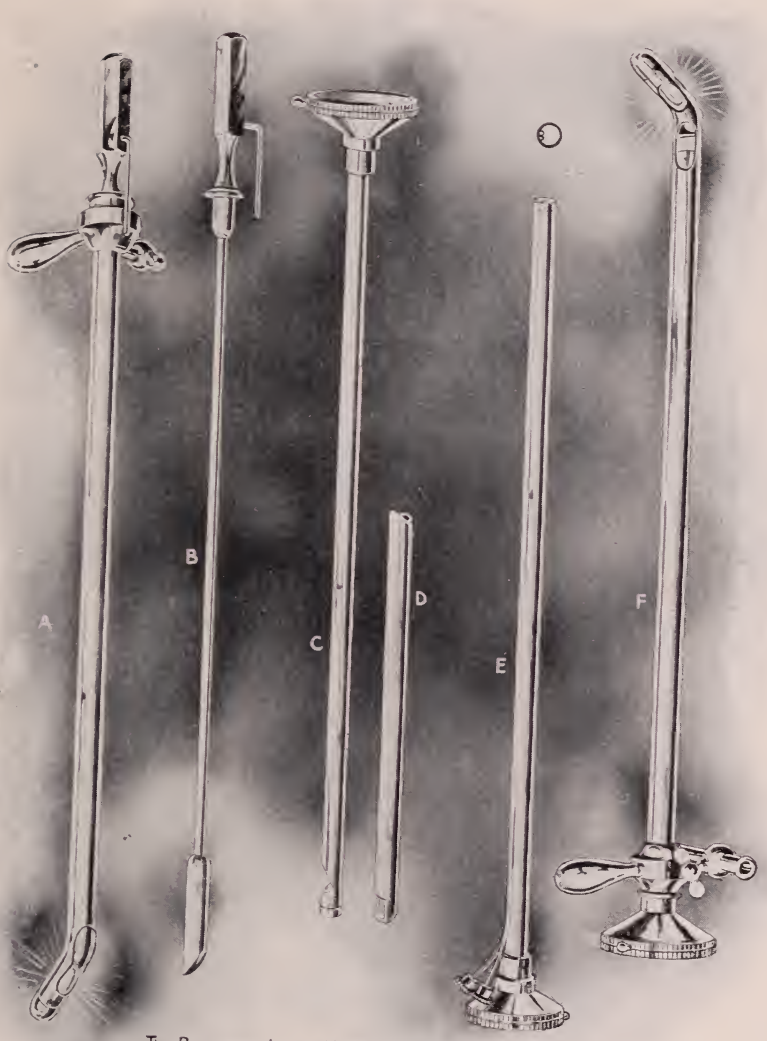

Fig. 1.

A. Convex view of cystoscope sheath.
B. Obturator for sheath.
C. Retrospective telescope.
D. Right-angle telescope.
E. Direct-view and catheterizing telescope.
F. Concave view of same.

PLATE X—To Illustrate the Article by Dr. Lewis.

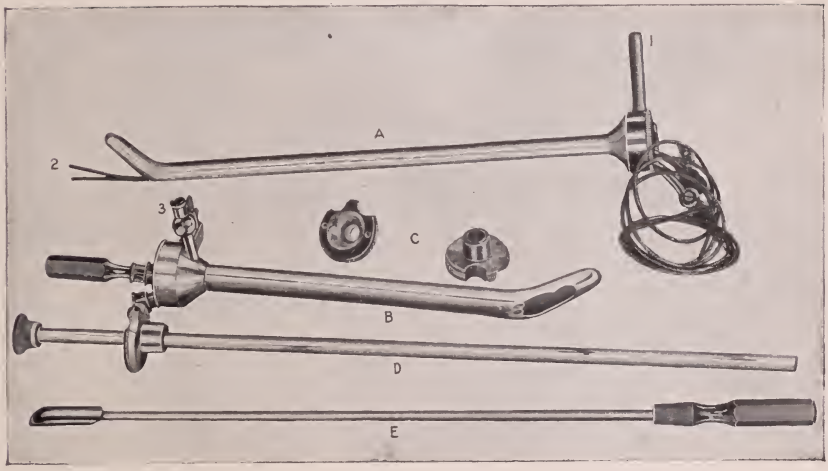

FIG. 2.

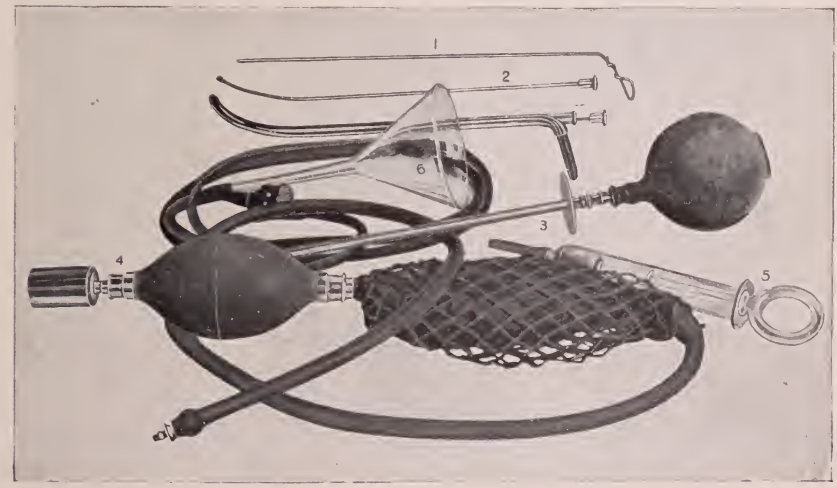

FIG. 3.

INDICATIONS FOR CYSTOSCOPY AS A MEANS OF DIAGNOSIS.[1]

CHARLES S. STERN, A. B., M. D., Hartford.

AT the present day, and especially before the members of this Association, I feel that the practice of cystoscopy requires no advocacy nor defense. But there are many men of high standing, both physicians and surgeons, who hold that the cystoscope should be used only as an extraordinary means of diagnosis. It is in order to provoke a discussion on this point, and that we may fix our position as to the limits of its use, that I have the temerity to introduce this subject. For I have nothing new to offer, and my experience is but meager in comparison with many eminent cystoscopists here present.

I include catheterism of the ureters under the general heading, considering this an integral part of the art of cystoscopy.

Most diseases of the urinary organs have a number of symptoms in common. Disturbances of micturition; pains of varying intensity and duration, located more frequently prevesically or at some point along the urethra; pain in the lumbar or inguinal regions, and radiating to the thighs, the rectum, or to the testicles and scrotum. It is remarkable how slight, variable, and indefinite these pains may be in serious cases; and, on the contrary, how very severe when the affection is comparatively mild. Again there may be only vague, uncomfortable sensations within the pelvis, which the patient finds difficulty in describing, associated with digestive disturbances and general ill-feeling, fatigue and malaise.

Urinalysis furnishes evidence of a disturbance in some part of the urinary organs; and we may or may not elicit definite data by palpation in the vesical and renal regions.

Usually, without the cystoscope, we can establish the existence of a pathologic condition in the genito-urinary tract, and often approximate its location and nature. But *with* its use mistakes

[1] Read at the Annual Meeting of the American Urological Association, at Boston, Mass., June 5, 1906.

are less frequent; for we can diagnose with certainty the exact position of a morbid process, and, what is quite as important, nominate the real character of the trouble.

Calculus is certainly a frequent cause of cystitis and pyelitis, and ordinarily its recognition is not difficult. But as a rule, it is already of considerable size, and has produced a great amount of damage to the tissues when its presence is first diagnosed. The vague symptoms which accompany the collection of minute crystals of uric or oxalic acid, and phosphates, before they gradually amalgamate and increase to form the larger calculi, are not indicative of stone; and in such a case the physician is apt to soothe his patient, if not satisfied himself, with a diagnosis of nervousness, irritable bladder, hyperacidity of urine, or something equally non-committal. On the other hand, even a large calculus may be overlooked by all the best methods of diagnosis, when the cystoscope alone will reveal its presence. Of this fact there are many cases already on record, and I will here report another which occurred to me recently.

Mr. B. had suffered four years with pains in the bladder, dysuria, occasional haematuria, and progressive diminution of weight and strength. He had consulted several excellent physicians; and, as the symptoms pointed to calculus, he had been subjected to all the usual means to establish such a diagnosis. A member of this Association made a thorough examination with the stone-searcher last September, and there is no question but that he would have detected a calculus by that method if any surgeon could. Yet after his examination he felt justified in excluding stone. So the patient was not relieved, and finally drifted to the charlatans. In January, Dr. Standish, his family physician, brought him to my office for cystoscopy. I found an elliptical stone $2\frac{1}{2}$ inches long by 2 inches wide, and an inch thick, and immovable at the right side of the trigone. At the same time intense redness of the mucous membrane, shreds of exfoliated mucous membrane and fibrin floating from the bladder walls, and the fluid rapidly becoming cloudy with pus and blood, showed the intensity of the accompanying cystitis. During the following week, Dr. O. C. Smith of Hartford, removed the stone by the supra-pubic operation, and the patient promptly recovered.

The advantages gained by the cystoscope as exemplified in

this case, over and above finding the calculus, were— to learn before operating, the exact, or at least approximate size of the mass, its fixed position, and a high degree of inflammation of the bladder walls, all of which pointed to the necessary procedure for relief, it being clearly apparent that here litholapaxy or perineal section would be inefficient.

Just here I would like to draw attention to the limited value of the skiagraph in such cases, for though the presence of a stone may be thus demonstrated, none of the accompanying conditions will be shown.

So we see that in one of the very frequent causes of cystitis, *only* the cystoscope can give us *exact* and *complete* knowledge of the conditions. But almost all other pathologic states of the bladder give as vague symptoms as do calculi and are even more uncertain of diagnosis. Yet in the cystoscope each has its distinct picture, and can be almost as readily diagnosed by the experienced eye, as on the epidermis, condyloma, herpes, angioma, urticaria, psoriasis, lichen, etc., are differentiated at a glance by one acquainted with these lesions.

The time for resorting to cystoscopy is when any case with urinary symptoms continues to suffer after generally approved treatment has been instituted for a moderate period. Of course many conditions as tuberculosis and chronic inflammations due to trabeculae, diverticulae, sacculae, prostatic hypertrophy, etc., will nevertheless require long continued treatment; but the same symptoms may persist from a cause that is easily remediable, and such cases will become worse and worse until that cause is removed. Therefore, we should ascertain this cause as early as possible with the cystoscope; and by its removal prevent the greater harm which delay produces.

Though it has been a long struggle for the cystoscope to obtain full recognition of its immense value to every practitioner, in the larger cities its great worth is now generally appreciated, and it is coming to be more extensively consulted, to the great advantage of the patients, and physicians as well. Surgeons have learned to guide themselves with confidence by its disclosures; nor would they feel justified in operating upon a kidney without a previous cystoscopy.

It is often possible to obtain all necessary information by a

simple cystoscopy. When the kidneys are at fault, as shown by urinalysis, we can frequently see a bloody, or purulent urine issuing from one ureter, while the other jets forth in clear ripples. Or the appearance of the ureteral orifices is sufficient to diagnose which side is affected, and if the symptoms are urgent, operative interference may be instituted at once. But when conditions warrant, we should unhesitatingly catheterize the ureters, and ascertain the degree of disturbance in each kidney by examination of its separate secretion. Simultaneously we can ascertain the presence of a calculus in the ureter, or a stricture, or other obstruction of its lumen; and renal calculi have thus been diagnosed when other means, including the X-ray, have failed. I do not wish to be misunderstood as undervaluing the X-ray. I consider it a very important auxilliary, but—in urology secondary to the cystoscope.

Though a practical diagnosis can be made by the usual methods in a *certain number* of cases, I believe that even in such cases cystoscopy is indicated for confirmatory evidence, if nothing more.

In most cases the cystoscopic examinations are conducted without anaesthesia, and without pain or even discomfort. It is sometimes advantageous to use cocaine, and occasionally general anaesthesia will be indicated, though personally I have never required it as yet.

Definite indications for cystoscopy in diagnosis may be summarized as follows:

1. Urinalysis findings, of pus, blood, tubercle bacilli, and inflammatory products from above the urethra.

2. Symptoms pointing to calculus, or other solid matter obstructing the lumen of a ureter, or occupying the cavity of the bladder, including foreign bodies, tumors, etc.

3. To locate the site of the opening in recto-vesical, or vagino-vesical fistulae.

4. In prostatic obstruction, to determine the extent of lateral or median lobe encroachment, whether the condition of the bladder warrants any surgical interference, and the best operative procedure.

5. The expulsion of small pieces of stone, or of any other abnormal bodies through the urethra; with or without subsequent symptoms.

PLATE XI—To Illustrate the Article by Mr. Battle.

6. Finally any continued interference with the act of micturition; as enuresis, frequency, obstruction to the flow, etc., when not perfectly accounted for by known conditions.

Accessory indications of importance and value are: to determine the presence and functional power of the opposite kidney; to place a metal bougie in the ureter as a guide in skyagraphy; to place a catheter in the ureter as a guide in pelvic operations; and to ascertain end results after all operations on the kidneys, ureters, bladder and prostate.

So it would seem that cystoscopy is indicated in most conditions of trouble in the urinary tract above the sphincter of the bladder. And I believe the time will soon come when this scope of its utility will be generally conceded.

A CASE OF FOREIGN BODY AND VAGINAL CALCULUS. VESICO-VAGINAL FISTULA. KOLPOKLEISIS.

By William Henry Battle, F. R. C. S.

Surgeon to St. Thomas's Hospital, London.

THE patient, a single woman aged sixty-three, was sent up to me at St. Thomas's Hospital, by Dr. A. J. Southey of Colubrook and admitted on March 16, 1906.

The history of the case, was that three weeks ago, Dr. Southey was called in to examine the patient because of the very offensive urinous odor which was associated with her. He then found that she had a continous flow of urine from the vagina, and on making an examination, removed the foreign bodies of which an illustration is appended. He found a large vesico-vaginal fistula. When questioned, the patient admitted that she had introduced the extinguisher-part into the vagina about ten years ago, with the object of relieving an irritation from which she was suffering; it had been there ever since. No trouble had resulted until six months ago, when her urine began to run away without her control; but during this time there has also been a certain amount of normal micturition through the urethra. Occasionally there had been streaks of blood in the urine.

In the last year and a half the patient has had difficulty in

getting the bowels open, and has used aperients regularly. She usually has pain every morning in the lower part of the abdomen, which is not relieved until the bowels have acted.

In the past thirty-five years she has had an inguinal hernia, for which she has worn a truss. It has been always reducible excepting on two occasions, namely, in 1883 and again in 1892, when she had to call in medical assistance to get it back. It was reduced on both occasions after the application of ice.

On admission, she was a stout, well nourished woman, about whom there was a very distinct and objectionable urinous odor. On examination, urine was seen to be dribbling from the vagina. In the anterior vaginal wall, two inches from the meatus urinarius, an irregular opening could be felt, through which the finger passed into the bladder. The edges of this opening are tender, and the patient says that it was here that the body removed by her doctor had lodged. There is large right inguinal hernia, which extends into the labium and is reducible.

The foreign body removed by Dr. Southey, was a large-sized, white, smooth porcelain candle extinguisher of the kind commonly used for bedroom candles. It would easily fit over the end of the thumb, and was apparently lying with the tip towards the cervix uteri. Its interior was full of phosphatic material, and below it was a calculus of similar formation, but of larger size. Around were smaller concretions of phosphatic origin. These were syringed away by Dr. Southey and any ulceration which might have been present at that time, had recovered before admission, as the vagina was carefully douched daily. Mr. Shattock who has mounted the specimen for the Museum of the Royal College of Surgeons of England, is of opinion that the calculus was not (at all events recently) continuous with the contents of the extinguisher, but probably articulated with them by means of a closely fitting, regular joint.

The calculus was probably deposited during the period of urinary incontinence, which the patient placed at eighteen months. At that time (and probably before that time) the ulceration had extended into the urethra and decomposition of the escaping urine commenced.

On March 28th, an examination was made under anesthesia. The opening was found to be a very large one, commencing about

two inches from the urethral orifice and extending upwards for nearly two inches, somewhat egg-shaped, the widest part was oblong. The edges were very hard, and held rigidly apart, traction on them producing no effect in lessening the size of the opening, excepting in the lower part. In consequence of the small size of the vagina, it was extremely difficult to see, or to reach the upper part of the fistula. Two or three sutures were, however, introduced and left in position below. There was no ulceration present.

After this examination, the patient said she could hold her water much better when in bed than she did before, but no great importance was attached to this statement.

April 3. An operation was performed to close the vagina. A circular incision was made about 1½ inches above the meatus urinarius, and a flap of the vaginal mucous membrane raised from below. Silk sutures were then passed through the submucous (or muscular) tissue of the flap from before backwards, so as to close the vagina antero-posteriorly. The raw surface of this flap was thus brought into accurate contact, but none of the sutures of this layer passed into or through the mucous membrane. A second row of interrupted sutures was then put in, bringing the lower line of incised mucous membrane into apposition, also from before backwards.

The result of this operation was to compel the urine to pass through the urethra, and although there had been no interference with the action of the sphincter during the examination, or later, during the operation, the patient suffered from incontinence and could not properly retain more than a few ounces when lying down.

For some days, also, the urine was alkaline and had a considerable deposit of pus and mucus. Large quantities of phosphates were also found.

The sutures were removed from the lower part of the vagina on the 13th, and she left the hospital on the 21st April, being very much more comfortable. All the urine was now passed per urethram, and its character had much improved under the use of urotropin. She could retain it for several hours.

This case is an example of a very uncommon cause of vesico-vaginal fistula, ulceration into the bladder, from the me-

chanical action of a smooth, non-absorbent foreign body. Had the foreign body been of a character to absorb mucus, or become acted upon by the secretion of the part, decomposition must have ensued at an earlier date, and the perforation taken place in a much shorter time. It is very probable that the edge of the opening of the extinguisher produced the first breach of surface and gradually made its way into the bladder, after which phosphatic deposits and decomposition caused a rapid extension of the ulceration.

I recollect very well a case which came under the care of Dr. Henry Gervis, when he was Obstetric Physician to St. Thomas's Hospital, some years ago. It was that of an old woman who was sent up for cancer of the uterus. Examination shewed that the foul smelling discharge, on which the diagnosis had been based, was due to the presence of a large, old-fashioned, circular, metal pessary. Erosion of this had taken place, and ulceration of the vaginal mucous membrane, giving rise to the discharge—the offensive character of which was increased by the accumulation of discharge in the interior of the hollow pessary. It had been introduced some sixteen years before, and never changed. A superficial ulceration of considerable extent had been produced, but the pressure had been diffused, not localised, and therefore perforation had not ensued.

Much credit is due to Dr. Southey for insisting on an examination, which the patient at first refused, and it was only when he had received the support of her employers that it was possible to induce the woman to submit.

The case presented unusual difficulties to the surgeon. 1. The fistula was high up, extending about to the os uteri. 2. It was large, with rigid, fixed edges. 3. The vagina was long and contracted. Moreover, in consequence of the prolonged irritation of the foreign body, the mucous lining was changed, and it was found impossible to increase its width by traction on the speculum.

Taking into consideration the age of the patient, her social state, and the conditions above mentioned, it was decided to close the vagina, and so make its upper part form part of the bladder. There were some additional reasons for this which do not usually obtain, viz.: the vagina was smaller than normal, as a result of

cicatrical changes, its mucous membrane was altered, the opening was a large one, and she had passed the climacteric.

As a rule the operation of kolpokleisis is not one to be commended, for there is a great tendency to the formation of phosphatic calculi in the recess, which is more or less always present afterwards, and the patient may suffer much in consequence. Whether the improved urinary antiseptics of the present day will do much to prevent this, remains to be seen.

In those fistulae which are not amenable to the plastic operations which are usually employed to close them, we have practically a choice of four methods:

1. Closure by means of flaps turned upwards and united to form the base of the bladder.

2. Closure of the fistula by suturing the denuded vesical mucous membrane to its anterior margin.

3. Closure of the fistula by detaching the bladder and suturing it independently.

4. Closure of the vesico-vaginal fistula by suturing the body of the uterus into the opening.

OPERATIVE CURE FOR A HITHERTO UNRELIEVED CLASS OF CYSTITES.[1]

By Eugene Fuller, M. D., New York City.

IT is a well known fact that a healthy bladder tends quickly to spontaneously rid itself of germ infection, and in order to enable such a process to persist in that part, some other favorable agency needs commonly to be present to aid the germ in question in effecting a permanent lodgment. The usual agencies favorable to such lodgment, are those causing defects in vesical drainage, such as stricture of the urethra and prostatic hypertrophy, and aside from these calculi, foreign bodies, neoplasms, traumatisms and tuberculosis.

There has for a considerable time, however, been recognized a class of cystites wherein chronic infection persists, or in which a relapsing reinfection repeatedly occurs in connection with which

[1] Read at the Annual Meeting of the American Urological Association, Boston, June 4-5, 1906.

it has been impossible hitherto, in the absence of the coexistence of any one of the usual favorable agencies, to account for the lodgment of infection and consequently for the cystitis.

For a number of years it has been established that germs from a focus of chronic infection can permeate the surrounding tissues, and thus enter and infect a nearby organ, having no direct connection with the focus of chronic infection. Hallé and others, recognizing this fact, cured cystites in women by ridding the womb cavity of chronic infection through curettage and other appropriate treatment. Gynecologists generally can now call to mind frequent instances wherein, after operation for the removal of chronically inflamed pelvic organs, chiefly tubes and ovaries, there has followed for this same reason, a spontaneous cure of a chronic and dependent cystitis.

The study of the male bladder presents many problems different from that of the female, still in studying the male organ the surgeon should always be alive to the lessons learned in that connection from the other sex.

A number of years ago I devised and published my operation for opening, draining and otherwise surgically treating the cavities of the seminal vesicles. At first my work in that direction was wholly experimental, but at the present time, as the result of much personal experience, which is represented by seventy-four operative cases, the work has passed out of the realm of experiment, so that I now in private practice, advise, when indicated, seminal vesiculotomy, just as I would cystotomy or any other established genito-urinary operation.

My first twenty-two operative cases I have already published (*Medical Record,* N. Y., May 21, 1904), and expect shortly to publish a condensed report of the subsequent cases. So far I have had no mortality.

In the early performance of seminal vesiculotomy, the operation was undertaken for the relief of the usual symptoms, chiefly of a sexual nature, which accompany chronic inflammatory involvement of the seminal vesicles. In the study of the results in these cases, I found incidentally, that in a number of them symptoms of cystitis, which had coexisted with those of a sexual nature, spontaneously disappeared after convalescence from the operation. This fact led me to make a careful cystoscopic study

of the bladder in a series of cases of seminal vesiculitis. I found as a result, that in those of them where the bladder was involved, the lesion was confined to the base of the organ, in fact to that part of the structure lying over the seminal vesicles. In some of them where the inflammation about the seminal vesicles had been extensive, I found likewise, that the inflammation invading the base of the bladder had been extensive and had extended further than the underlying limits of the seminal vesicles. In all these cases, the other portions of the bladder wall were normal or nearly so in appearance.

From these cystoscopic studies it seemed reasonable to infer that the lesions of the vesical bases accounting for the cystites, were really peripheral ones, the center foci for which were the infected seminal vesicles, the germs in the bladders having penetrated the intervening tissues from the cavities of the seminal vesicles. In other words, I classed the bladder inflammations as localized pericystites. In mild cases, the cystoscope showed the vesical mucous membrane of the area involved, red, infiltrated and edematous, while in the severe types, granulation tissue had in large measure taken the place of the mucous surface. Here and there on these granulations would be pus flocculi, films of inflammatory exudate and spots of hemorrhage. In some of the advanced cases, the least instrumental contact with the surface granulations was sufficient to provoke a fairly free hemorrhage. On one of them a triple-phosphate crustation had formed.

As a result of these investigations, I felt confident that a cure of this form of pericystitis would follow spontaneously after the operative elimination of the chronic infection in connection with the seminal vesicles. Acting on this conviction, I have cured through seminal vesiculotomy, a number of these cases, all, in fact, on which I have so far operated. These results are included in the list of seventy-four instances in which I have so far performed seminal vesiculotomy. For illustration the histories of a number of these cases will be detailed.

List Case 28. Patient fifty-six years of age. His complaint was frequent urination. At times he would be called on to urinate by day every hour or every half hour, while his longest interval would be two hours. At night he would always have to get up twice and sometimes six or eight times. When the acts

of urination were especially frequent, there was much accompanying scalding pain, while during periods of comparative urinary quiescence there was little scalding. Associated with the scalding there was apt to be vesical tenesmus, together with suprapubic and perineal pain. At the age of twenty, he had had gonorrhoea. At forty-four he had been operated on for hemorrhoids. Retention had followed the operation, requiring catheterization. That was twelve years ago, and it was from that time that the patient dated his present trouble. He was married and had no complaint as to his sexual status. His urine was decidedly turbid, chiefly from bacteria, to a less degree from pus. It was acid, contained a trace of albumin, no sugar. Specific gravity 1018. For the last twelve years the patient had been going from one doctor to another without ever having experienced relief, while in many instances he felt that the treatment prescribed had served to aggravate his troubles. His bladder had been washed innumerable times with all sorts of solutions, and his urethra had been overdilated. Special search had been made for stone. Some had thought his trouble might be in the renal pelvis. He had been urged to part with his testicles, to have the Bottini operation tried and to have his prostate removed.

On urination I found his stream full and unobstructed, the bladder being left empty at the end of the act. Rectal examination showed the prostate normal, but a hard, inflammatory mass, the size of a walnut, focused about and involving the right seminal vesicle. The left organ was not involved. Renal palpation showed nothing abnormal. Cystoscopic examination showed a lesion in an otherwise healthy bladder, in the region of the trigonum, chiefly on the right side. Posteriorly the lesion extended beyond the limits of the trigonum. The mucous surface involved was deep red, tumefied, and bled readily from contact with the end of the cystoscope. Adherent to it in spots, were bits of purulent, stringy mucus.

My diagnosis was that the bladder trouble was caused by a localized pericystitis, the origin of infection being the involved right seminal vesicle. Seminal vesiculotomy was performed. The right seminal vesicle was incised its entire length. The cavity of the sac was found to be full of firm granulations. With a sharp curette these were thoroughly removed. The sac cavity

was packed with gauze and external perineal drainage established. The gauze packing was removed at the end of five days. A few days later the tubes were also removed and the track of the wound allowed to close. The patient made a perfect recovery. The vesical urgency speedily disappeared after the operation, though temporarily the pus in the urine increased. In a few months after the operation, however, the urine was clear and sterile, and the patient was in a normal condition. Some time still later, I received a letter from him stating that his bladder was perfectly well and normal. This patient curiously complained before operation of no sexual trouble, possibly owing to the fact that the left seminal vesicle was not involved.

List Case 29. Patient thirty years old. He had had pus and bacteria in his urine for six years following a gonorrhoea. Ever since then his urination had been painful, at times more so than at others. There had been attacks of vesical tenesmus associated generally with a perineal pain, and sometimes with a false desire to stool. Drinking, coitus or vigorous exercise, so tended to aggravate his symptoms, that he had in large measure to abstain from all of them. He stated that during the acute stage of his gonorrhoea six years before, he rode a bicycle, with the apparent result that an abscess formed which caused urinary retention. After several days of severe suffering, there was a discharge of pus per rectum, after which time the power to urinate returned. Ever since then the patient stated he would not infrequently notice circumscribed deposits of pus and mucus on a formed stool. The patient was of the opinion that these deposits came from the old abscess cavity, which still from time to time, discharged itself into the rectum. Rectal digital exploration showed a very marked old chronic inflammation of both seminal vesicles. In fact this inflammation had been so extensive that it had invaded all the surrounding tissues, filling the post-prostatic space and extending forward into the prostatic capsule, so that one uninitiated in the rectal touch might have mistaken the condition presented, for one of prostatic enlargement. On the rectal wall, over the right side of this inflammatory area could be felt a prominent papilla. On putting the patient in the Sims position and introducing a speculum, it could be seen that this papilla marked the opening of a sinus, and that the patient was right in the statement that pus from

time to time leaked out of the old abscess cavity. From the examination it was evident that the abscess which had formed had been focused about the right seminal vesicle. On making a cystoscopic examination, much the same appearance presented itself in this case as in the preceding one. The bladder lesion was confined to the region of the trigonum and to the basic structures somewhat posterior to it. The rest of the bladder presented a normal appearance. There was no urethral stricture. Owing to the bowel sinus, I was at first rather loath to strongly urge seminal vesiculotomy in this case, being fearful that a bad result might follow from fecal contact in connection with the incised tissues. The patient had, however, been for years consulting genito-urinary authorities without any real benefit, and after I had carefully explained the situation to him, he insisted that I should operate.

In the performance of the operation, after I had dissected up and raised the rectum so as to bring into view through the wound the sinus opening into the bowel, my intention was to close it by means of a purse-string suture, and then to open the cavities of the seminal vesicles. On attempting this, however, I found the walls of the gut around the sinus so attenuated and diseased, that no purse-string suture would hold. Consequently, the attempt being abandoned, I cut with scissors longitudinally the raised wall of the rectum through the sphincter, right back into the hole made by the sinus. I then opened the cavities of both seminal vesicles, curetted and packed them with gauze. Next, after packing carefully the lateral paths of the dissection so that feces could not well get under the rectal flaps, I sutured the rectum back into its former position, leaving open and packing the longitudinal cut extending back to the sinus opening. The packings were gradually removed as healing progressed. The patient recovered uneventfully from the operation. For a time, owing to the cut through the rectal sphincter, there was some fecal incontinence, but even that trouble now at the end of a year and a half has ceased to exist. The symptoms of cystitis all disappeared in a short time after the operation. The urine is now clear and sterile. Sexually, he is so satisfactory and competent, that he is shortly to be married.

List Case 33. Patient thirty-five years of age. His com-

plaint was frequent and painful urination. His interval by day never went over an hour, while by night one and a half to two hours, represented his longest period. His urine was foul, being loaded with pus and bacteria. In reaction, it was neutral or alkaline. It contained some triple phosphate crystals and a fair amount of red blood corpuscles. At times the urine had been decidedly red from hemorrhage. There was much suprapubic and perineal pain, which increased as urine collected in the bladder. Exercise served to increase his discomfort. His sexual function was greatly impaired. He had had his trouble for ten years, following an attack of gonorrhoea. During all that period he had been constantly going from one doctor to another without ever having experienced any relief. The treatment he had received had been chiefly directed toward the bladder and urethra. Sounds, injections, irrigations and vesical lavage with every known agent had been employed. Some had suspected calculi, while many had thought the case one of vesicle tuberculosis.

On making a rectal digital examination, a very marked chronic seminal vesiculitis was found to exist. In fact, all the outlying post-prostatic connective tissue outside, and about the seminal vesicles was hard, infiltrated, and the seat of chronic edema. The bladder was carefully washed, till the return flow became clear. Then a 1 to 5000 adrenalin solution was injected, after which the part was carefully distended to its capacity, when the cystoscope was introduced. The same vesical lesion was found here to exist as in the two preceding cases, except that in character it was more advanced and intense. The posterior limits of the inflammatory area extended back beyond the trigonum and the ureteral orifices. The posterior wall of the bladder, the apex and the lateral walls were normal in appearance. Over the affected area, there had in places, formed tufts of granulations, some of which had broken down, ulcerations resulting. Pus flocculi were here and there adherent to the granulations, and in one or two spots over ulcerations, triple phosphate crustations had formed. Hemorrhage readily followed instrumental contact with the granulations. The patient readily consented to seminal vesiculotomy. In performing the operation, I not only opened freely both seminal vesicles, but also dissected the bladder wall free from the inflammatory tissue, somewhat beyond these organs. The

packing and drainage of the wound was carefully arranged. The day after the operation, the patient stated that he was free from the old painful desire to urinate. Recovery in this case was very striking. The patient left the hospital before the end of his third week. He could then hold his urine till six to eight ounces had accumulated, and pass it freely, naturally and without any pain or discomfort. The urine was still quite purulent, but strongly acid. Three months after the operation, the last time I saw the patient, the urine was but slightly purulent, and contained very few bacteria. The rectal feel showed a very satisfactory resolution in connection with the seminal vesiculitis. Cystoscopic examination showed at that time a slight persistance in places of inflammatory evidences. Where the intra-vesical lesions before operation had been so marked, I had not expected complete resolution could have occurred in so short a space as three months. The patient then stated that he was perfectly well, and although requested to report again for observation, he never did so.

List Case 69. A man, forty-eight years of age. His complaint was frequent urination, associated with pain. Pain in the perineum, suprapubic region and lower back, was also complained of. Aside from these symptoms there existed a crippling of the sexual function, neurasthenia and general mental depression. The urine contained some bacteria and a moderate amount of pus. He had been well until five years ago, when he contracted his first gonorrhoea. His present symptoms dated from that time, and had gradually been becoming worse rather than better. This patient had sought relief at many hands, but had never experienced any apparent benefit. His bladder and urethra had been subjected to all recognized forms of treatment.

On examination, per rectum, I found marked chronic involvement of both seminal vesicles. As in the preceding case, the whole post-prostatic space had been invaded by a hard inflammatory infiltration, which extended posteriorly beyond the extreme reach of the finger tip. Urethral examination showed a roomy canal free from lesions. On introducing a Thompson's searcher into the bladder, the fundus to its touch felt hard and rather uneven, suggesting the presence there of a neoplasm. That area also was very tender. The rest of the bladder to the touch of this instrument appeared normal. On inspection with the cystoscope,

the pathological evidences at the base were much less marked than in the preceding cases, the rest of the bladder seeming normal. The pathological appearances were limited to the area which felt hard to the touch of the searcher. I took it that the hard feeling at the base and the appearances there were due to a chronic infiltration and edema, which had extended into the bladder base from the seminal vesiculitis, that lesion representing the primary focus of infection. Seminal vesiculotomy was performed. All the tissues were very hard and infiltrated. After opening both seminal vesicals, the bladder base was dissected free from the infiltrate beyond the apices of those organs, and the whole space packed with gauze and drained. The frequent desire to urinate was relieved, just as in the preceding case, almost immediately after operation. The patient left the hospital at the end of three weeks, retaining the normal amount of urine without discomfort. There was then no pain on micturition. One month after his discharge from the hospital, I saw him for the last time. His urine was then sterile and he was free from symptoms, besides being in a most satisfactory condition. Rectal examination showed the seminal vesicles and the surrounding tissues to be soft and yielding on palpation, the old infiltrate having disappeared.

These and other similar results have interested me greatly. They show another group of pathological conditions which are curable through seminal vesiculotomy. Last year in my paper "The Relation of Gonorrhoeal Rheumatism to Seminal Vesiculitis and Its Cure by Seminal Vesiculotomy," (*Annals of Surgery,* June, 1905), I showed the beneficial effects of the operation in cases of that description, and since then I have had much further favorable operative experience in other like cases.

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OPERATIVE TREATMENT OF GONORRHOEA IN THE MALE.[1]

By A. C. Stokes, M. D., Omaha, Neb.

GONORRHOEA has been and is, to my mind, the most neglected subject in the whole catalogue of diseases, which have presented themselves since the birth of rational medicine. Even after the work of Neisser and Bumm, Guyon and Neoggarth, it has only been within the last few years that the enormous havoc of this disease has become recognized by the profession, and we, as a profession, must hold ourselves responsible for the light way in which such a disease is regarded among men. However, at the present time, here and there, arises a man who realizes the terrible devastation which the disease has wrought upon civilization, and comes forth with a plea for its more careful consideration. It is not an over-statement of the fact to say that at least 75 per cent. of all so-called diseases of women are gonorrhoeal in origin, and fully 75 per cent. of the invalidism among women is due to this disease, and a great per cent. of sterile marriages are due to gonorrhoea either of the male or the female. I have no hesitation in making the statement that gonorrhoea causes more pain and sorrow and trouble, than all other known disease at the present time; and in point of importance to the health and earning capacity of a community, gonorrhea stands second only to tuberculosis, if second at all.

A certain per cent. of the ravage of this disease is due to our neglect and incomplete and imperfect treatment of these cases. (Some few extremists among genito-urinary surgeons have laid down the dictum that once a gonorrhoeaic, always a gonorrhoeaic; while others of the old school who, themselves, have been more or less, as the phrase has it, "rounders" in their day, declare that a gonorrhoeal infection is no worse than a bad cold, and amounts really to nothing.) Between these two extremes there is a mean which seems to me to be a more correct position. Just what

[1] Read before the Western Surgical and Gynecological Association, August, 1906.

per cent. of men who have had gonorrhea get entirely over the disease, it is a difficult thing to say, but that there is a large per cent. who do not, no one will question. Some from want of treatment; some from conditions which do not yield to treatment; and some through carelessness. Nevertheless, there is quite a per cent. of gonorrhoeaics who have gonorrhoea for years, and which infection resists all the present forms of treatment, and anyone studying the case would not hesitate for a moment to pronounce the patient infectious. They may have no discharge, they may have no symptoms, but still appears occasionally the famous "morning drop," following an extra exertion, a carouse, or excessive sexual excitement; or it may be possible at times to find cases in which the evidence of an old gonorrhoea can only be found by the expression of the prostatic secretion, and the examination with a microscope, where we will find leucocytes or sometimes the micrococcus itself. It is a fair statement to say that anyway 80 per cent. of all gonorrhoeas become posterior, and most of the posterior gonorrhoeas affect the prostate gland. And gonorrhoea of the prostate is the most common and the most stubborn of the present complications of this disease. The gonococcus may lie dormant for years in the urethra, and then be stirred up by some unusual excitement. Bumm has found it there ten years after an infection, and Bransford Lewis claims to have two cases in which auto-infection occurred after a period of twenty-five years. With all the array of facts concerning the enormity of the disease, it is certainly a duty which we owe to ourselves and to the sufferers to look more carefully after these cases. Many of my friends continually inform me that they do not see any of these cases. I can't but think that they are not looking for them. Others of us are inclined to smile at the sufferers who apply for treatment and, oftentimes for the want of knowledge of a definite treatment, they are either superficially treated or are dismissed without any satisfaction as to their condition. These cases are too common to be left to the genito-urinary man entirely. The general surgeons must endeavor to handle these cases in a more rational and scientific manner than we have in the past. Some of us take the attitude that it is beneath the dignity of our consideration. We would rather let them marry and remove the pus tubes from their wives afterwards.

It is not my purpose in this paper to discuss either the pathology of gonorrhoea in general, or to say anything in particular about the medicinal treatment, either local or internal, which is in common use in the profession at the present time; but rather to recite something of personal experience which I, myself, have had in handling these cases. I shall take it for granted that you will accept the proposition that there are certain gonorrhoeas in the male which either cannot be cured at all by the present recognized methods, or can only be cured by years of constant treatment, and the consequent expenditure of a great amount of time and money. That such cases do exist, I know positively, from my own experience, and the man does not live who cures all his cases of gonorrhoea.

I am persuaded, however, that the problem is, after all, not so much a problem of treatment as it is of diagnosis. Not so much a diagnosis of the presence of gonorrhoea alone, which is oftentimes difficult enough, but also the diagnosis of the point of the urethra infected and the pathology existing at that point. This means a careful study of the bladder, the urethra, anterior and posterior, the prostate, seminal vesicles, vas deferens and epididymis. The definiteness with which this is done, controls, to a large extent, the results of our treatment, as well as the method of procedure. I will not, in this paper, enter into a discussion of the use of the cystoscope and urethrascope, taking it as axiomatic that these instruments must be intelligently and carefully used in the determination of these more definite diagnoses. That in addition to this, the prostate has been carefully studied by palpation through the rectum; that the prostatic fluid and urethral excretions have likewise been carefully studied, both macroscopically and microscopically; that careful study be likewise made of the seminal vesicles and their fluid, that the bas fons of the bladder, the ducts leading into the urethra, the sinus procularis, Cowper's glands, the bulb of the urethra, and the anterior urethra have all been, so far as is possible, considered. This seems, at times, rather difficult, but by care one can arrive at a fairly definite idea of the position of the infection, and much knowledge may be gained of the condition of the lesion, and one may approximate a definite anatomical diagnosis. Recognizing the above facts, I have, since 1901, had this problem under consideration, viz.: given a definite anatomical

diagnosis of gonorrhoeal infection in the male, how shall we institute treatment with reference to each particular lesion, and how should these treatments differ? I was persuaded to another conclusion, viz.: That the present treatment of these old chronic gonorrhoeas by instillation, injection, and irrigation, is primitive, oftentimes irrelevant, sometimes injurious. Do not understand me to mean that these kinds of treatment should never be used; but it seems to me a primitive conception to endeavor to cure an infection by producing a chemical inflammatory reaction of the urethra, which many regard as the probable way in which chronic gonorrhoea is cured, and recommend, consequently, the use of strong chemicals in the urethra. They are irrelevant because oftentimes the infected portions are not touched by our present system of medication, and the healthy mucous membrane receives insult after insult. They are more or less guess work, because we do not conceive the infection as existing in a definite part of the urethra, but treat the whole urethra without respect to a definite portion. The use of the endoscope is a step in the right direction, and by the careful use of it the healthy portions of the urethra may be protected, and for the treatment of any chronic anterior urethral infection, the endoscope seems to me to be the ideal method, for by its use we are able to treat the affected areas directly and them alone, and to observe the pathology existing along the urethra. But the endoscope is not satisfactory, or has not proved satisfactory in my hands in the treatment of posterior infections, and it is the posterior infections of the different anatomical structures which prove the most intractible.

It is evident that the physiological factors which make for chronicity in gonorrhea of the male are two, viz.: first, the imperfect drainage of the infected area; second, the continuous use of the urethra as a channel of exit for a complex and more or less irritating chemical excretion. The pendulous urethra drains itself, but the bulbous, the membranous and the prostatic urethra must necessarily drain up hill, and that through a tube that normally lies with closed lumen; consequently drainage, if it takes place at all, does so with difficulty, and naturally enough the infection will be crowded by the laws of resistence into all the existing glands and follicles, which in this region are lined by columnar epithelium and form an ideal place for the growth of the

gonococcus. Attempts have been made to drain the posterior urethra through the anterior urethra by means of wicks of gauze, catheters, etc., but this has proven very impracticable, owing to the size and shape of the urethra, and to the fact that it must be used every few hours for the passage of urine; hence, our ordinary surgical principles of drainage and rest, which have obtained in all other infections with the formation of pus, have been in gonorrhoea thoughtlessly and carelessly violated.

The problem, then, which first presents itself, is an attempt to obtain better drainage for the infected area. It is apparent that it is impracticable to open the anterior urethra at any point. First, because of the anatomical structure of the corpora spongiosa; secondly, because a hole in the anterior urethra frequently leads to a permanent fistula, and thirdly, the anterior urethra can nowhere drain the membranous or prostatic urethra without an uphill flow. We naturally, therefore, came to the conclusion that the posterior urethra must be the point sought for drainage. The membranous portion is, with one exception, the most favorable portion of the urethra for drainage. The exception is, that this membranous portion is limited at each end by the anterior and posterior layers of the pelvic fascia which do not dilate as freely as other parts. In other words, an external urethrotomy for drainage of the urethra is, I believe, a valuable procedure in chronic urethritis, affecting any of the anatomical structures above mentioned. The second point, viz.: rest of the urethra is also established by drainage of the urine through a tube in the perineaum, and we then have not only drainage and rest, but an opportunity to directly approach the urethra. The ability to obtain drainage, rest, and an accessible urethra have led me to do external urethrotomy in old chronic gonorrhoeas where the infection lay in the prostate gland, the membranous urethra or seminal vesicles, or any of the ducts thereto tributary. We have made an ordinary external urethrotomy, going through the anterior layer of the triangular ligament, opening the membranous urethra for nearly its whole length, dilating the posterior urethra forcibly, both in front of, and behind the incised area, using either an ordinary curved forceps for this process or a Kolemann's urethral dilator. A careful examination of the urethra is now made by examining the membranous and prostatic urethra through the

wound, by means of a urethrascope, or sometimes I have used the direct cystoscope. The ulcerating areas are determined, if possible, and in most cases we have been able to gain considerable added information to what we had before the operation. When the prostate or any of its glands or sinuses are the seat of infection, we have curetted the entire mucous membrane away in this area, being careful to reach the bottom, as much as possible, of the sinus procularis, the meatus of the bladder, and the mouth of the seminal vesicles. The entire area is then cauterized with a 20 per cent. silver nitrate solution. It is not necessary to be particularly careful in regard to the mucous membrane in the posterior urethra, because it reconstructs very rapidly, as Freyer has shown, and while in my first two cases I did not curette very thoroughly, in the latter ones I have curetted nearly all the mucosa away, and after this have cauterized the area with twenty per cent. silver solution, applied by a long probe used as an applicator, endeavoring to get at the bottom of as many prostatic follicles and glands as possible. The urine in the bladder and the oozing from the wound interfered very much with this procedure at first. I finally packed the bladder with iodoform gauze, which dammed back the urine, protecting it from the silver, and by the constant use of sponges on carriers, I was able to see a considerable part of the prostatic urethra, and to keep the field clear for examination with the cystoscope and urethrascope. I then dilated the anterior urethra after this procedure by Kolemann's urethral dilator, and cauterized it at the same time with a ten per cent. silver solution. In my first case I used twenty per cent. which is too strong. Most of the mucous membrane of the urethra will slough from a ten per cent. solution. Drainage is then put into the bladder through the perineal incision. I prefer a large tube which goes to the bottom of the bladder. The chief trouble that I have had from this is in obtaining drainage from the bottom of the bladder, most of the tubes not curving down into the bladder sufficiently, but going straight in, and not allowing the bladder to drain from the bottom and urine flowing out over the wound. Great care must be had as to this point. I have consequently used in some cases large gum catheters, which retained their curved shape better than the ordinary drainage tube. I have also tried curved glass rods with a small lumen and a thick wall. I am not entirely satisfied with

the way tubes drain the bladder in this relation, and I have been endeavoring to make a tube with parachute, so that the urine could not escape out around it, and would only escape through the tube.

So far I have treated four cases in the way detailed, and the report is at the end of this article.

I have found, so far, no reference to this procedure in any of the literature, either English, French, or German.

The second class of cases which I wish to discuss are those in which the infection has travelled into the vas deferens, the seminal vesicles, or the epididymis. It has been shown that the gonococcus may lie dormant in any of these areas for years, the known limit of which, according to Neisser, is twenty years. In the following work I have only continued the work of Belfield who reports in the *Journal of the American Medical Association,* for April 22, 1905, the opening of the vas deferens in epididymitis and in old chronic infections of the vas and seminal vesicles. Bazet of San Francisco, has also reported forty-three cases in the AMERICAN JOURNAL OF UROLOGY for May. We wish to report herewith five cases of opening of the vas. The technique that we have used is as follows: The skin is incised in the region of the high operation for varicocele, and arriving at the cord, the vas is dissected from its fascia and freed for a distance of about an inch and a half; it is then opened into its lumen and the edges sewed to the skin. The lumen of the vas can then be irrigated, and has drainage at both ends; that is, at the urethral end of the vas and at the end of the incision. Belfield has shown that a fluid is easily passed from this incision in the vas deferens through the lumen of the vas into the urethra. There is no question that certain forms of chronic gonorrhoea are due to pus tubes in men. They do not produce the symptoms which they do in women, but they produce sufficient symptomatology to be recognized, if carefully studied. There is oftentimes in these cases pain over pubis; when the bowels are distended or the bladder is full, this pain is oftentimes aggravated. Enlargement of vas can be felt, and it is always tender. After the infections in the prostate, I am inclined to believe that those in the vas deferens and seminal vesicles are the most numerous in chronic gonorrhoea. We therefore proceed, as we have indicated, by opening the vas deferens, and injecting into it a one-eighth per cent. of silver nitrate and increasing as we can until

the percentage has arrived in one case to two per cent. So far, my results in both methods of procedure have been apparently ideal, and in the nine cases which I have treated in the two different ways outlined in the paper, I have every reason to believe that the infective process has ceased. None of the cases, however, have been followed longer than two years, and some of them have disappeared immediately upon leaving the hospital. A detailed account of the history of each case is given in the paper, and I will only sum up the general principles here, viz.: first, chronic gonorrhoea is a surgical disease. Second, chronic gonorrhoea requires careful anatomical diagnosis. Third, infections of the prostate and the glands and ducts of the urethra can be successfully treated by external urethrotomy. Fourth, infections of the vas deferens, epididymis and seminal vesicles can be treated by opening the vas, irrigations and drainage.

In conclusion, I do not give you this paper as final upon this subject, because I have not been able to cover all the ground. You have probably noticed many parts of the paper which are not entirely satisfactory. I therefore leave this subject for further consideration, in the hope that we may be able, by these methods, or modifications of them, to do something and promise something for the unfortunate sufferer of chronic gonorrhoea.

Case No. 1. Mr. L., South Omaha, Neb. Had gonorrhoea four and a half years; wished to marry; consulted me in November, 1904.

Past History—Good. Had the diseases of childhood; outside of this had never been sick. Contracted gonorrhoea four and a half years before; discharged profusely for three weeks; since then had occasional discharge, with periods of apparently no discharge. Had more or less soreness in urethra at times. Said he could not pass water as freely as before. Several times during the past four years there were periods at which he was compelled to rise once or twice at night to pass urine. Occasional periods of seminal emissions taking place at night, without his knowledge.

Present Condition—A. Symptoms: Occasional burning when passing water. Morning drop present; discharge increased after taking liquor. Erections more or less painful.

B. Physical condition: Prostate enlarged and sore; by gentle massage, large quantities of fluid could be expressed. This was centrifuged and examined for gonococci, which, after several attempts, were differentiated. *Posterior urethra;* upon endoscopic

examination, nothing found except a redness and swelling of the vera montanum. *Anterior urethra;* no induration, no infiltration; slight areas of congestion.

Diagnosis—Gonorrhoeal infection of the prostate gland.

Treatment—Advised external urethrotomy, which was performed in the Wise Memorial Hospital on November 9, 1904, Dr. Hoyt assisting.

Urethra opened as described, prostate cauterized with twenty per cent. silver; bladder drained with an ordinary rubber tube. Anterior urethra dilated thoroughly, and cauterized with a ten per cent. silver nitrate solution. After three days, tube removed and the prostatic urethra cauterized with ten per cent. solution of silver. This was repeated every third day for three doses; after twelve days, the wound was allowed to heal, and the tube was removed. I did not curette off the mucous membrane of the prostate and its adnexa in this case; but think I could have gotten more rapid results, and, perhaps, surer ones, had I done so.

Results—In three weeks the wound entirely closed, and for three weeks of observation succeeding this, I found neither morning drop, shreds, nor pus in the urine. Patient married and at the present time tells me that he has no trouble so far as he knows, and his wife is perfectly well.

Case No. 2. Mr. P., salesman for carpet company, Omaha, Neb. Presented himself to me with a gonorrhoea of some two months' duration. Upon examination, found discharge; examination of the prostate gland, showed large fluctuating abscess in the left lobe. Advised external urethrotomy and drainage, as before; which operation was performed in the Wise Memorial Hospital, January 30, 1905. In this case I curetted the mucous membrane off almost entirely, endeavoring to get to the bottom of the abscess; drainage instituted as before, patient making about the same recovery. He was married a few weeks afterwards, without my knowledge or consent. I heard from him last June, at which time said he had never experienced any more trouble and that his wife was well and had borne him a child.

Case No. 3. Mr. S., a Jew. Seen in consultation with Dr. Romm, of Omaha. Found him suffering excruciating pain, giving the following history: Up to about six weeks before, had been perfectly well; had then contracted gonorrhoea; about three days before he was taken with excruciating pain in the perineum; unable to pass water; the doctor was unable to catheterize him, and after several hours of such a condition, I saw the patient; examination by the rectum discovered a prostate more than twice as large as normal, extremely tender, and very hard. We made an external urethrotomy, punctured the prostate through the urethra and large quantities of pus came out, and we curetted out the

abscess and drained as before. After three weeks, I lost track of the patient and have not seen him since. The doctor tells me that, so far as he knows, the patient is entirely well.

Case No. 4. Mr. X., a Hungarian. Contracted gonorrhoea in the fall of 1903. Presented himself at my office in May, 1905. He gave the following history:

Past History—He had never had gonorrhoea before, had never been sick in his life, and gave evidence of being a very healthy laboring man. He had had a continual discharge for about two years, at times it seemed to disappear, and at other times to increase. He complained of soreness in the perineum, pain in the head of the penis, and said that at times he was compelled to urinate frequently.

Present Condition—Symptoms, occasional burning from passing urine; pain after passing urine; pain very much increased upon using any acid food, such as pickles, or by drinking any sort of liquor. By the use of medicines which made the urine bland, he was able at times to entirely stop all symptoms as well as the discharge; but upon discontinuing the medicine, the trouble returned as before.

Physical examination showed a prostate normal; expression of fluid and examination by the microscope showed neither leucocytes nor micro-organisms. Upon endoscopic examination of the posterior urethra, the vera montanum was swollen, enlarged and congested, as was also the membranous urethra. Anterior urethra showed points of congestion and induration. Certain areas had gone on to the formation of scar tissue.

Diagnosis—Gonorrhoeal infection of the posterior urethra and the glands of the bulbous urethra.

Treatment—Advised external urethrotomy, as before. This was done after some months of attempts to cure by other means, in the Swedish Hospital, on October 30, 1905, Dr. Dodge assisting. Urethra was opened as described before and drained. The mucous membrane was curetted away around the prostatic and membranous areas; the anterior urethra was dilated and cauterized with a ten per cent. solution of silver. The patient is still about town, I see him occasionally, and he appears to be well, so far as he knows and so far as I am able to determine.

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BALSAMIC TREATMENT OF GONORRHOEA

By Dr. Leopold Lilienthal, Berlin, Germany.

DESPITE the fact that balsamic drugs have been used empirically for centuries, their mode of action is still obscure. In his "Therapie der Harnkrankheiten," Prof. C. Posner, several years ago, remarked as follows: "It is of course, possible to medicate the urethra in an indirect manner, by giving drugs which will pass into the urine, and thus reach the diseased mucous membrane. This form of therapy has long been in vogue, and numerous antigonorrhoic drugs have been recommended. There can be no doubt that they exert a beneficial effect and that the urine and not the blood, brings them to the affected parts. Local irritation, so common with injections, will not occur, though there may be disagreeable after-effects from their use. There are, however, patients who will react to every injection severely, and when this fact is known, the treatment must be restricted to internal medication.

"The active drugs almost all belong to the balsams. They appear in the urine in the form of resinous salts, and these probably inhibit the growth of the gonococcus, though this has not yet been demonstrated experimentally. The most commonly prescribed are the balsams of copaiba and cubebs, which are generally administered together in capsules. They often cause gastric disturbance, cutaneous eruptions, and renal irritation. The after-effects are less severe with oil of santal, provided the preparation is pure."

It has not, however, been proven that really pure oil of santal does not cause some irritation, and reports on disagreeable after-effects have appeared recently. Vieth, therefore, made an accurate analysis of the balsams and examined carefully the following: Oil of turpentine, pine tar, balsam of copaiba, East and West Indian oil of santal, oil of cedar and juniper, the extract of cubebs and Kawa Resin. Four different principles, closely allied genetically, were isolated, viz.: 1. terpenes; 2. terpene alcohols; 3. resinous acids; 4. resenes and other neutral resins and esters.

He found that all balsams yielded several of these groups, and in order to determine which components are responsible for the irritation of the superficial tissues, he made external, local applications on animals.

Terpene and sesquiterpene are pure hydrocarbons. Oil of turpentine and copaiba, the santalen of oil of santal and the chief substance of oil of cedar and juniper, belong to this group. Externally they severely irritate and internally they affect the kidneys.

The terpene alcohols are represented by the santalol of East Indian santal, the amyrol of West Indian santal, etc. They irritate only after continued application.

Resinous acids (pine tar or colophonium, and constituents of copaiba, cubebs and Kawa) do not irritate internally or externally in herbivors, but in carnivors and man they produce diarrhoea.

The resenes and neutral esters do not in any way irritate, and also possess the advantage of being almost without taste and odorless.

Vieth now attempted to convert the other constituents of balsams into resins. He succeeded with terpene alcohols and resinous acids, by combining them with salicylic and benzoic acids. Salol and aspirin are like compounds since the irritating properties of the phenols are here corrected by a similar esterization.

Both Vieth and Ehrmann found that gastrointestinal symptoms will not appear if the esterized resinous acids of copaiba are administered. Eruptions, however, will occur as before. The salicylic ester of the oil of santal was found to be more suitable, and has been placed upon the market under the trade name "Santyl." This is an almost tasteless and odorless oil, of pale yellow color. It contains 60 per cent. of santalol, in chemical combination with salicylic acid. In its unaltered state, it is no more irritating than olive oil, and is only split up into its components after it has left the stomach. This process is so slow that no renal pain will appear, and the breath of the patient will not reveal the drug. In healthy individuals, the excretion by way of the urine commences in about one hour and lasts for about 24 hours. Even with an empty stomach, there is no gastric disturbance.

The conclusions of Vieth and Ehrmann from their clinical experience with a number of patients, the majority of which suffered from gonorrhoeal urethritis, caused me to try "Santyl" in

about 50 successive cases. In the meantime, R. Kaufmann of Frankfurt a/M. has reported 45 cases, and H. Bottstein of Hamburg, 60 cases treated with this drug.

Fifty of the cases treated were acute, and five of these in women. Particular attention was paid to the action of the drug upon the gastrointestinal tract and kidneys, as well as to its general therapeutic efficacy.

The mode of administration was always in the form of drops, 20 being given three times a day after meals. Even in those cases where the drug was purposely given for an extended period before the meals, there was no gastric pain, nausea, eructation, vomiting, colic or diarrhoea. All patients confirmed the almost complete absence of odor and taste.

Renal irritation was not seen in a single instance. Several patients who complained of pain in the renal region after the use of pure santalol or mixtures of santalol with other balsams, could take Santyl for a long time without the slightest disturbance. That unadulterated preparations of santal can irritate the kidneys, as observed by Vieth and Ehrmann, while with Santyl, not a single instance was recorded.

The therapeutic action of the drug is very pronounced. In the five female cases with acute gonorrhoea, the pains ceased very rapidly. The remaining 45 cases, included 18 with acute anterior gonorrhoea, 17 with anterior and posterior gonorrhoea, 7 with gonorrhoeal cystitis and three with prostatitis.

Two of the anterior cases were completely cured after the use of Santyl alone, because, for certain reasons local treatment could not be resorted to. I have, however, had the same experience with the oil of santal, so that Santyl is not necessarily more efficacious. In all other cases, local treatment was also employed (injections of albargin or protargol, Janet's irrigations, bladder irrigations, Guyon's instillations). The results obtained by other authors with this drug, I can confirm. Burning in the urethra, painful urination and the desire to pass water, disappear very rapidly. In the majority of instances, painful erections do not torment the patients. In posterior gonorrhoea, the second portion of urine frequently cleared up completely, even without local treatment of the posterior urethra. This persisted even when the patients again injected the anterior portion of the canal. In three

cases of cystitis, the tenesmus disappeared with Santyl alone, while in the other four, narcotics were necessary. Epididymitis was not met with, but three cases developed prostatitis. In two, Santyl diminished the pains considerably, while in the third, suppositories were necessary.

In conclusion, I would say that Santyl is equally as effective as the other santal preparations, but it should not be regarded as a remedy which will cure gonorrhoea without local treatment. Where the inflammation is so severe that local applications are out of the question, Santyl does excellent service without giving rise to the after-effects so common with the other balsamic drugs. The best results have been obtained in posterior urethritis, probably owing to the chemical union of santalol with salicylic acid.

The best method of administering Santyl is in the form of drops (20 three times a day to one tablespoonful of water). Since almost without odor and tasteless, it is not necessary to prescribe capsules.

Finally, two patients may be referred to, who suffered from abnormal sensations in the urethra after the gonorrhoea was cured. Santyl did away with these in a short time, even after the bromides had proven ineffective.

LITERATURE.

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Bottstein: Ueber Santyl, ein reizloses, internes Antigonorrhoicum. Med Klinik, Vol. 2, No. 11, 1906.

BOOK REVIEWS

Surgical Suggestions.—By WALTER M. BRICKNER, M.D., Chief of Surgical Department, Mount Sinai Hospital Dispensary, New York; and ELI MOSCHCOWITZ, M.D., Assistant Physician, Mount Sinia Hospital Dispensary, New York. New York: Surgery Publishing Co., 1906.

This book is most novel on account of the many original terse and epigrammatic practical suggestions given. It contains 250 suggestions grouped under proper headings and its contents is carefully indexed. While some of the items are familiar to the practical surgeon, they are presented in a manner that will impress them on the reader's memory.

This book will be found of particular value to the general practitioner as the hints contained are most suggestive and to the point.

From the publisher's view point, the book leaves nothing to be desired.

Hypertrophie de la Prostate et la Prostatectomie.—By DR. A. MISSET, Paris, 1906. Bonvalot-Jouve, Publisher.

This little brochure of seventy-eight pages contains the teachings of the Necker school. The author concludes his study by saying that the supra-pubic route is rapid, easy, and perilous; it does not possess all the advantages of the perineal or the combined methods, yet it retains all the dangers. The supra-pubic route should be selected only in marked prostatic hypertrophy in young, thin, vigorous subjects, with proper renal function and who are desirious of retaining their sexual functions.

The combined method is particularly indicated when the so-called middle lobe is very large.

The book is illustrated by sixteen excellent figures.

Annex