The American Journal of Urology

GENITO-URINARY AND VENEREAL DISEASES

EDITED BY
WILLIAM J. ROBINSON, M. D.
OF NEW YORK

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VOL. VII
JANUARY-DECEMBER, 1911

THE UROLOGIC PUBLISHING ASSOCIATION
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THE AMERICAN
JOURNAL OF UROLOGY
WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII JANUARY, 1911 NO. 1

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

THE NORMAL AND PATHOLOGICAL POSTERIOR URETHRA AND NECK OF THE BLADDER

A STUDY WITH THE CYSTO-URETHROSCOPE

By LEO BUERGER, M.A., M.D.

Assistant Adjunct Surgeon and Associate in Surgical Pathology, Mount Sinai Hospital; Associate Surgeon, Har Moriah Hospital, N. Y.

IN previous publications I described a new cysto-urethroscope by means of which it is possible to obtain pictures of the neck of the bladder and posterior urethra, which are both upright and free from distortion. Having employed the instrument in more than 300 cases, including both private and polyclinic patients during the past year, it seems to me that a report of my own experiences may be of some value in stimulating further investigation along these lines. In the exposition of my subject I shall devote myself to the following themes: First, anatomical landmarks; second, elementary principles underlying the use of the instrument, and technic; third, the normal pictures of the neck of the bladder and urethra; and fourth, pathological lesions.

In order to facilitate localization of the findings obtained by cysto-urethroscopy, it is expedient to divide up the posterior urethra in an arbitrary way, taking certain well defined landmarks, such as the *annulus urethralis* or margin of the internal sphincter of the bladder, and the *colliculus seminalis*, in determining the extent of each portion. The sub-divisions that I have found most useful in practice are the following:

The Sphincter margin (mn) with superior (roof), inferior (floor) and lateral portions (sides); the *pars prostatica* (C) and the *pars membranacea* (B). (Fig. 1.)

We divide the prostatic urethra into:

A. Supramontane portion between sphincter margin and colliculus, with a roof, later walls (sides) and floor (U).

B. Montane portion with a roof, sides and floor (T).

The floor of the supramontane portion shows the fossula prostatica (FP), and the floor of the montane portion contains the colliculus (urethral crest) and lateral sulci (sulci laterales). If we regard the complete ridge or verumontanum as the urethral crest, or crista urethralis, it seems best for topographical reasons, to distinguish the following parts: Posteriorly (towards the bladder) there are frequently a number of small bands that lie in the fossula prostatica and pass in to the crista urethralis. These shall be called *posterior frenula.* They belong both to the supramontane portion and to the montane. The crista shows a posterior gradual inclination (crista posterior) or declive (S), a central prominence, or summit, and the anterior distal slope, the acclive (R). We shall drop the term urethral crest and speak only of a *colliculus* showing a *summit, acclive* (anterior crista) and *declive* (posterior crista). The valleys on either side of the colliculus are the *sulci laterales.*

The membranous urethra (B, Fig. 1) receives the terminating fold of the acclive and anterior crista, and also has a roof, side walls and floor.

THEORETICAL AND TECHNICAL CONSIDERATIONS

I need not dwell here on the theory involved in the development of the cysto-urethroscope, for this has been already described elsewhere.* It will suffice to note a few fundamental facts. It is to be remembered that in our optical system, a prism is employed by virtue of which upright and right-angled images are obtained. It may be well to say here that the deflection of the rays of light is not quite 90 degrees, so that the telescope looks slightly forward. Theoretically there is a certain advantage in a slight obliquity of the axial ray; for the center of the area of illumination and the middle of the field will then coincide. In the interpretation of the pictures, however, we can disregard this slight deviation from the canonical displacement of 90 degrees.

**American Journal of Surgery,* May, 1910.

As for the size of the field, this is determined by the size or width of the fenestra when the mucous membrane is in contact with it. As the mucous membrane falls away (which occurs whenever there is a fossa, or which is artificially brought about by the injection of fluid) the size of the actual field increases, just as in the case of the cystoscope. Thus the diameter of the field will vary from 4 to 7-16 of an inch.

When the "inner field," or virtual image or that which appears to the eye, is 3-4 or an inch in diameter, the canonical size for the instrument, objects lying in the plane of the fenestra are enlarged about three diameters. When the mucous membrane of the urethra is in contact with the fenestra of the instrument, the actual field is about 1-4 of an inch in diameter. As the mucous membrane is made to fall away from the window by the injection of the irrigating fluid, the field becomes larger and the objects become proportionally smaller. Thus at a distance of about 1-20 of an inch we are able to see a circle measuring 5-16 of an inch in diameter; at 1-10 of an inch, a circle 6-16 of an inch; and at 1-6 of an inch, the field measures 7-16 of an inch in diameter.

The adoption of an optical system of short focal distance and of but meagre magnifying power at close range, secured for the author's cysto-urethroscope that much desired quality of being able to bring properly into view objects lying very near to the prism. In addition to this advantageous feature we employed a form of illumination that is excellent for near work, namely, a prismatic roof illumination.* In the cysto-urethroscope, therefore, we have conditions which are admirably fitted for the investigation of near objects, making it possible to see the minutiae of the markings of the mucous membrane with great distinctness. In the male, but a limited portion of the mucous membrane of the bladder can be brought into view. No difficulty will be encountered in locating the ureters and in studying the whole of the trigone. The sphincteric margin can be perfectly studied, but there are portions of the juxta-sphincteric mucous membrane (namely, that portion which lies in the bladder) that may escape

*In more recent models the prism has been substituted by an obliquely placed lamp shedding its rays through a glass window. Either type of illumination (prism or direct variety) has been found satisfactory.

our observation. This is especially true as regards that portion of the mucous membrane of the bladder which adjoins the roof of the sphincter. It is because of our inability to depress the penis sufficiently, and consequently of our inability to approximate the fenestra and the mucous membrane in question, that the failure to bring this portion into view results. In the female, on the other hand, the shortness of the urethra makes it possible to make wide excursions with the cysto-urethroscope, and the instrument becomes a better one for vesical observation. For practical purposes it is quite sufficient to be able to see the trigone, ureters and sphincter.

Although we regard the simultaneous employment of the author's right-angled telescope * together with the irrigation method (Goldschmidt) as affording us the most accurate pictures of the posterior urethra, we must admit that even this combination may permit the tyro to misinterpret some of the pictures. Thus, although the prismatic illumination is adequate for near objects, the more remote objects, such as the dilated bladder mucosa, remain insufficiently lighted. When the bladder is somewhat distended and the fenestra is at the sphincter margin, the failure to illuminate the bladder is shown in Fig. 6, where the upper dark zone corresponds to the mucosa of the bladder and the lower light portion represents the sphincteric margin and beginning of the supramontane floor. In practice this restricted lighting property is not a disadvantage, since the optical apparatus too is best adapted to near objects.

Although we believe that the colors seen with the telescope of the cysto-urethroscope equal in exactness of reproduction those seen with the ordinary cystoscope, certain changes may be produced by the pressure of the instrument, by spasm on the part of the bladder neck, and by prolapse of the urethral mucous membrane. Thus, as the instrument is drawn into portions of the urethra which are narrow, the pressure effect upon the mucous membrane is sometimes manifest, and we can see the mucous membrane become blanched and the capillaries and vascular streaks turn pale. A little experience, however, will tell us at once when the pallor is a true one, for it requires but slight manipulation or holding of

*This telescope may be used in other cavities for near work; such as in the oesophagus, mouth, nasal passages, etc.

the instrument at rest for a moment to bring about a return of the vascular flow and a restoration of the normal color.

As for prolapse of the mucous membrane, this takes place most readily in the region of the colliculus when it is turgid or when it is inflamed. It occurs in the bulbous urethra when irrigation is stopped, or when one of the faucets is open. Any marked redundancy of mucous membrane coupled with an absence of distention by irrigation will tend to make the mucous membrane fall into the window of the instrument. If we take sufficient precaution to follow exactly the technic described later in the paper, it will rarely happen that we are disturbed by prolapsing mucous membrane. Even if this does occur, vision is not altogether interfered with, increased magnification and slight darkening being the result.

In passing from the trigone over the floor of the supramontane urethra, we must bear in mind that the sphincteric margin may be rather prominent., Owing to the declivity of the floor of the supramontane region, and also to the downward inclination of the trigone, slight variations in the appearance of the sphincteric and juxta-sphincteric regions will inevitably depend upon the differences in position of the instrument. Thus, if we depress the ocular considerably in viewing the floor of the supramontane region, we may slightly transilluminate the sphincter margin, and the picture will change accordingly. Villous growths and hypertrophies in this region, therefore, must be studied from different points of view, the shaft of the instrument being made to follow the plane of the parts to be seen.

We need not dwell on the optical principles involved in the interpretation of the pictures seen with the cysto-urethroscope, for they are the same as those belonging to a Nitze cystoscope with an upright field. It is only for the region of the sphincter that a word of explanation may be advisable. Fig. 7 illustrates diagrammatically the floor, roof and lateral aspect of this region. The shaded areas represent the non-illuminated bladder, which appears in the upper part of the field when the fenestra of the instrument is turned downward. Although the floor of the sphincter presents a horizontal slightly convex line, the roof and side walls show marked concavities. In interpreting these pictures it must be re-

membered that when the fenestra looks down the far point of the field is at a point north (Fig. 2). On rotation of the cysto-urethroscope, the fenestra pointing to the right side of the patient, the far point is east. In viewing the roof the far point of the field is south, and looking at the left part of the sphincter the far point of the field lies at the west. The concave lines, therefore, do not represent the curve of the urethra in a plane perpendicular to the shaft of the instrument but they illustrate the sphincter margin in a plane parallel to the shaft. In other words, the concavities presented by the roof, side walls and floor are directed towards the bladder and not towards each other.

Technique: Inasmuch as this has already been discussed in a previous paper, I wish here only to allude to those improvements which have developed during the course of my practical experience with the instrument. After introduction with the obturator and irrigation of the bladder when the contents are turbid, the telescope is inserted and an irrigator which is situated about three feet above the level of the table is attached to one of the lateral faucets. The other faucet remains closed and is opened in order to evacuate the bladder. When we desire to bring about prolapse of the urethral mucous membrane irrigation is made to cease temporarily, or, to secure considerable prolapse, the discharging faucet may be opened for a moment. But a very small amount of fluid is allowed to enter the bladder and we begin the examination of the empty bladder, noting, if we wish, the peculiarities of the case in hand, and studying the points that are to be described in a separate chapter. The flow is then again started and allowed to continue throughout the examination, being only made to stop for special reasons or while emptying the bladder. If we do not care to study the collapsed bladder, we begin the search for the ureters, which are usually easily found when the bladder is filled with but a small amount of fluid, viz., from 30 to 100 c. c. In some instances, when the *bas fond* is very deep, the trigone may be carried far downward on dilatation, making the finding of the ureters more difficult. In such cases it is best to seek the ureteral orifices after having allowed most of the fluid to run out. The examination of the trigone is next in order, and during this process it is best to raise the ocular of the instrument so as to bring the fenestra fairly close to the

mucous membrane. The scrutiny of the sphincteric margin is now begun; its whole circumference can be brought into view by simple rotation of the shaft. For observation of the juxta-sphincteric portions of the bladder, we should have very little fluid in the bladder, and carry the shaft of the instrument far in the opposite direction. We usually examine the floor of the supramontane and montane regions next. This accomplished, the fenestra is pushed into the bladder, turned upward and withdrawn for the examination of the roof of the supramontane, montane regions and of the side walls. The membranous urethra and bulb are the last to engage our attention. As regards the bulbous urethra we must not loose sight of the fact that its capacity and dilatability vary considerably in different individuals; that when it is not distended its appearance is very rugous, and that when it is filled ad maximum it may lie so far away from the fenestra that the field becomes somewhat obscure. We must then manipulate the evacuating faucet as well as the irrigating flow in order to obtain the proper distance for most satisfactory observation. The sharp limiting margin, marking the junction between the bulbous and penile urethra, as shown in Fig. 19, will serve as a reliable landmark for the recognition of its peripheral boundary.

For those using the cysto-urethroscope for the first time, the following more detailed description of the various parts of the instrument may be of service:

Familiarize yourself with the following parts before attempting to use the instrument:

1. THE SHEATH (Fig. 3) WITH ITS DETACHABLE BEAK (a), FENESTRA WITH CATHETER NOTCH (b), LAMP, ILLUMINATING WINDOW (Fig. 4m), IRRIGATING FAUCETS (d), COUPLING (c), AND LOCKING SCREW (e). Remove the curved beak, inspect lamp and lamp socket (Fig. 4g). A short straight tip may be substituted for the curved one. Keep the screw joint and beak anointed with the special wax provided for that purpose.

2. THE TELESCOPE (Figs. 4 and 5), with CATHETER CHANNEL (k), CATHETER OUTLET (o), LOCKING FORK (p), the DEFLECTOR for a CATHETER (y) or high frequency electrode, the FILIFORM DEFLECTOR (x); and the TELESCOPIC JOINTS (j), at the end of the telescope, for the reception of the deflectors.

For ureteral catheterization, or fulguration, adjust the larger deflector, after having capped the catheter outlet with the proper per-

forated rubber tip. Place the deflector so that the catheter or electrode will emerge as near to the ocular end of the fenestra as possible. To probe the utricle and ejaculatory ducts use the finer curved filiform deflector. For observation alone, close the catheter outlet with a closed tip.

3. THE OBTURATOR, WITH LOCKING FORK (Fig. 3f).

TECHNIQUE.

A. Use ordinary cystoscopic preparations, and in sensitive individuals anesthetize the urethra with 2% Novocain or 2% Alypin Solution. Employ: (1) A connecting tube for irrigation through one faucet. (2) An irrigator filled with boric acid solution situated 3 to 4 feet above the level of the patient.

B. Test the lamp, watching the illuminated ground glass window. A great deal of light is not required, inspection being done at close range. Short circuiting is prevented by keeping the screw joint of the beak smeared with wax. Adjust deflector according to requirements. Note that the deflectors may cut off a tiny part of the field.

C. Introduce instrument with obturator into the bladder; remove obturator.

D. Wash bladder if necessary through sheath.

E. Insert telescope; adjust connecting tube to one irrigating faucet, both faucets being closed.

F. Inspect the collapsed bladder. Start the flow and examine trigone, ureters and vesical sphincter. After the sphincter has been examined proceed to the inspection of the floor of the prostatic urethra, and then view the roof and side walls.

If the telescope becomes soiled with secretion, remove and clean it without disturbing the position of the sheath. The distended bladder may be emptied at any time through the other faucet, after pushing the instrument inward so that the fenestra lies in the bladder.

N. B. ON THE MANAGEMENT OF THE DEFLECTORS:

Try the deflectors before introducing the sheath. If they slide into the joints too easily, spread the two limbs. Adjust in the proper position so as to get maximum deflection. This is obtained by giving the deflector a slight bend so that it tends to spring away from the telescope. Make a mental note of the proper position by observing just how much of the field (if any) is obscured by it. Usually only a minute section of the field is encroached upon; sometimes not any of the field is cut off.

The Normal Pictures

The Empty Bladder: A splendid opportunity for studying the movements of the walls of the bladder, as well as for viewing the normal configuration of the parts about the vesical orifice, is afforded us by reason of the instrument's capacity for producing reliable pictures in the presence of a minimum amount of filling fluid. Thus the form of the *orificium internum* could be investigated in the case of the empty bladder just as well as with varying degrees of distension of that organ.

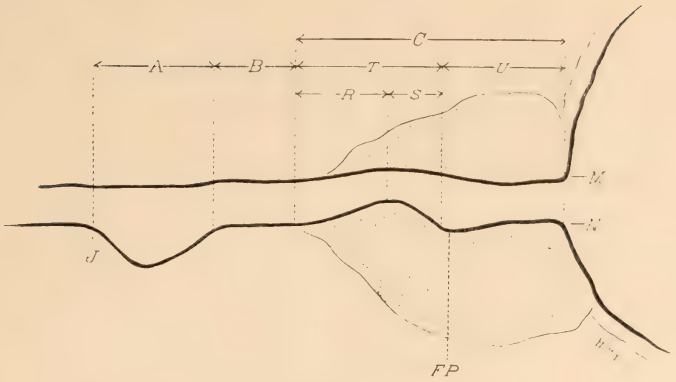

Fig. 1

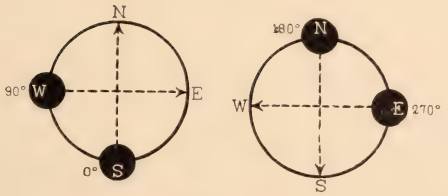

Fig. 2

Fig. 3

EXPLANATIONS OF FIGURES.*

Fig. 1. Schematic drawing showing author's method of dividing up the posterior urethra and bulb. The exact proportions are not adhered to, the bulb being relatively too small in the figure.

Fig. 2. Schematic representation of the far point of the field; when the fenestra of the cysto-urethroscope is at the black circle, the arrow-point indicates the most distant part of the field.

Fig. 3. Sheath of author's cysto-urethroscope with obturator in place: a, beak; b, fenestra with notch; c, coupling for current; d, faucets; e, locking screw; f, obturator.

*All the half-tone drawings are exact reproductions of pictures seen through the cysto-urethroscope. The drawings were made while the artist was looking through the instrument.

American Journal of Urology, January, 1911.

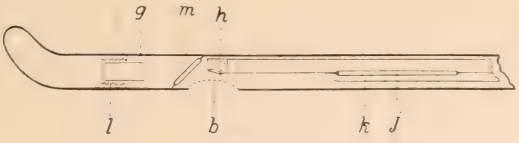

Fig. 4

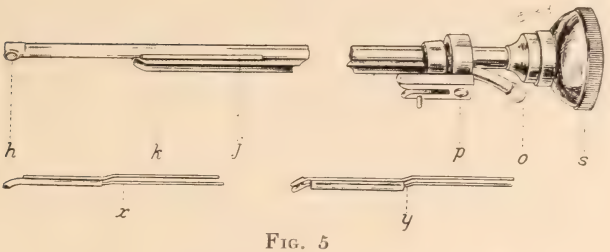

Fig. 5

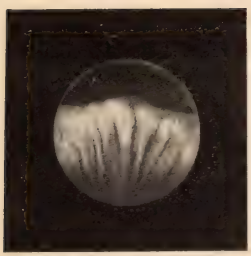

Fig. 6

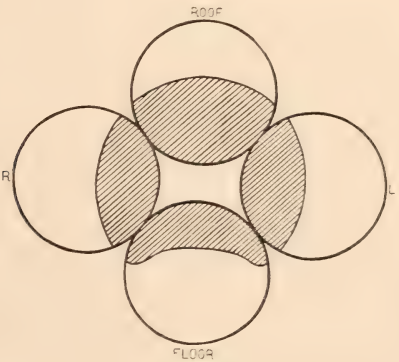

Fig. 7

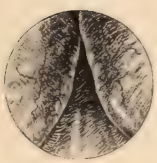

Fig. 8

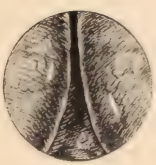

Fig. 9

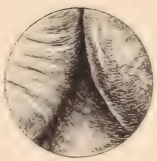

Fig. 10

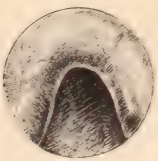

Fig. 11

Fig. 4. Cysto-urethroscope with disposition of light and lens system diagrammatically shown: b, fenestra; g, lamp socket; l, screw joint of beak; h, objective with cap; j, telescopic joint for deflectors; k, catheter channel; m, illuminating window.

Fig. 5. Telescope of the cysto-urethroscope: h, objective; j, telescopic joint; k, catheter groove; o, catheter outlet; p, locking fork; s, ocular; x, filiform deflector; y, catheter deflector.

Fig. 6. Floor of the urethral aspect of the internal sphincter.

Fig. 7. Diagrammatic representation of the internal sphincter.

Fig. 8. Trigone and overhanging roof of the empty bladder.

Fig. 9. Divided overhanging vesical roof of the empty bladder.

Fig. 10. Roof of the empty bladder falling down on the sphincter as viewed with the fenestra pointing down and to the right.

Fig. 11. Sharp notch at roof of internal sphincter.

It is in the collapsed state that the physical conditions are such as to permit of a rather extensive view of the mucosa, with minimum excursions of the instrument. As has already been pointed out elsewhere, the evacuation of the bladder offers a means of bringing into view parts which would be beyond the pale of the visual capacity of the optical system.

Let us now turn our attention to a few of the typical pictures of the orifice of an empty male bladder. Keeping the sphincteric margin in the center of the field we see only the red trigone. A slight push inward will reveal a different view, the trigone being below and the pale bladder mucosa encroaching upon and overhanging it in an oblique fashion (Fig. 8). On passing deeper inward, in the direction from before backward, the obliquity of the folds of the prolapsing roof is lost until their margins become almost parallel enclosing an oblong strip of plicated dark red trigonal mucosa (Fig. 9).

In order to avoid possible misconception, it may not be amiss to emphasize the fact that in the interpretation of these views of the empty bladder obtained with the cysto-urethroscope, the displacement produced by the instrument must be taken into account. Thus in the Figs. 8 and 9, showing two bulging walls that appear to overhang the floor of the bladder, careful consideration reveals the fact that we are not dealing with two distinct side walls, but with a protrusion of the roof. For instead of meeting the trigone, the collapsed vertex is moulded around the shaft of the instrument. The roof of the bladder, therefore, is practically divided into two lateral portions as long as the instrument looks down upon the floor.

Turning 15° to 30° to the right or left from the primary position (which shows the inferior margin of the sphincter), the line representing contact of the roof of the bladder and sphincter is brought into view (Fig. 10). Often there is a single convex wall of pale mucosa meeting the red sphincteric ring, but at times we encounter an additional intermediate fold intruding into the angle betwen sphincter and bladder.

On rotation of the cysto-urethroscope to either side (with an added motion of translation in the form of a slight withdrawing pull) we see that the sphincter margin is covered by the pro-

lapsed roof. Still turning the instrument in the same sense, the typical angular superior margin is encountered, the triangular incisure being covered by the bulging pale roof of the bladder (Fig. 11). It would appear from an analysis of these illustrations that the vesical roof falls downward and forward on the internal orifice, meeting the trigone. Under normal conditions it covers the bladder surface of the sphincter or the annulus urethralis. In some cases, two lateral projections insinuate themselves at points on either side of the internal meatus. With the instrument *in situ*, a certain distortion is inevitable, leading to the production of the pictures just described.

(*To be continued in the February issue*)

Contributed by the Author to THE AMRRICAN JOURNAL OF UROLOGY.

THE TECHNIQUE OF THE HYPEREMIC TREATMENT OF THE URETHRA BY MEANS OF HOT SOUNDS

By DR. MORITZ POROSZ, Budapest, Hungary.

THE application of hyperemia to the urethra by means of the hot sound may be secured by allowing hot water to flow through a hollow double-channeled instrument, without permitting any contact of water with the urethra itself. In the following description I intend to call attention to the simplest method of applying this treatment. In large cities every specialist has in his office a hot-water apparatus in addition to the ordinary water faucets. If a hot-water apparatus be used the method which may otherwise seem complicated becomes very simple. The thermometer in the irrigator shows the exact temperature of the water in the container. The patient sits upon a chair and holds the sound in one hand, in order to retain it in position. The instrument is a straight conical hollow sound, provided with an inflow and outflow (Fig. 1). The inflow is connected with an irrigator jar, which is raised one and a half or two meters above the floor. The outflow of the water which has passed through the sound is led into a vessel which stands at the patient's feet. The patient holds the control stopcock in his other hand (Fig. 2).

In my description of this method (*Deutsche medizinische Wochenschrift*, 1909) I stated that lukewarm water must be used

at first when beginning the treatment, because the urethra is not accustomed to the unusually hot water, and consequently the patient feels the sudden application of heat as a painful or disagreeable sensation. For this purpose I have found my old arrangement for washing the bladder quite satisfactory. I connected the tube of the hot-water apparatus with the tube of the cold-water faucet so that the water in the irrigating tube would represent the temperature of the mixture. The connection is made by means of a small coupling and a rubber tube, as pictured in Fig. 3. When the proper temperature has been secured, the gas flame under the hot-water heater is extinguished and the hot water is allowed to flow into the tube. In order to obtain some lukewarm water at the beginning of the treatment, the connection with the hot-water receptacle is made at the start when the flame is first lighted. Thus the thermometer can be watched as its mercury rises. The temperature in the large receptacle gradually sinks, the colder water, being heavier, remains near the bottom of

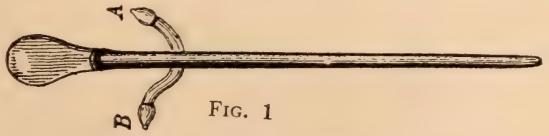

FIG. 1

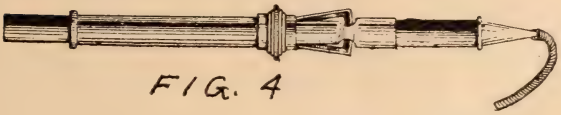

FIG. 4

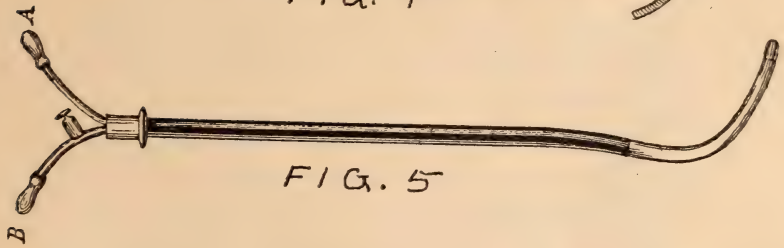

FIG. 5

the irrigator and the temperature of the water above becomes gradually warmer as one approaches the surface, provided the irrigator be not shaken. This physical property can be utilized by filling the rubber tube and the lower part of the irrigator with lukewarm, or even with cold water. When the irrigator is now connected with the heating sound, the water which is at the bottom of the irrigator and which is lukewarm or cold first flows

FIG. 2

through the sound. Then as the water flows off, the warmer layers in turn flow through the sound, and so the patient gradually becomes accustomed to the heat, until the proper temperature reaches the urethra.

Control observations were made by measuring the temperature of the outflowing water. This was done by holding the thermometer directly under the outflowing stream of water. This indicated the exact temperature.

I found in these experiments that the beginning of the treatment may be made with water at 35 to 36 degrees Centigrade in the outflow tube and that this temperature was not felt at all by the patient. When the outflow measures 40 degrees he begins to feel that the water is becoming warm. A temperature of 42 or 43 degrees C. is borne even by sensitive, nervous patients. At 44 to 45 degrees in the outflow, the patient feels that the sound is quite hot, but this temperature is borne by nearly every patient, and in some instances very resistant patients could bear 50 degrees C. in the outflow. In such cases, however, the sound seemed to have burned the epithelium of the meatus, so that the latter was sensitive for several days and a thin eschar had formed. The urethra itself, however, bore this temperature well.

As the result of these measurements I found that by regulating the stopcock I could reach an average temperature of 45 degrees in the outflow, when the receptacle contained water at a variety of temperatures.

Thus, when the water in the irrigator was at 60 degrees, I was able to get 45 degrees in the outflow stream by merely allowing a thinner stream of water to pass through the apparatus. With a larger stream I could get 45 degrees in the outflow from a receptacle containing water at from 50 to 52 degrees C. The larger the number of thermal units passed through the apparatus in a given time unit, the greater was the heat communicated to the urethra. When the water was allowed to gush out suddenly, the patient felt that the heat was greater, but the control thermometer showed also a higher temperature. If the stream of water was allowed to flow slowly a lower temperature was noted by the patient and was registered by the thermometer.

I did not take the trouble to make calculations of the relation of the velocity of the stream to the heat emitted, for in the first

place I could not make these measurements, and in the second place these complicated calculations are of no practical value. The patients themselves, anyway, regulate the heat satisfactorily. In my first article, already referred to, I stated that there was a difference of from 8 to 10 degrees C. between the water which flowed

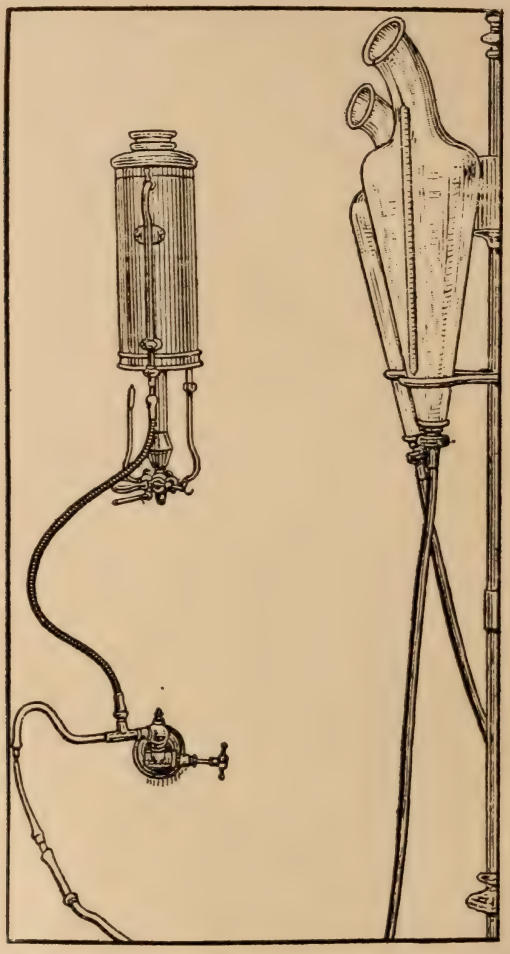

Fig. 3

in and that which flowed out, so that the urethra absorbed from 8 to 10 degrees of heat. Later, however, I discovered that the connecting tubes, the receptacle and the vessel in which the container stands are all sources of loss of heat. The temperature varies at different seasons and depends upon the temperature of the room.

When the fluid in the irrigator is shaken the temperature in

every layer of the fluid becomes equalized. Patients will not bear an initial stream of 45 or 46 degrees, but if they are gradually accustomed to it, they will bear as high as 54 and 55 degrees, provided the velocity of the stream be appropriately regulated.

Whenever the patient feels that the sound is very hot, he interrupts the stream by shutting the cut-off upon the connecting rubber tube and thus the sensation of heat is at once relieved. The same takes place if the stream is partly shut off. The patient thus is enabled to get intervals of rest, after which he can tolerate the action of the heat for a longer period. The patient thus has in his own hands the regulation of the degree of heat, and in this manner avoids too great suffering. The heat does not cause pain, but is tolerable. The stream may also be regulated with the cylindrical cut-off pictured in Fig. 4. On moving the ring one millimeter, the temperature of the outflowing water can be altered to the extent of one or two degrees. This regulation is much more safe and more delicate than the ordinary method, or that with Leiter's stopcock.

I usually allow two liters of fluid to pass through the sound. If the receptacle contains water at 50 to 52 degrees C. and the outflow measures 45 degrees, it takes from eight to ten minutes to pass this amount of water through the sound. If the temperature is higher in the receptacle, and if the outflow is to measure 45 degrees, the water must be allowed to flow more slowly, and the treatment lasts from twelve to fifteen minutes. When the patient feels very warm and begins to perspire, I do not force matters, but interrupt the treatment.

The mucous membrane of the urethra becomes very red after the treatment. The temperature of the surface at the lower aspect of the urethra was found to be 41 degrees; while at the upper surface the thermometer placed in contact with the cavernous bodies registered but 39 1-2 degrees. The difference is due to the greater thickness of the layers of tissues between the source of heat and the thermometer.

After the treatment the urethra is sensitive to the passage of urine. This sensitiveness continues sometimes on the next day if the heat has been very great, and in such cases the treatment is omitted on that day. In rare cases treatment has to be omitted on the third day also.

Vörner recommends the use of a hot sound heated by an electric apparatus, which can heat the sound up to a glow. In order to prevent overheating a rheostat is employed. This is a convenient method, but in my opinion the heat cannot be as easily regulated with the electric apparatus as with my own method, and the patients cannot themselves regulate the heat as they can by the water system. Moreover, hot water and an irrigator can be provided anywhere, so that the only special instrument needed is a sound.

Vörner himself mentions the disadvantages of his method. He cannot get a thin enough sound. My sounds can be manufactured as small as 14 F., or even smaller, though in my opinion a smaller sound is not necessary. In strictures of smaller calibre one can more easily avoid making false passages by employing bougies. Anybody who has had the opportunity to struggle with rigid, easily bleeding and quickly relapsing strictures will appreciate the brilliant, rapid and safe successes which can be obtained in such cases with the hot sound.

In strictures of the posterior urethra, one may use in addition to the straight, hot sounds, an electric psychrophore (Fig. 5), with the difference that the beak alone is not isolated with hard rubber.

I demonstrated my instruments for the application of hyperemia to the urethra in 1908 at the first Congress of German Urologists, where I also read a paper regarding my experience with this method. Experiences with this treatment since then have convinced me that the use of the hot sound constitutes an excellent therapeutic method in the treatment of sub-acute and chronic urethritis, as well as in softening infiltrates and dilatation of strictures.

On the other hand, my expectation of being able to destroy gonococci in acute gonorrhea, by applying a temperature of over 40 degrees to the urethra, was not realized. The acutely inflamed urethra not only does not bear high temperatures, but even in those cases in which I succeeded in applying heat of over 40 degrees to the urethra in this condition, I failed to destroy the goncocci. The temperature was measured externally upon the surface of the skin, as was later done also by Vörner. This simply is another

proof that the life of the gonococcus is different *in vitro* from that which takes place in the body cavities.

For this reason the success of the treatment in infiltrates and strictures was all the more satisfactory. When these lesions were the causes of urethral discharge and of the presence of gonococci therein, then the cure of these conditions and the disappearance of the secretions was completely successful.

I do not mean to say that the mucous shreds floating in the urine disappeared in every case. I must admit that I expected this, and in many cases I succeeded in obtaining this result. But the mucous shreds were always to be found in the morning urine. The causation of this phenomenon could not be discovered even with a urethroscope. The open follicles of Morgagni were filled with mucus, but were healthy and not inflamed, and could not be regarded as evidences of disease.

The treatment considerably increased the dilatability of strictures. With the aid of the hot sound I have been able to dilate without a single drop of blood strictures which had been treated repeatedly by others and which had bled easily. In one or two cases I was able to determine after considerable intervals that the normally dilated urethral calibre had remained as such for months and had not again become narrowed.

I was also able to observe that in cases of infiltrates and strictures, the urethral discharge which is so frequently present, but which rarely contains gonococci, disappeared without the use of any irrigations or injections, simply through the dilatation of the narrowed portions up to the normal calibre.

Encouraged by these experiences, I made an attempt to treat with the hot sound cases of non-gonorrheal urethritis in which I encountered foreign, non-pathogenic bacteria. In such cases we do not know with certainty whether these bacteria are associated with the urethritis as a mixed infection, or whether they are the organisms which cause the mucoid discharge. At first, I thought that the hot sound was a useful measure in such cases, but in one or two cases I found that I could not avoid the use of astringents. I must admit, therefore, that the hot sounds alone do not lead to a definite cure in some of these cases, yet it is well to try them in obstinate cases on account of the sometimes surprising success which follows their use.

Contributed by the Author to The American Journal of Urology.

ROENTGENOLOGICAL EXAMINATIONS OF THE KIDNEYS

By Arthur Holding, M.D., Albany, N. Y.

BY careful technique in the preparation of the patient and in the making of radiographs, shadows can be obtained of most calculi in the urinary tract so that their size, location, character, and number can be determined accurately. The enormous increase in the number of nephrotomies done for calculus since Röntgen's discovery and the frequency of the diagnosis of calculus being made to-day as compared with a decade ago is a significant testimony to the efficacy of the X-rays in kidney examinations. Very rarely a calculus will be of such soft consistence or so obscured by the bulk of the patient or the patient presents himself with such a distended abdomen that the calculus will not cast a sufficent shadow to be registered on the radiograph.

The essentials in radiographing the urinary tract are:

1. An apparatus giving a maximum of direct rays and a minimum of inverse, indirect or secondary rays;
2. Fixation or compression of the parts to be examined;
3. An exposure while the patient holds his breath.

Long experience has demonstrated certain dicta in regard to Rontgenological examinations of the urinary tract, which are as follows:

1. A positive diagnosis of calculus should only be made after the entire urinary tract has been radiographed and the shadow of the lesion has been duplicated in at least two radiographs.
2. A negative diagnosis of calculus is only justified when the radiographs show the outlines of the transverse processes of the vertebrae, the psoas muscles and the kidney.
3. The visible outline of the kidney on the X-ray plate is evidence that the radiograph is one of superior excellence. It is not always possible to show these details in very large patients or in those whose bowels have not been properly prepared previous to the examination.
4. The correct interpretation is often more important and quite as difficult as the making of radiographs of sufficient excel-

lence to be trustworthy. Pseudo-calculus shadows may be caused by,

a, Foreign bodies as Blaud or silver pills, bullet in the back, and the like;

b, Calcification, of cartilages, lymph-nodes, arteries, veins, phleboliths, spiculae of bones;

c, Folds of intestines particularly when enveloped in adhesions;

d, Enteroliths;

e, Prostatic calculi;

f, Gall stones (rarely);

g, Tuberculosis of the kidney in chronic lesions with calcification;

h, Artefacts, as finger-marks, stains from uneven development, flaws in plates, etc.;

i, Sesamoid bones near spine of the ischium;

j, Finally, there occur shadows at rare intervals, pseudo-calculi, for which no satisfactory explanation can be found short of an autopsy.

5. Misled by pseudo-calculus shadows, a wrong diagnosis may lead to a useless and humiliating operation. In this method of examination, therefore, it is essential to have the best radiographs obtainable, and still more important to interprete these radiographs correctly. On the other hand, some of the most skillful surgeons have failed to find the stones at operation when a positive radiograph diagnosis has been made; subsequently the patients have passed stones corresponding in number, shape and size to shadows obtained on the radiographic plates; therefore, if the surgeon fails to find stones at the operation, when the stones are clearly shown on the X-ray plate, it does not necessarily mean that the stones are not there.

6. Neglect of proper intestinal preparation before radiographic examination is indefensible.

7. Under the best conditions radiography is the most reliable method of diagnosis of calculus at our disposal. In selected cases it will be found to be an advantage to check the X-ray findings by cystoscopy and urethral catherisation. To verify

a diagnosis of pseudo-calculus it may be necessary to demonstrate the path of the ureter by catherising the ureters, using a bismuth ureteral catheter, and radiographing with it *in situ*.

8. The symptoms of a calculus of the kidney may be on one side when the calculus is in the kidney on the other side of the patient. (Reno-renal reflex.)
9. "With a limited knowledge of the science, radiographs have been made which did not have sufficient detail to justify a negative or positive diagnosis, and persons without sufficient experience have made negative or positive diagnosis on these plates." (Cole.)
10. Most patients having typical attacks of renal colic do not have calculi, and, on the other hand, only very few of the patients who have calculi have symptoms sufficiently characteristic to justify an operation.
11. The physician who sends his patient to a radiographer to be examined should see to it that the patient's bowels have been properly prepared over a course of at least one, and in some cases, two or three days preceding the examination.
12. The radiographer who examines a patient whose bowels have not been properly prepared previously, who makes a diagnosis of a calculus from plates obtained under such conditions and demands no further examination under proper conditions, is a menace to public safety.
13. A very considerable number of cases which have been diagnosed as sub-acute or chronic appendicitis have ultimately proved to be cases of calculus.
14. Characteristic symptoms of nephrolithiasis have presented in cases which proved to be cholecystitis; renal tuberculosis; renal cancer; hypernephroma; pyelitis; empyema of the renal pelvis; bacilluria; hydronephrosis; cystic kidney; prostatic disease or calculi; seminal vesiculitis; diseases of the urinary bladder; essential hematuria, or that associated with scurvy, purpura, or leukaemia; chronic appendicitis; diseases of the spine, especially osteo-arthritis and Pott's disease in the adult; muscular rheumatism with spasm of the muscles of the back; flatulence.

15. In women, the passing of wax-tipped catheters may give valuable information, but this method is not of as much value in men because of structural differences necessary in the male cystoscope.
16. The absence of pain and danger of infection in making the radiographic examinations, and the information gained as to the positive size and surfaces of stones (whether rough or smooth, therefore, whether movable or not), and the number of calculi present, make the radiographic method the one of preference; to be supplemented by other methods if necessary.
17. The larger the calculus the less typical are the symptoms; the small calculi give the most typical attacks of colic.

The day when the medical profession will be satisfied with a radiograph made by an orderly, a nurse, or any person who is not an expert, is past. The day of the X-ray "photographer" is past. The day of the X-ray "diagnostician" is here. The day when the medical profession will have sufficient experience in reading plates to decide for themselves whether the plate has sufficient detail to justify a diagnosis, I pray will soon come.

Other diseases of the kidneys that can be demonstrated by radiographs are nephroptosis, tumors, hydronephrosis, pyonephrosis, ureteral anomalies. In cases where the kidney can be outlined in the radiographs a diagnosis of the presence or absence of a floating kidney by the use of Lange's technique is possible, but ordinarily simpler methods will establish the diagnosis of floating kidney. Tumor outlines and chronic tuberculosis of the kidneys have been demonstrated in radiographs.

18. The X-rays are not as often used as they should be.
19. Economy in cash by neglecting to have an X-ray examination often means extravagance in human suffering.

98 Chestnut Street.

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TREATMENT OF ACUTE GONORRHEAL EPIDIDYMITIS:

CONSERVATIVE CONTRASTED WITH SURGICAL METHODS,*

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SINCE Bevan (1) states that 20 per cent. of all cases of acute gonorrhea are complicated by acute epididymitis, cases of the latter must come under the observation of the general practitioner fairly frequently.

The usually stormy course of the affection demands relief for the patient in the promptest manner. As a fundamental principle all treatment of the urethra locally should absolutely cease for the time. This includes any form of injection or irrigation.

Surgical Methods. Surgical methods will be considered first. A brief resumé of the work in this direction need not take us back beyond a few years. In this country one of the earliest advocates of surgical relief for the condition was Hagner, who in 1906 and again in 1908 treated the subject quite exhaustively. The operation consists in an incision through the skin of the scrotum and through the tunica vaginalis directly into the inflamed epididymis, the patient being under the influence of a general anesthetic. In the same year Bazet (4) reported 65 cases similarly treated. Cunningham (5) recommends the incision operation. Likewise Gross (6), modifying the recommendations of the others, however, by advising its use only in certain selected cases. Kreissl (7) and certain German surgeons, *i. e.*, Baehrmann (8) and Ernst (9), are strong advocates of surgical interference, but confine the same to puncture of the inflamed epididymis with a small trocar. The chief claim made by the advocates of either method is that the agonizing pain is immediately relieved; the fever disappears; the leucocyte-count is lowered, and, upon recovery from the anesthetic, the patient is euphoric. The further advantage is claimed that the patient is confined to bed for from 4 to 5 days, and the wound

*Read at the regular monthly meeting of the San Francisco County Medical Society, September 13, 1910.

heals in from 8 to 15 days, with a cigarette-drain left in for from 4 to 6 days. The seminiferous tubules are injured so slightly, if at all, that upon complete restitution the testicle is left unimpaired. Pus-foci are not always discoverable, but sometimes appear as miliary points. Occasionally a fairly large suppurative focus will be opened. Ernst claims that the average course following puncture is about 6 days. The puncture is recommended to be performed with a very small trocar or aspirating needle. Gentle aspirations may be added, thus withdrawing more or less bloody fluid. Hagner makes the further claim for the incision method that the induration rapidly disappears and that the urethral discharge decreases. With regard to the latter claim it is worthy of note that the general experience is that during the acme of the epididymis the urethral discharge becomes very scanty or even disappears, to reappear as the inflammation subsides in the testicle.

Local Applications. Until within recent years, by non-operative procedures, the various stock antiphlogistic measures have had the changes rung on them, including the use of sedatives and opiates. The average of general measures seems to have narrowed itself to the confinement of the patient to bed; the use of a suitable support for the inflamed organ; the application of moist heat preferably, or ice in some instances. In the use of medication locally for the relief of pain Guaiacol seems to stand out preeminently. Diluted with alcohol and glycerin, according to the tolerance of each individual, the mixture is painted on the scrotum of the affected side, its application being extended upward toward the abdominal ring if there be pain along the course of the vas deferens. The analgesic action of the Guaiacol is strikingly prompt in some instances. It must not be forgotten, however, that this powerful remedy may exert powerful and even depressant effects upon the patient. Again, its action may be excessively caustic at times, causing complete desquamation of the epidermis, thus increasing the possibility of infection. In some patients the caustic effects of the remedy completely overshadow the pain of the epididymitis, calling for relief from the former. If Guaiacol so applied relieves without untoward results it is almost ideal for counteracting the most striking and distressing symptom — pain.

It is only necessary to refer to ointments containing mercury, belladonna, ichthyol or similar venerable remedies for this affection as affording slight, if any, demonstrable relief. They succeed in placing the patient in a state of smeary, black uncleanness, most distressing to the average individual. That old standby, lead and opium lotion, applied hot, whatever the questionable virtue residing in the external application of the main ingredients, at least gives some relief because of the moist heat.

Magnesium Sulphate. Tucker (10) in 1908 recommended somewhat empirically the use of a saturated solution of magnesium sulphate for the relief of erysipelas, having used the same in the form of hot fomentations on more than 700 patients as a basis on which to found his conclusions. Subsequently he was led to employ the same in various inflammatory conditions, including epididymitis. In the latter condition, experience has led me to adopt its use to the exclusion of all other forms of local application. It should be borne in mind that in certain susceptible individuals its use after a week or so may be followed by an annoying and obstinate erythema. It relieves the pain quite promptly, usually within a few hours after its application, although tenderness and swelling persist for a somewhat longer period. The solution is applied on several thicknesses of gauze and the whole is covered with oil-silk tissue. The compress is kept constantly moistened, the solution being poured along the edges. This dressing is not to be disturbed otherwise oftener than twice in 24 hours. The comparative cleanliness of this form of local application, and the very prompt and positive relief of pain it affords, makes it a most valuable addition to our therapeutic armamentarium in the treatment of epididymitis. It is almost superfluous to refer to the necessity of keeping the patient's channels of elimination functionating freely by an occasional mercurial and the daily administration of a mild saline, in order to insure soft evacuations and a more or less depleted condition of the pelvic venous system.

Urethritis Posterior. Of almost uniform coincidence with epididymitis is a deep urethritis or a urethro-cystitis, involving the entire canal as well as the bladder about the internal orifice. This will be evidenced by frequent and painful micturition and tenesmus. At times, depending upon the intensity of the inflammation,

in the deep urethra, a small amount of blood may appear at the end of urination. Bloody urine may also occur through the reflux of blood into the bladder from an intensely congested deep urethra.

These conditions call for relief urgently. Balsamics are most useful adjuvants. Santal oil, preferably its salicylic acid ester because of its minimum disturbing effect upon the stomach and because it is not followed by renal pain, usually has a decidedly soothing effect. A very simple and effective relief for the tenesmus is the use of a hot sitz-bath once or more in 24 hours. Not infrequently the use of an opiate is called for. Then Codein in 0.06 gm., dose in suppository, best fulfils the indication. The fluid extract of Piper methysticum (Kava Kava) in combination with some alkali and possibly fluidextract of Hyoscyamus form useful adjuvants in the treatment. The well-known antiseptic action of formaldehyde in the form of Hexamethylenetetramin serves to modify more or less the noxious activity of the flora responsible for the urethral condition and is a valuable aid to this extent. It should not be forgotten that some patients develop irritability of the bladder neck from this latter drug.

Vaccines. We now come to the use of vaccines. As a preliminary, I cannot do better than to quote Adami (11). He says: "Thus as a final principle it may be laid down — and I do this with a full sense of the necessity and responsibility that attaches thereto — that vaccine therapy is not to be undertaken by the ordinary practitioner; there are too many dangers attaching thereto; and with this corollary that, excellent as may be the stock vaccines prepared by certain firms, to advertise these light-heartedly and recommend them and their employment far and wide deserves the commendation of this association and all interested in the well-being of their fellow-men."

To this the author may only add his humble testimony that the use of a serum or bacterin, with its powerful possibilities, is not to be lightly undertaken. The effect of the first injection on the patient should be carefully watched and subsequent injections modified as required. The phenomenon of anaphylaxis should be anticipated by inquiry as to the patient's past experience with serums, if any. In certain foudroyant or stubborn cases only the use of an autogenous vaccine is followed by appreciable relief. Rarely some cases are not even affected by these. The majority

seem to respond fairly well to the use of the ordinary stock vaccines or bacterins. Injected into the substance of the larger gluteal muscle, the initial dose may be 50 million devitalized gonococci and subsequently carried as high as 500 millions. These injections may be repeated as often as every third day. The author has yet to observe any untoward general effect following many such injections in all strengths. At most, a trifling tenderness at the site of injection, lasting perhaps 24 hours, follows in some.

In comparison with the old expectant methods the use of bacterins has a distinctly modifying effect upon the course of the epididymitis, both as regards the severity of the symptoms and the course of the disease. It may be stated in general terms that unless a noticeable reaction follows the use of a vaccine no very decided effect upon the course of the disease may be looked for. The experience of the author in the use of vaccines, followed as it is by the most striking change in the clinical picture — cessation of the agonizing pain, fall of temperature, subsidence of the swelling to a marked degree and a general euphoric condition of the patient — has led him to adopt the use of vaccines as one of the first therapeutic measures in the treatment of gonorrheal epididymitis. Similar experience is recorded by Swinburne of New York (12). He says: "I have found the serum of the greatest assistance in epididymitis, both acute and relapsing. In many cases, when given in the earliest stages, I have seen the disease aborted. Of such value have I found the serum in these cases that although in the past two years I have looked for cases on which to perform the Hagner operation for epididymitis, I have not yet met a case when I felt justified in doing it."

Conclusions. In conclusion and by comparison it would seem that the protagonists of the various surgical methods of treating acute gonorrheal epididymitis offer in behalf of the operative methods immediate relief from the severe and often agonizing pain of the disease. While such relief is a great desideratum, the operation involves the use of a general anesthetic, presumably with maintenance in a hospital and an open wound, which, under very favorable conditions, closes in as early as six days.

In view of the aborted cases following the use of serums or vaccines, and the very marked moderation of the symptoms by

the use of the local and internal methods above referred to, the author has still to be convinced that the subjection of a patient to a fairly serious surgical intervention in order to obtain results practically similar to those obtained by non-surgical methods, as regards relief of symptoms and shortening the course of the disease, is warranted or advisable in the face of the results thus far obtained.

Butler Building.

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Contributed by the Author to The American Journal of Urology.

POSITION DRAINAGE IN SUPRAPUBIC PROSTATECTOMY

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A NEW METHOD IN RELATION TO SUPRAPUBIC DRAINAGE

THE unbiased surgeon of to-day realizes that there exist cases in which the suprapubic route is to be preferred to the perineal, and vice versa. It is the writer's opinion that were the question of drainage properly solved, the number

of cases operated upon by the suprapubic route would be decidedly increased. The suggestion for the adoption of the following method came as a result of observing a confrère perform the Gilliam operation, in which the position herein described was utilized.

In three patients recently operated upon for enlarged prostate, I have placed them upon the abdomen immediately after operating, having first secured a large-sized drainage tube by suture in the wound. This tube should have an opening of at least one inch, and the end of it allowed to dip into, but not reach, the fundus of the bladder. In the lower portion of the tube are two good-sized openings made on either side. Upon the completion of the enucleation the tube is introduced into the opening of the bladder, the size of the tube depending upon the size of the bladder wound, never less, however, than one inch. The contraction of the walls of the bladder around the tube is sufficient, in the majority of instances, to prevent leakage.

The tube is secured by suture through the abdominal wall. It is cut even with the surface of the abdomen, and a large absorbing dressing of gauze and cotton is placed over it. The patient is returned to bed and placed upon his abdomen, and if he complains of being uncomfortable, on account of his posture, the nurse is instructed to change the position by allowing him to lie on his side or back for a few moments at a time. It is surprising, however, how little complaint is noted on account of this position, which naturally favors drainage, prevents those complications which poor drainage induces, and lessens the tendency toward the development of post-operative pneumonia incited by stasis in the lungs, a likelihood developing from the usual position.

What effect this procedure may have on kidney complications and post-operative bleeding, I am not at this time prepared to state.

The dressings can be changed as often as it is found necessary. My first idea was to carry a tube through a hole in the mattress into a receptacle underneath the bed, but objections were noted in regard to this, the principal one being that it limited the movements of the patient and made pressure on the tube likely. The drainage tube in these cases can be removed after the time

usually adopted in ordinary suprapubic prostatectomy. My experience is too limited to notice any special objections to the method that I have outlined above, and this preliminary report of detail of technique is made so that it may be tried out and a proper estimate of its value determined.

309 Century Building.

Review of Current Urologic Literature

FOLIA UROLOGICA

November, 1910

1. Urethro-cystitis and Chronic Cystic Urethritis. By Leo Buerger.
2. Myofibroma of the Bladder. By Victor Blum.
3. Gonococcal Toxemia. By T. M. Townsend and J. J. Valentine.

1. Urethro-cystitis and Chronic Cystic Urethritis.—Leo Buerger says that since he has employed his cysto-urethroscope in a routine way in the large number of patients, he has frequently encountered a condition which he wishes to designate as urethro-cystitis or chronic cystic urethritis. Although his observations have not yet been thoroughly worked out, it seems well to call attention to them, so that the lesions in question may become the subject of further study. In the present article, he reports briefly upon some twenty cases, giving in detail the lesions in fourteen of these. After a brief outline of the workings of the cysto-urethroscope,Buerger proceeds to describe and to illustrate a number of cases in which cysts were found in the posterior urethra. There seem to be two types of cystic disease of the neck of the bladder and the posterior urethra. The first of these is due to inflammatory causes, and is gonorrheal in origin; the second is due to retention, and belongs to the involution changes of the senile period. The inflammatory cysts which belong to true chronic cystic urethritis are most frequently found in the supramontane portion, although they are also seen in the other portions of the pars posterior. In two of the patients, the verumontanum was found markedly diseased. The cysts varied considerably in size, from about a millimetre to five millimetres or more in diameter. At times, a confluent form was met with, but usually the cysts were discreet, hemispherical, with a slight tendency to become oval, and when the light was prop-

erly regulated, they appeared as small, pearly-white spheres, over which small blood vessels ramified. When the illumination is insufficient the cystic nature of these bodies does not appear, but they seem to be solid hypertrophies. A number of illustrations are given, showing some remarkable pictures of cystic urethritis. Clinically considered, all the cases have had one or more attacks of gonorrhea. Some of them gave a history of complications. The symptoms varied markedly. There were disturbances of urination in two cases, and in one, severe pain during micturition. One patient had been treated for a number of years by various specialists, and it was found that he had a number of small cysts in the roof of the posterior urethra. The treatment of these cysts consists in incising them or puncturing them under control of the eye, by means of a specially-constructed knife, which can be adapted to the cysto-urethroscope. Incision should be thorough, so as to obliterate the cysts completely. If there are many cysts, the treatment should be divided into two or three sittings, with intervals of about a week or ten days. In the case in which there was marked disturbance of urination, improvement occurred to a distinct degree after the incision of the cyst. In two cases no improvement occurred after incision.

2. Myofibroma of the Bladder.—Blum reports the following case: A young man was taken ill with a profuse hematuria, without any other urinary symptoms. A marked rise of temperature suddenly appeared, and it was supposed that he had a pericystic suppuration. Upon suprapubic incision a tumor, the size of a fist, was discovered on the posterior wall of the bladder. The tumor was edematous, and had a twisted pedicle. It was removed in the course of two operations at different times, and on examination was found to be a myofibroma. The patient made a good recovery. The submucous type of myoma is the most common type of this tumor in the bladder. The symptoms accompanying these tumors are characteristically as follows: When no infection has taken place, there is profuse bleeding, a palpable tumor, symptoms of pressure upon the rectum and, at times, urinary retention. After infection, the symptoms are those of very severe cystitis, with gangrene and ulcerations as well as the presence of a palpable tumor. When the pedicle of the tumor becomes twisted, as in the present case, the symptoms are those of a rapidly-developing pericystitis. In the case of small tumors, the cystoscope will aid in diagnosis. Sometimes there will be particles of the tumor voided in the urine. In other cases, the diagnosis can be made only by incision.

3. Gonococcal Toxemia.—Townsend and Valentine complain of the confusion which exists at present in the designation of general gonococcus infection,— inasmuch as no distinction is usually made between gonococcal toxemia, septicemia and pyemia. Gonococcal toxemia was known, clinically, before its etiology was recognized. The demonstration of the gonotoxin furnished an explanation for its development. Gonococcal toxemia is accompanied by general malaise, headache, pain in the back, loss of appetite, rises of temperature, and leucocytosis, occurring at the start of an uncomplicated gonorrheal urethritis. The authors report a case of gonococcal toxemia in a man 44 years of age. This was the first attack of gonococcus infection in this patient. Rises of temperature occurred on the twelfth day and continued until the thirty-eighth day. The range of the fever was from 100 to 103.8° F. The only successful treatment consisted in high enemas of a 6 per cent. solution of magnesium sulphate, at a temperature of 70° F. After the ninth irrigation, the temperature sank to normal. One pint of the magnesium sulphate solution was allowed to flow into the rectum, and repeated every six hours. The condition improved notably after the first enema. Four days later office treatment was begun for the urethritis. The above-mentioned treatment has a threefold effect: Firstly, it reduces fever temporarily by the absorption of a quantity of fluid whose temperature is considerably below that of the body. Secondly, the enemas produce copious evacuations, and thus elimination of toxins through the intestine, and thirdly, they produce a derivation of the local inflammatory effects.

ZEITSCHRIFT FÜR UROLOGIE

Vol. IV, No. 11 (1910)

1. Two Rare Malformations of the Male Genitals. By Fritz Neumann.
2. Congenital Strictures of the Male Urethra. By Carl R. Wilckens.
3. Sarcomas of the Bladder. By Chassia Munwes.
4. Cystic Dilatation of an Accessory Ureter. By S. P. Von Fedoroff.

2. Congenital Strictures of the Male Urethra.—Wilckens contributes a complete study of congenital strictures. The best classification of these strictures, in his opinion, is that of Englisch. This author divides obstructions of this sort into those which are present during fetal life and disappear later, and those which remain per-

manently. Among the first group are included adhesions of the epithelial lining of the urinary canal, adhesions of the same character, at the mouth of the ureter, the formation of valves and twists in the ureter which are obliterated later in life, adhesions obliterating the inner orifice of the urethra as well as the outer, atresia of the prepuce, etc. In the second group, the permanent lesions, Englisch includes valves and stenoses. Valves may occur in various parts of the urinary tract, especially at the entrance of the ureter into the renal pelvis, less frequently, at the neck of the bladder or in the bladder itself, in the prostatic urethra, in the anterior urethra, at the meatus, or at the orifice of the prepuce. Stenoses may be found at all the orifices and at any part of the urethra, particularly at the boundary of the membranous urethra and the bulb, at the posterior end of the navicular fessa, and at the meatus.

Congenital strictures of the urethra were not regarded as of great importance until Bazy, in 1903, called attention to their frequency. The most interesting type of congenital strictures are those characterized by valve-like malformations of the posterior urethra. An instructive case of this kind, is reported by the present author. In a boy of two years, who died of diphtheria, the urethra at autopsy seemed normal in its glandular and cavernous sections. At the boundary-line between the membranous and prostatic urethra, however, there were found two longitudinal folds of mucous membrane, which constituted two lateral valves, enclosing pockets, the concavity of which was turned towards the bladder. A very small space was left between these valves for the passage of urine. The kidneys showed the presence of an advanced degree of chronic nephritis and hydronephrosis, particularly on the left side. Other cases of a similar type, were reported by Tolmatscheff (3 cases), Budd, Velpeau, Schlagenhaufer, Commandeur, Bonnet and Reboul, etc. One feature is common to all the reports, save that of Velpeau, namely, the presence of a valve-like formation at the lower end of the posterior urethra, and distinct lesions in the urinary organs situated above the valves. The genesis of these valve-like stenoses is to be looked for in an exaggerated development of folds which exist normally. Usually the stenosis is accompanied by dilatation of the urethra, the bladder, or the renal pelvis above the valve. Naturally, the degree of damage to the upper tract depends upon the extent of the obstruction.

Congenital stenoses of the urethra very quickly terminate fatally. Death may occur *in utero*,— as the result of circulatory disturbances which are dependent upon the pressure of the distended bladder upon

the umbilical arteries. In other cases, death occurs at a very early age. The symptoms of this congenital anomaly are often very obscure. In some cases, however, there is a suspiciously-thin stream of urine or prolonged dribbling. Incontinence of urine, during the day or at night, may also be present. In addition to difficulty and pain on urination, there may be also hematuria. None of these symptoms, however, were present in the case reported. The only thing that called attention to the urinary apparatus, in this case, was the albuminuria.

3. Sarcomas of the Bladder.—Munwes contributes a very comprehensive study of sarcomas of the bladder, with statistics, showing the frequency of the various forms, etc. While modern methods of diagnosis are certainly of value in the detection of bladder tumors, yet even the cystoscope cannot be relied upon to detect sarcoma, inasmuch as this tumor very frequently resembles epithelial growths. Exploratory incision, therefore, can alone be relied upon. As regards the results of treatment, there were 76 cases operated upon out of the 107 cases collected and studied. In 44 cases, a suprapubic operation was performed, in 11 cases a perineal incision was used, in 3 laparotomies were performed (owing to the size of the tumors). In one case, the tumor was approached through the sacral route and in another through the vaginal. In 6 cases, the character of the incision was not stated, and in 9, the tumor was removed in women, through the dilated urethra.

Endovesical operations cannot be expected to produce permanent results in these cases, as the sarcoma frequently involves the entire thickness of the bladder wall. Total extirpation of the bladder has been performed in a number of cases. Thus Goldenberg collected 26 cases, with a mortality of 61.5 per cent. Rafin collected 30 cases, with a mortality of 56.6 per cent., but only two patients were recorded as permanently cured.

In the present study of 69 cases of bladder sarcomas operated upon in various ways, there was permanent cure in 3 cases, apparent cure for a short period of observation in 13 cases, cures followed by recurrences, in 15 cases; death several weeks or months after the operation, in 11 cases, death a few days after operation; in 21 cases, and death without any data as to the time when it occurred, in 6 cases. In the cases in which death occurred within the first few days after operation, death was caused in five instances, by shock, reflex anuria, embolism, hemorrhage, sudden collapse, and pneumonia, respectively. In the remaining 9 cases, the cause of

death was not stated definitely. In 8 cases, in which simple resection of the bladder wall was performed, the mortality was 12½ per cent. A much higher mortality was noted in those cases in which, in addition to the bladder wall, there had been a resection of the ureters. Four out of five patients, thus operated upon, died.

Thus far, it appears that operative results have been very unfavorable in sarcomas of the bladder. Rafin found that most of the patients, even among those who survived the operation, died within a year after the tumor had been removed. The question arises whether it is advisable to remove these tumors. This must be answered in the affirmative, when we consider how rapidly these patients perish without operative aid. The patient has nothing to lose, but, in many cases, his life may be prolonged. The operation should be performed early, and should be as radical as possible. In conclusion, the author reports a case of bladder sarcoma, in a woman aged 77.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Vol. II, No. 21, November, 1910

1. Extrophy of the Bladder. By Dr. Stefanesco-Galazzi.
2. Note upon a Case of Gonococcal Septicemia, Treated with Injections of Antimeningococcus Serum. By Dr. Strominger.
3. The Radical Treatment of Urethral Strictures by the Excision of the Narrowed Portion. By Dr. Choltzov.

1. A Case of Extrophy of the Bladder.—Stefanesco-Galazzi reports the case of a boy ten years of age, with a very striking extrophy of the bladder, and a complete division of the external genitals, including absence of the anal sphincter. The interesting feature of this case was the association of genital malformations. The boy's hair was cut short and his features were not delicate, but he wore skirts, and since early childhood, had constantly voided his urine involuntarily. At the time of his birth, the midwife declared the child to be a girl, but as he grew older his sex became more and more apparent, so that he was prompted to be a boy, the father compromising by cutting his hair, and allowing him to wear skirts. Examination showed that he was indeed of the male sex, but the vesical extrophy and the complete division of the genitals in the median line, were so marked that it was not to be wondered at that his sex had remained doubtful in the eyes of his parents. In the entire litera-

ture, the author was unable to find another case in which such profound malformations in the genitals existed, in connection with vesical extrophy. He considers the case as an illustration of the theory of the origin of extrophy of the bladder. This malformation is produced by an arrest of development in the course of which, the anal membrane, which closes anteriorly, in the normal subject, is absent. This closure completes the continuity of the urethra and the external genitals. The farther back we go into fetal life, the more open we find these organs, and the lower their opening towards the perineum. In the present case, the anal orifice was so close to the bladder that we might say that the primitive cloaca, which opens in the fetus by two closely superimposed openings, practically had remained unchanged. Between the two canals there was but a centimetre, and the only median organ was a small tubercle, which might be regarded as a dependence of the old cloacal stopper.

As regards the treatment of these cases, a number of procedures have been devised, none of which is absolutely successful. The difficulty lies in the absence of the vesical sphincter, so that the patient remains unable to hold his urine after the operation as he was before, although the operation does remove the exposed red, bleeding and sensitive surface of the bladder. In the present case, it might be possible to perform a plastic operation, but besides the vesical incontinence which would remain, there would also be rectal incontinence, and it would then be difficult to protect the patient from infection. It might be better to try to divert the flow of urine into the rectum, but, in this case, there would be no advantage in performing Maydl's operation, for example, as the patient could not keep the urine in his rectum, owing to his anal incontinence. It might be possible to perform an extensive operation which would first render the intestine continent, and then implant the bladder therein, but this would be extremely difficult and would afterwards be a source of danger from infection of the urinary tract. It is best, therefore, to leave the child alone with his infirmity, rather than to perform a brilliant operation, which would kill him in a short time.

2. Antimeningococcus Serum in Gonococcal Septicemia.—Strominger reports the case of a man, aged 49, who had been infected with gonorrhea on Dec. 10th, 1909. A few days later he had an attack of retention, for which a catheter had to be passed. A few days afterwards he felt chills, fever, accompanied by sweat and general malaise. The temperature rose every evening, in spite of antipyretics. He was seen by the author two months later, in a state

of extreme emaciation, with slight jaundice, dry tongue, complaining of fever, attacks of perspiration and acute pain in the right shoulder. Examination of the various organs was negative, but the urethral secretions contained numerous gonococci. Blood cultures were negative. Believing that the patient was suffering from general gonococcus toxemia, the author injected antimeningococcus serum prepared by Wassermann, of Berlin. The doses he used were 10 c. c., given every other day, in four injections. The temperature gradually fell, and did not rise again. Local treatment was resumed, and the patient was completely cured.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Vol. II, No. 22, November, 1910

1. Smooth Muscular Tumors of the Bladder. By M. Heintz-Boyer and Doré. (To be continued.)
2. A New Urethro-Vesical Irrigating Catheter for Women. By Lucien Wormser.

2. Urethro-Vesical Irrigating Catheter for Women.—Lucien Wormser employs irrigations of the urethra and bladder with large quantities of antiseptic solutions in urethritis in women. He remarks in introducing the subject that urethritis may be frequently discovered in women if one takes the trouble to examine attentively all patients who complain of pain in the abdomen. The author prefers irrigations to the use of internal medication because the latter method is slow, uncertain and often inefficient. The solutions employed are of potassium permanganate in cases of gonorrheal urethritis, or solutions of mercury bichloride or oxycyanide in cases of urethritis due to the common bacteria. The strength of the solution should be gradually increased and if the lavage be properly applied the results will always be very satisfactory.

The ordinary irrigating instruments are first used in the urethra where they cleanse this canal, and are then gently introduced into the bladder. The bladder is slowly filled until the patient feels the desire to void it, and then the patient is allowed to expel the fluid through the urethra. In Wormser's opinion this method of irrigation of the urethra is insufficient, because it is too superficial. Consequently, he has had the idea of devising a new irrigating tube which would provide for the continuous irrigation of the urethra, and at

the same time for the entrance of the solution into the bladder. Accordingly, he has had constructed by Gentile a metallic, urethro-vesical irrigator, which fulfils these two requirements.

The irrigating tubes connected with the rubber tube of an irrigating tank, the pressure being regulated in the usual manner. The instrument consists of a straight tube, ending in an olive, the shoulder of which is provided with two lateral openings, intended for vesical lavage. Three centimeters behind the olive there are six orifices arranged spirally over a distance of three centimeters, which corresponds to the length of the female urethra. Over the tube of the irrigator a sliding cuff is provided whereby the orifices may singly or totally be closed at will.

The method of employing this irrigator is as follows: After the external genitals and the vagina have been thoroughly washed, and after the urethral orifice has also been cleansed, the connection is made with the irrigator, the sliding cuff remaining over the orifices (Fig. 1), in order to protect the operator from the jets of fluid which would otherwise issue from these openings. As the olive is introduced into the urethra the sliding cuff is pushed back in virtue of the perforated disk which has been provided at its end (Fig. 2). The sound is pushed forward along the urethra until the six orifices are exposed, as in Figure 3. In this position the bladder is washed through the two openings in the olive, while the six openings in the tube remain opposite the urethra and wash the latter with a rotatory spiral stream (Fig. 3). The sound is removed after the lavage, by slowly withdrawing it and at the same time pushing the cuff forward to occlude the openings. The patient can then void the fluid remaining in the bladder.

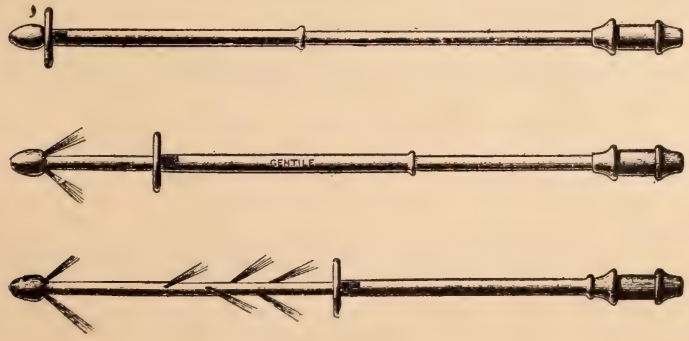

Fig. 1, 2, 3.

ANNALES DES MALADIES VÉNÉRIENNES

Vol. V, No. 11, November, 1910

1. Arsenobenzol (Salvarsan) in the Treatment of Syphilis. By Dr. Bayet.
2. Treatment of Syphilis with Salvarsan. By A. Jambon.

1. Arsenobenzol (Salvarsan).—Bayet, of Brussels, has employed Ehrlich's remedy in 100 cases, and summarizes the present status of the question of the treatment of syphilis by means of the new compound. He employed Wechselmann's technique, using a very slightly alkaline or neutral suspension. An important point is to have the volume injected as small as possible, if practicable not greater than 5 c. c. In order to get a solution as concentrated as this, he advises the use of a ten per cent. solution of sodium hydrate. He prefers to inject subcutaneously in the interscapular region, and finds that there is less suffering after the injection when this method is pursued than with the ordinary injections in the buttocks. Iodide is used to paint the skin before the injection, and collodion is employed to seal the puncture. In most cases there is very little pain until the night after the injection, when a dull ache appears and lasts for a few days. Usually the infiltration is absorbed without unpleasant effects, but sometimes the center of the swelling softens, and in eight cases out of a hundred a focus of necrosis developed. Curiously enough, these foci of necrosis appeared only in persons with tertiary or para-syphilitic lesions.

Usually no temperature elevation was noted, but in seven per cent. of cases there was some fever, while in some cases in which fever had been present before the injection the temperature fell after the dose had been administered. In three cases an interesting complication was noted in the shape of swellings of the joints with rather marked pains and all the appearances of rheumatism, occurring about the fifteenth day after the injection. These symptoms were accompanied by slight fever and disappeared within a few days. In two cases there were also generalized erythematous eruptions which resembled antitoxin rashes. The urine did not show any changes in any of the cases, nor was there any disturbance of urination. Vision and hearing were not affected, and in no case was there anything which would lead to the suspicion of arsenic poisoning. The effects of the injections were so mild that in some cases the injections were given in the office or dispensary without asking the patient to go

to bed. A very general effect was improvement in the general condition and increase in weight.

On the basis of the 100 cases injected, Bayet formulates the following conclusions as to the effects of arsenobenzol:

(a) It is undeniable that the new remedy constitutes a most powerful antisyphilitic agent. It acts with remarkable efficiency both in the secondary and the tertiary stages.

(b) The action of arsenobenzol when compared with that of mercury and the iodides is more direct, more immediate, and more constant than that of the old remedy.

(c) In certain cases arsenobenzol acts with promptness when mercury and the iodides prove inefficient. This alone would entitle the new remedy to an important place in therapeutics.

(d) Arsenobenzol does not seem to have any action upon parasyphilitic lesions.

(e) In some isolated cases of secondary and of tertiary lesions the new remedy does not show any well-marked efficiency.

(f) Relapses occur in a rather considerable number of cases.

The question of relapses is one of the most important in this connection. Naturally we are not prepared as yet to report definitely upon the frequency of these relapses. In one case of mutilating syphilis of the face in which excellent and rapid results were obtained, there was a relapse a month after the healing had taken place and a new ulceration rapidly spread. A second injection was given and the ulcer healed in a few days. Probably the first dose of 30 centigrams had been too small. In another case of secondary syphilis of the larynx the hoarseness rapidly disappeared, but there was a relapse four weeks later. It is impossible to say definitely as yet whether or not arsenobenzol permanently cures. Unfortunately the announcement was made that a single injection is intended to cure, and both physicians and the public believed this. The trouble is that we have no way at present of knowing when syphilis is cured, although the change from a positive to a negative serum reaction is a favorable sign. A suspicious circumstance, however, is the extreme resistance of the serum reaction in many cases treated with "606." A persisting positive reaction certainly may be taken as a sign of failure to cure. Another important point is the fact that in many cases in which the chancre has been cured there was a persistence of the glandular swellings. One cannot declare a case of syphilis cured in the presence of persistent glandular enlargement.

2. Treatment of Syphilis with Salvarsan (606).—Jambon, of Lyons, reports his experience with "606" in ten cases. He is convinced that the new remedy is both efficient and free from danger. It is also easily administered. He prefers the neutral suspension, because it is not painful and easily prepared. He employs in preference the procedure of Wechselmann-lange, rather than the method involving the use of an oily base as recommended by Levy-Bing. The danger in using "606" should not be exaggerated, for it is not greater than that inovlved in using morphine and other strong drugs in daily use. A careful examination of the patient is necessary before the remedy is administered, and the dose should be proportionate to the weight of the patient. It is best to give 60 or 70 centigrams as an initial dose, if possible, and three weeks later in many cases it is well to give a second injection when the urine no longer contains arsenic. The second injection is necessary to prevent relapses.

3. Treatment of Syphilis with Salvarsan (606)—Burnier reviews the experiences of the past six months with "606." While the impression generally created by the communications which have been published during this period is that Ehrlich has discovered a remedy against syphilis which is distinctly superior to any which have been recommended, yet we are even at this early date aware of the fact that the single injection of "606" does not cure syphilis. Arsenobenzol presents certain advantages over mercury. It acts in cases in which mercury has failed and a single injection produces results which can be obtained with eight or ten injections of insoluble salts of mercury during a period of from five to six weeks. The patient should remain in the hospital from four to sixteen days. As yet the technique of administration is by no means perfect, although much progress has been made in this direction. The most striking effects of the remedy were noted in the tertiary cases. A number of cases of cerebral syphilis and of paralysis have been improved, while some of the symptoms of tabes have been relieved by the new treatment. Good results were also obtained by some authors in ocular syphilis, and a few cases of hereditary infection have shown remarkable results. Relapses have already been noted in numerous cases, and some writers go so far as to say that a single dose is never sufficient. Fraenkel and Grouven employ an initial dose of 40 centigrams, a second dose of 70 centigrams after two weeks, and a third dose of 80 to 100 centigrams, or even to 120 centigrams after two weeks more.

ANNALES DES MALADIES VÉNÉRIENNES

Vol. V, No. 12, December, 1910

1. Noguchi's Method of Serum Diagnosis in Syphilis. By Daisy Orleman Robinson.
2. Circumscribed Sclerosing Dermatitis of the Mucous Layer of the Prepuce in Connection with Late Syphilis. By G. Berrotti.
3. A Case of Multiple Gonorrheal Ulcers. By G. Mestschersky.
4. Cutaneous or Mucous Syphilitic Lesions in the Course of General Paralysis. By M. H. Cesbron.

1. Noguchi's Test in Syphilis.—Robinson says that syphilis may be diagnosticated in the laboratory without any clinical observation of the patient. The original technique of Wassermann is very complicated and one of the practical modifications thereof, which is at the same time very accurate and trustworthy, is that of Noguchi. The author has employed this method in 416 cases of various skin diseases in patients of the Northwestern Dispensary and the New York Polyclinic. Of these cases 180 were clinically diagnosed as syphilis. The results in the syphilitic cases corresponded to those found by other observers. The reaction was positive in 100 per cent. of hereditary syphilis; in 93.7 per cent. of secondary syphilis; in 86.2 per cent. of primary syphilis; in 79.9 per cent. of tertiary syphilis; and in 69.6 per cent. of latent syphilis. In 236 cases of various non-syphilitic skin diesases the reaction was invariably negative.

3. Multiple Gonorrheal Ulcers.—Mestchersky reports a case of multiple serpiginous ulcers due to gonorrheal infection. The ulcers occurred upon the external genitals and were chronic in character, and on examining the secretions there were found staphylococci and gonococci, although the latter could not be cultivated. The treatment consisted of external applications of a ten per cent. protargol solution and the cauterization of subcutaneous fistulous tracts with silver nitrate. Internally a sandal-wood oil preparation was given. Under this treatment the ulcers gradually healed. An interesting fact was that the gonococci appeared in the secretions of the ulcerations only after the application of a strong solution of protargal. The infection was evidently in the lymphatic system of the tissue of the scrotum, for the ulcers were accompanied by chronic lymphangitis and by involvment of the neighboring lymphatic glands.

Coli-uria. H. M. McCrea (*The Practitioner,* September, 1910, p. 246) says that until recently this condition has been of more interest to the pathologist than to the clinician; but it is now recognized as a clinical entity, owing to the fact that a definite line of symptoms is now known to accompany it. The first description of infection of the urinary tract by the *Bacillus coli communis* appeared in 1894. It was then described as a "coli-cystitis." The term "*coli-uria*" is more fitting as a general designation for infections of any part of the urinary tract with this class of germs. The disease is most common in young children, and occurs most frequently in the female sex. Pregnancy seems to predispose towards this infection. The infection takes place (a) from without, i. e., as an ascending infection (in infants this is explained easily by the fact that the napkins are infected with the *bacillus coli*); (b) infection by contiguity, from neighboring organs, namely, from the bowels into the bladder or kidneys; (c) infection by the blood stream. Clinically, the cases are divided into those of a simple bacilluria, those accompanied by cystitis, those characterized by pyelitis, and, lastly, those with pyelonephritis. Several typical cases are reported by the author.

The treatment of coli-uria is divided into drug treatment and vaccine therapy. The drug treatment aims to render the urine alkaline, to encourage the work of the kidneys, and to secure antisepsis. Copious amounts of fluids should be given and the citrate or acetate of potassium should be administered in moderate doses. Urotropin may be also used, although opinions differ as to its value. The author gives one grain of urotropin to a child one year old. Vaccines have been most successful in the treatment of this affection. They must be autogenous, i. e., prepared from the particular organism causing the infection. Three million is a suitable initial dose for a child one year old, and twenty-five million for an adult. The dose should be repeated in two days' time, and then the interval gradually extended, according to the progress of the case.

THE AMERICAN
JOURNAL OF UROLOGY
WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII FEBRUARY, 1911 NO. 2

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

THE NORMAL AND PATHOLOGICAL POSTERIOR URETHRA AND NECK OF THE BLADDER*

A STUDY WITH THE CYSTO-URETHROSCOPE

By LEO BUERGER, M.A., M.D.

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THE *Supramontane Region:* Although it is difficult to set an exact peripheral limit to the supramontane portion, it is expedient to describe the antomical features of this region separately, because it differs so strikingly from the montane portion, both in the pathological lesions and in the distinguishing topographical landmarks.

The floor presents a picture quite distinct from that of the lateral wall and roof. Its markings seem to be prolongations of those of the trigone. Usually the floor takes a decline downward from the sphincter margin towards the periphery, terminating in a small depression, which we call the *fossula prostatica.* The mucous membrane of this region is of a deeper red than that of the roof and sides of the sphincteric margin. The reason for this is evident when we remember that at the margin the transition into the bladder occurs. At the sides and roof the bladder is pale, and at these situations the sphincter margin shows rather a transition from pale vesical to red urethral mucous membrane. At the floor of course this change is absent, the trigonal mucous membrane being of deeper red. As for the markings, we usually find longitudinal vessels which show a tendency to converge towards the periphery, taking their source from the sphincteric margin and

*Continued from January.

passing towards the fossula prostatica. Although in most cases we find a perfectly smooth, thin mucous membrane which seems to be tightly adherent to the musculature and connective tissue of the sphincter, certain cases present redundancy of mucous membrane, so that slight longitudinal folding takes place (Fig. 12). It is in the cases where this plication occurs that we are also more apt to find a deeper excavation of this region, so that instead of a gradual transition from trigone into flor of pars supramontana, we see a change into a deep valley, at the bottom of which there are longitudinal folds. Although we must admit that the placing of lateral limitations to the floor of the supramontane region is rather arbitrary, it is not difficult in some cases to recognize the side walls, for they may be strikingly prominent. In other cases, however, the change into the side walls is not abrupt, but takes place in the form of a gradual curve.

The side walls and roof present nothing worthy of note. The roof sometimes shows longitudinal vascular striations which are somewhat paler than those of the floor, but at other times these are not apparent and there seems to be a network of irregular larger vascular channels which lie in slight elevations of mucous membrane.

In practice it is also expedient to keep in mind the fact that the supramontane region contains a distal and a proximal portion. The proximal part, or beginning of the posterior urethra, corresponds to the true internal sphincter. Under the mucous membrane lies the strong muscle which closes the bladder. It is not surprising, therefore, that the mucous membrane here should show some variation from the peripheral part, or that which is included in the prostate. The mucous membrane or sphincteric portion is apt to show a deeper red, whereas the peripheral or prostatic part becomes paler and smoother. Distally the floor of the pars supramontana contains the fossula prostatica, in which lie the posterior frenula. The latter are tiny ridges which pass backward from the foot of the declive, diverging as they are traced backward towards the sphincter. These ridges vary both in number, in size and inclination. Sometimes there are only two; at other times as many as five can be made out. In the normal urethra they have a sharp summit, whereas in pathological condition their tops become rounded. From their general appearance one gains the im-

pression that a cross section of these bands would often be triangular in shape.

In the examination of this region it is important to obtain adequate illumination. When the fossula prostatica is very deep the amount of light diminishes. We overcome this by the expedient of raising the ocular of the instrument and pressing the fenestra against the floor of the urethra. If we use only a moderate amount of light, relative brightness of successive fields gives us an indication of the distance of the mucous membrane from the fenestra. Thus * as soon as we meet with a fossa or a sharp decline in the level of mucous membrane, a diminution in the intensity of the light occurs. This is well illustrated when we pull the instrument out from the sphincteric margin towards the fossula prostatica. The downward † obliquity of the floor of the pars supramontana then becomes evident, although it is not marked in all cases. When a great deal of light is employed these fine nuances are not in evidence.

Fig. 6 shows the typical floor of the sphincteric margin with the beginning of the pars supramontana. There is a dark area above which corresponds to the non-illuminated bladder. The sphincteric margin shows a slight prominence in the center, which has been termed by anatomists, " uvula vesicae." The longitudinal and slightly converging vascular striations are well shown. Whereas this figure shows the type of floor of pars supramontana in which there is no abrupt transition into the side walls, Fig. 12 shows quite a different picture. Here we would gain the impression that there is a hypertrophy of the side walls, such as occur in prostatic enlargement. The figure shows the two prominent and bulging lateral walls and a central valley, the floor of the supramontane portion, with a number of longitudinal folds. In my own experience, this type is infrequent, although a very slight protrusion inward on the part of the side walls is seen in a fairly large number of cases.

It is at the level of the fossula prostatica that we begin to meet with the larger, plainly visible prostatic ducts. Although these are not always apparent, we are apt to encounter them if we examine closely the depressions between the posterior frenula at the

*If too much light is used, these facts cannot be appreciated.

†When the patient is in dorsal decubitus.

foot of the declive. The posterior frenula are well shown in Fig. 13, where they are so prominent that they obliterate the fossula to a certain extent. At the foot of the declive, and even posterior to this, we find slit-like openings, veritable foveae, which at times are hidden by the adjoining ridges. They can be best demonstrated by allowing the irrigating fluid to suddenly distend the urethra. By means of a fine filiform bougie we can probe these ducts. However, they are usually so small (except at their orifice) that the bougie will but enter a millimeter or two. In the normal urethra the fossula has a pale yellow red color. The longitudinal or converging striations of the floor of the pars supramontana do not occur, but instead, we see very fine vessels. At times this region is completely bald and it is difficult to make out any vestige of ridge-like structure. If we rotate the instrument at this particular level so as to take in the roof, we will find a striking difference between the distal part of the roof of the pars supramontana and the vesical portion. Whereas the latter partakes of the same red color that is so characteristic of the floor of the vesical sphincter, the distal portion becomes suddenly smoother and paler and a tendency to transverse folding makes itself apparent. Here there are no distinct vascular markings and there may simply be a fine network of vascular channels.

The Montane Region: Let us now turn our attention to the montane region, which is perhaps the most interesting part of the posterior urethra. We have already referred to the sub-division into a floor with its colliculus and the sulci laterales, two lateral walls and a roof. The colliculus has a summit, a posterior portion or declive, and an anterior portion or acclive. It is in this region that we meet with the greatest diversity in the configuration of the parts, although lesions are no more frequent here than they are in the supramontane portion. After having examined a large number of cases, we are soon struck by the fact that the relative size of the colliculus varies greatly. Not only this, the general shape of the region is subject to variation, insofar as it may sometimes show a deep concavity, and at others seems to be filled by the verumontanum and side walls. This fact is in part to be explained by the great vascularity of the colliculus and its tendency to become turgid upon very slight irritation. This, however, is not always the cause, and there are undoubtedly cases which present

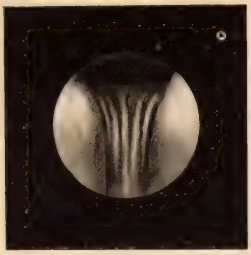

Fig. 12

Fig. 13

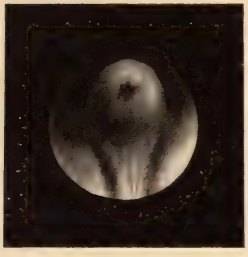

Fig. 14

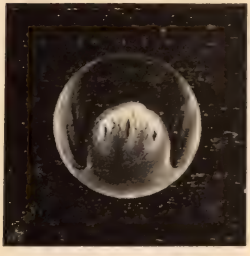

Fig. 15

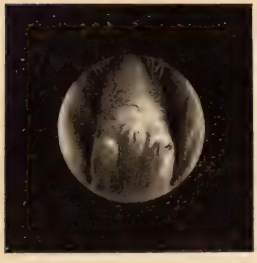

Fig. 16

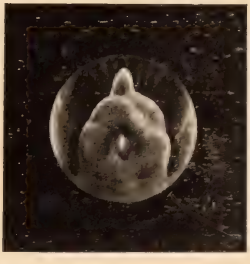

Fig. 17

Fig. 12. Floor of the proximal portion of the supramontane region when this forms a valley surmounted by prominent side walls.

Fig. 13. Normal colliculus with prominent posterior frenula.

Fig. 14. Normal colliculus viewed from in front (distally), presenting summit and acclive.

Fig. 15. Normal colliculus with utricle and ejaculatory ducts.

Fig. 16. Normal colliculus with declive (above), and striking orbicular orifices.

Fig. 17. Pyramidal shaped colliculus with umbilicated utricle.

N. B.—Figure 10 illustrating the empty bladder in the January issue is incorrectly placed. It should be viewed with the West point looking South (towards the observer).

Fig. 18

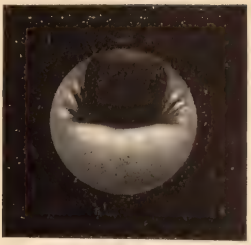

Fig. 19

Fig. 20

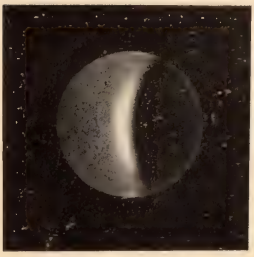

Fig. 21

Fig. 22

Fig. 18. Atypical colliculus with peculiar utricle.

Fig. 19. Junction of pendulous and bulbous urethra. The dark area is the non-illuminated bulb; the bright white portion below is the beginning of the floor of the pendulous urethra. If more illumination be employed the bulb would be clearly visible.

Fig. 20. Juxta-sphincteric portion of the trigone where the mucous membrane shows the continuation of the trigonal markings. Owing to the declination posteriorly, the upper part of the field becomes dark. Figure shows a very vascular mucous membrane.

Fig. 21. Normal sphincter; right margin.

Fig. 22. Left margin and part of the roof of the sphincter with reduplicated marginal fold.

quite an excavation in this region, and others in which considerable dilatation is necessary to unfold the parts.

Turning our attention to the colliculus itself, we must point out that there is no fixed type, since the normal may assume a number of the different forms that will be now described. In interpreting the pictures obtained with the author's cysto-urethroscope, it must be remembered that only a limited portion of the urethra is brought into view at once. The size of the field will, of course, depend upon the distance of the mucous membrane from the fenestra. Thus it is only in cases of small colliculus, or when the posterior urethra permits of considerable dilatation, especially in those instances where we meet with a considerable excavation, that the whole of the long diameter of the verumontanum is brought into view in one field. When viewing the fossula prostatica we are apt to see only the declive possibly with the summit, and the summit of the colliculus with the acclive can also be made to occupy one field. Fig. 14 shows a very common type of colliculus seen from above and in front (distally). The typical rounded summit is well illustrated, and one of the forms of utricle orifice is also shown. Not very far below the top there is a depression, the utricle opening or the orifice of the uterus masculinus. This leads backward for a distance of a few millimeters to a centimeter or more. The ejaculatory ducts are not to be seen. The slope of the acclive is rather sudden. Commencing by a fine tapering extremity in the membranous urethra, the urethral crest broadens in a triangular fashion as it ascends, becoming the acclive of the colliculus. Another not unusual form of colliculus is shown in Fig. 15, where the ejaculatory ducts are prominent and lie to either side of the centrally placed utricle. Here all three openings are vertical * slits, lying in mucosa that seems to pout at their immediate site. Frequently fine tortuous vessels can be seen to cross over the declive and summit passing between the orifices, as depicted in the figure. A similar disposition of the ejaculatory ducts and utricle is represented in Fig. 16, where, however, the prominent orbicular arrangement of the mucosa around the ducts is even more striking. Being seen from a point farther back, more of the declive comes into the field, and at the top of the picture several of the frenula make their

*Vertical in the picture, but in fact running more or less obliquely and sagittally.

appearance. Coursing over the surface of the declive we can see a bifurcating tortuous vessel. Whereas the smooth surfaces shown in the previous figures are indications of normal structures, we may at times meet with colliculi whose summit and acclive show a somewhat bosselated appearance. It is true that bulbous changes and knob-like hypertrophies are as a rule indications of pathological processes. This shall be referred to later. In Figs. 17 and 18, however, two varieties of colliculus are shown in which the rounded contour of the previous type is missing. Although there was no reason to assume here that this peculiar variation was due to previous inflammatory process, Fig. 17 shows a pyramidal type of colliculus that is anomalous, but not pathological. In the upper part of the field there are indications of the posterior frenula lying in the darker fossula prostatica. The utricle, too, presents a rather large umbilicated form. This type of orifice is not at all common, particularly in those instances where it is difficult to find the ejaculatory ducts. It would seem that here the ejaculatory ducts and utricle open into a common receptacle. If we examine the utricle orifice closely we find in these varieties a marked overhang above and a distinct ring-like depression which is somewhat oval with the long axis vertical. At its center there is a small bulbous protrusion as in a navel. Another colliculus with irregular contour and with an odd form of utricle opening is depicted in Fig. 18. Here the umbilication is still more pronounced, there being two bulbous bodies instead of one. The ejaculatory ducts open into a common fossa.

In the contracted and empty state the color of the colliculus is a pale yellow red. A change in color takes place when upon artificial irritation or psychical excitation this body becomes congested. Under these circumstances, a deepening of the color at once takes place. With this there is a corresponding increase in size.

Under ordinary circumstances, the declive and summit, or the acclive and summit can be brought into the field at the same time. It is only in cases of very small colliculus, in prostatic hypertrophy, and in the excavated type of prostatic urethra that a large portion comprising the whole of the colliculus and possibly a portion of the fossula prostatica can be seen at the same time. By means of dilatation with fluid we can also bring into view a por-

tion of the sulci laterales, although for a perfect examination it is best to turn the instrument to one or the other side in order to expose the finer details of the region. It may happen that during the examination the colliculus will suddenly become enlarged, making it necessary to inject fluid under greater pressure in order to obtain a proper view. As for special markings, it is only the orifices above described that can be usually seen. In some instances, however, very minute prostatic ducts can be found emptying in the region of the acclive. Normally the declive shows a pale homogeneous mucous membrane with fine capillary vessels.

The Sulci Laterales. As has already been said, these are best seen when the colliculus is small and in the excavated type of posterior urethra. However, the study of these two valleys is always easy when the instrument is turned somewhat to the side and the fluid is flowing. Their depth varies considerably in different cases. The transition from the floor to the side walls may be either in the form of a concave wall or there may be an abrupt ascent in those instances in which the lateral walls are swollen or have a tendency to prolapse. It is in these sulci that we find a number of prostatic ducts varying from two to one-half dozen, sometimes in the form of tiny slit-like opening and more frequently having a punctate shape. The mucous membrane here is also of a pale red yellow and the vascular markings are in the form of irregularly longitudinal streaks and tortuous delicate vessels. When there has been no previous pathological process, the mucous membrane is smooth and apparently thin, without any folds. At the junction between the floor and side walls we are apt to encounter the slit-like orifices, whereas the rounded openings are more frequently found in the sulci themselves. The tortuous vessels course for the most part in an oblique direction, passing backwards and upwards along the side walls.

As for the side walls, these offer very little of interest. In most cases there is a fairly abrupt rise from the sulci, and in other cases there is a concavity which is of a somewhat deeper red than the floor. When the urethra has been free from inflammatory process, the delicate vessels seen in the sulci are found to interanastomose with similar vessels on the side walls or continue directly upward on these walls. Attacks of gonorrhoea cause these markings to disappear and leave irregular vascular streaks in

their stead. The roof is devoid of any characteristic markings, and is usually much paler than the lateral walls.

The Pars Membranacea: As the instrument is withdrawn from the montane region with the fenestra turned downward, the acclive can be followed by its tapering crest into the membranous urethra. The longitudinal markings are very distinct as a rule, parallel or slightly converging vascular striations passing at the side of the anterior crest and gradually becoming lost in the floor of the membranous urethra. The membranous urethra itself is smooth and the mucosa looks thin, the floor is yellow red, whereas the roof and sides are somewhat paler, almost gray white.

The delicate median ridge of the acclive, as it becomes lost in this portion of the urethra, often shows a striking pallor at its summit or middle, due partly to the pressure effect of the instrument and possibly also to an avascular condition of the part.

On either side of the disappearing anterior crest we see the continuation of the vessels of the sulci laterales, and observe how they take a longitudinal direction. The roof and sides of this region present nothing of note and are practically devoid of markings.

The Bulbous Urethra: Whereas every detail of the sphincteric margin, the pars supramontana, the montane portion and the pars membranacea can be thoroughly scrutinized without the exercise of special maneuvers, the bulbous region (Fig. 1A)* may offer some difficulty owing to its distensibility and the depth which it occasionally assumes. It is in the examination of this part that some skill is required in the manipulation of the irrigation fluid. We must be able to displace the mucosa at one time, and at another produce prolapse in order to obtain a sufficiently clear picture in some of the cases. Thus the pars bulbosa may be so large that when distended with fluid its distance from the fenestra and lamp is considerable, and illumination becomes diminished. This can be easily overcome by opening the second faucet of the instrument and evacuating some fluid, or by stopping the flow. The floor of this part presents a corrugated or folded appearance when incompletely dilated and the color may or may not be of a somewhat deeper red than the parts above. The roof and sides do

*No attempt was made in the diagrammatic Fig. 1 to represent actual or even relatve sizes with accuracy.

not present the same folded appearance. A useful and interesting distal landmark is afforded by the junction of the bulbous and penile urethra shown in Fig. 19 (and marked J in Fig. 1). The transverse margin with the illuminated mucous membrane below (Fig. 19) presents the beginning of the penile urethra. On either side the folded lateral wall and part of the floor of the bulbous urethra are seen, and the central upper dark region represents the non-illuminated distended bulb. Although the junction is not always so abrupt, it is usually very well marked. In a certain number of individuals the proximal limit of the bulbous urethra is indicated by a distinct transverse ridge or a few folds that occupy the floor and part of the lateral walls of the urethra. These ridges may be conspicuous or just barely discernible. In favorable cases then the boundaries of the bulbous urethra are sharp, making estimation of its extent easy. The relative size of the bulb can be determined, as a rule, by a glance through the instrument.

The Sphincter Margin: In the chapter on the interpretation of pictures seen with the cysto-urethroscope, we already alluded to the explanation of the views here obtained. It is not easy to define the exact limits of what is included in the term " sphincteric margin." Properly speaking, we should consider three distinct portions. First, the vesical part, which properly belongs to the realm of the right angled and retrograde cystoscope; second, the true margin or ring; and third, the urethral portion. Owing to anatomical conditions it is impossible, in the male, to obtain a satisfactory view of that portion of the roof of the bladder which adjoins the sphincter, namely, the juxta sphincteric part of the bladder roof. The margin can be perfectly seen throughout its circumference. Our inability to depress the ocular of the instrument sufficiently makes it impossible to approximate the window of the instrument and the roof of the bladder near the sphincter sufficiently to obtain a proper view. In the sides, however, this is easier, particularly if we allow the bladder to collapse. In examining the inferior aspect of the vesical portion of the sphincter we encounter no difficulty, for the transition from trigone to floor of the vesical sphincter is a gradual one, and there is no sudden drop or sudden cancavity such as is characteristic for the roof and sides (Fig. 20). In the female these obstacles do not obtain,

the urethra being short and the instrument having prefect freedom of motion. An adequate view of all that portion of the bladder which adjoins the margin of the sphincter can easily be obtained. In other words, in the female a retrograde cystoscope can be readily dispensed with when we have a cysto-urethroscope at our disposal.

In practice it is best to disregard the adjoining bladder from a consideration of the sphincter margin, and to consider the beginning of this region as being that ring which goes to form the internal orifice. This is readily brought into view when, in the slightly distended bladder, the cysto-urethroscope is gradually pulled out until a sharp illuminated margin appears. The picture of the floor of this region is so different from that of the sides and roof that it merits special description. Fig. 6 illustrates well the normal floor of the sphincteric margin. In the upper part of the field a dark area is seen which is the non-illuminated bladder. Below this we see the beginning of the floor of the pars supramontana and a slightly convex margin, the internal orifice or floor of the sphincteric margin. Usually this line is slightly convex or almost flat and horizontal, but at times we see a central projection which corresponds to what the anatomists have called the "uvula vesicae." The color of this part is a fairly deep red admixed with yellow, and the vascular markings run in a longitudinal direction with a tendency to converge towards the urethra. In the normal state, the mucous membrane is smooth without any visible duct orifices. As a rule the transition from this margin into the sides is gradual. In a few cases we have noticed an abrupt change into the side walls, the junction being marked by deep lateral grooves. It is not alone in color, vascular markings and contour that the floor of the sphincter differs from the sides and roof. Whereas the roof, and to a less degree the sides, pass into the bladder by a sudden concavity, the floor presents a gradual slope down towards the trigone, and distally, too, there is a gradual decline towards the fossula prostatica.

Fig. 21 shows the right side of the sphincteric margin. The absence of vascular markings is striking and the color too is quite different from that seen in the floor. The red margin is replaced by a pale pearly line which imperceptibly changes into a deeper red, the beginning of the supramontane urethra. A slight con-

cavity is the rule. The sides are usually counterparts, but the roof of the sphincteric margin often presents a more acute angle. Although a concavity is the rule, a sharp notch is not uncommon. In rare instances a few tortuous vessels cross along the sphincteric margin even at the sides and roof. Sometimes a reduplication of the sphincteric margin seem to occur (Fig. 22). Close scrutiny, however, makes it apparent that in such instances we are dealing with a slight prolapse of the adjoining bladder mucosa.

If we rotate the instrument at the level of the floor of the sphincteric margin with the border of the sphincter occupying the middle of the field, we will note that a smaller amount of the lateral aspect of the sphincter comes into view. As for the roof, this may just skirt the field or fail completely to come into view. In this way we ascertain that the annulus urethralis or internal urethral orifice does not occupy a vertical plain, but has a slight inclination from above, downward and backward, when the patient is in the dorsal decubition. The amount of obliquity varies. It is necessary, therefore, in the examination of the sphincter to draw the instrument out a short distance as we scrutinize the sides, and to pull it out still further for the roof. This anatomical peculiarity can be best demonstrated when the bladder is almost empty.

(*To be concluded in the March issue*)

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

MASSIVE DESTRUCTION OF THE URETHRA AFTER A SUCCESSION OF ATTEMPTS TO RESTORE IT IN A CASE OF HYPOSPADIAS

BY G. A. DESANTOS SAXE, M.D., New York City.

EVERY urologist whose experience is extensive enough meets in his practice examples of strikingly unfavorable results after operations performed by colleagues who deservedly enjoy high repute. Those whose testimony would be of great value as first-hand information rarely report such cases, and so it comes about that many pitiful failures of surgery remain unknown, unsung, and unseen.

The question arises, is it proper for one who has seen only the end-result, to report such cases? I submit humbly, that it

Presented to the New York Society of the American Urological Association, February 1, 1911.

is not only proper, but the duty of every surgeon to acquaint his colleagues with striking examples of operative failures that may come to his knowledge, especially if a scant number of such failures have been published in literature. Nothing is of greater value in checking any tendency towards a *furor operandi* among us, than a thorough acquaintance with the reverse side of the medal commemorating the achievements of urological surgery.

HISTORY OF THE CASE

The patient whom I am presenting to you this evening, H. B., stock clerk, 28 years old, born in New York, was first seen by me at one of my clinical lectures at the Postgraduate Hospital in July, 1910. On examination, he was found to have a mere stump in place of a penis, the root of the organ and about an inch of the pendulous urethra being all that remained. At the free end this stump expanded into a shallow funnel-shaped structure at the bottom of which the urethral opening could be seen as a deep-red pit. There was pus exuding from this opening, and on examination this discharge was found to contain many gonococci. It was for the urethritis that the patient had applied to the clinic for treatment.

The expansion at the free end of the stump consisted of wrinkled, shriveled skin, containing harder masses of cicatricial tissue. There were also in the ear-like flaps of the stump some remains of what apparently was erectile tissue from the corpora cavernosa, but there remained apparently no vestige of the glans penis. The urethra, examined at a later date, admitted a No. 9 F. bougie and was stenosed throughout the entire extent of the penile remnant. The bulbous and posterior portions seemed to be of fairly normal calibre.

Upon careful questioning, the patient gave the following history. He was born with a hypospadias of the penile type. "The opening from which the urine came," as he describes it, was situated at about the level of the coronal sulcus. Thence there was a groove leading upward, a tunneled canal through the lower surface of the glans, and a second opening, smaller in size, at the apex of the glans.

At the age of ten, or eighteen years ago, his parents applied to a surgeon of prominence for the restoration of the hypo-

spadias. A plastic operation was performed, the exact character of which cannot be vouched for at this time. It appeared, however, that this operation was not sufficient to restore the continuity of the canal, and that during the next four years, or until the patient was fourteen years old, he was under constant observation of this surgeon, who tried his best to complete the work by three supplementary plastic procedures. The result at the end of that period was apparently fairly good, at any rate, the patient received no further attention until four years later, at the age of eighteen, when he contracted a sore which he characterizes as "soft," although he is not sure of this point. The sore, which was situated at the coronal sulcus, was cauterized by the same surgeon, and three weeks later the remains of the sore were excised. The patient claims that at the same sitting the surgeon proceeded to make further attempts to close the gaping urethra. The healing after this operation was very unsatisfactory, and the patient remained at the hospital for seven months, during which time the attending surgeon on eight different occasions cut away sloughing tissue, apparently with the object of saving as much of the organ as could be rescued. The patient's condition when he left the hospital was practically the same as at present.

It is impossible to determine definitely *the cause of the very extensive sloughing* which took place ten years ago. The patient is firmly convinced that he had a syphilitic sore, but he does not give a very clear history of secondary symptoms. Regarding the occurrence of a secondary rash he is not very definite, but claims to have had a scaling, pinkish eruption on chest and arms some time after the sore had been excised. He asserts that his hair fell out while he was in the hospital,— a sign certainly suspicious in a lad of eighteen. There is, however, no evidence that he received any regular treatment which could be construed as antisyphilitic, nor did the surgeon inform him that he would have to be treated for some years to come.

If the sore was not syphilitic, it must have been chancroidal in character. The sloughing might have been due to chancroidal infection, of course, but there is also to be borne in mind the possibility of gangrene from insufficient blood supply of plastic flaps, and secondary infection of the wound leading to sloughing

of the parts. At all events, the exact etiology of the extensive sloughing cannot be determined at this late date.

The patient's *subsequent history* presents some further interesting features. In the first place, his sexual power was not impaired by the extensive loss of penile and urethral tissue. He has been able to have normal (?) erections, and satisfactory intercourse, in spite of the fact that the glans, which is the seat of end-organs playing an important part in the orgasm, had been totally destroyed. During the erections the penile stump became several times longer than in the flaccid state, reaching sufficient length for intromission. It is possible, that the sensory nerves of the urethra have in this case taken the place of the end organs of the glans, and that thus orgasm occurs without any material change.

Owing to his infirmity, the urethra is naturally exposed to infection, the funnel-shaped hollow in which it opens lending itself particularly to the accumulation of secretion. Accordingly, six years ago he acquired a gonorrhea *lege artis*. The attack lasted six months and was treated exclusively with internal medicines. Two years ago he noted another sore upon one of the flaps of the penile stump. Again he is vague in his description of the sore, and does not give the history of any secondaries, nor of any constitutional treatment. About six months ago, believing that he had syphilis in early youth (at the time of the disastrous operation) he had his blood examined by one of the recognized serologists of this city, who found the Wassermann reaction to be positive. The patient immediately began a course of mercurial treatment which he has continued with intermissions ever since. Second Wassermann reaction performed in December, 1910, showed a strongly positive finding, although the patient has not hand any symptoms of syphilis since he has been under my observation.

The attack of gonorrheal urethritis for which he applied for treatment in July was apparently entirely cured on September 30th. The treatment used by me in his case consisted, in addition to the use of lacto-santal capsules, of irrigations with solutions of silver nitrate in increasing strengths, by means of a coudé silk-woven catheter, No. 9 French. The Janet method of irri-

gation could not be used with his deformity, nor did a soft catheter enable one to irrigate the canal. He was able to use hand injections of protargol solution ($\frac{1}{4}$ to $\frac{1}{2}$ per cent.) at home, pinching the flaps over the urethral opening and the tip of the syringe.

SUMMARY

The points of special interest in this case, to my mind, are:

(1) The extensive loss of tissue resulting from a series of attempts to restore a hypospadic urethra ten years ago.

(2) The fact that the patient's *potentia coeundi* has remained unimpaired in spite of the reduction of the penis to a mere stump, with complete destruction of the glans.

(3) The entrance of the syphilitic element, either at the time immediately preceding the disastrous operation, or since then.

It is not in a spirit of criticism that I have presented this case to you to-night. The operator who failed so pitifully in restoring this man's urethra was a man of such repute that few of us can say that the patient would have fared better in their hands, all things being equal. There is one thing, however, which seems to be inexcusable, if the patient's statement be accepted,— the excision of the sore at or near the corona, followed immediately by a delicate plastic operation. The nature of this venereal sore could not have been determined ten years ago (in the absence of knowledge concerning the Treponema of Schaudinn, and of the serum reaction) without waiting for secondaries. While the wisdom of excising the sore before waiting for it to heal might be questioned in the circumstances, the performance of the operation before a definite diagnosis of the sore was made seems anything but rational. However, in the absence of medical testimony on this point, even this false step cannot be held against the operator.

The case is presented chiefly as a warning against ill-considered interference in the less troublesome forms of hypospadias, where there is little discomfort or danger. Such cases should be left alone, if we have any veneration for the principle of *non nocere*, which should rule in urological surgery, as well as in all other branches of the healing art.

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Contributed by the Author to The American Journal of Urology.

SEXUAL NEURASTHENIA: ITS LOCAL AND HYDROTHERAPEUTIC TREATMENT*

By Dr. Moritz Porosz, Budapest.

THE sexual symptoms of sexual neurasthenia often follow a urethritis or prostatitis. These symptoms are: pollutions, spermatorrhea, ejaculatio praecox. In the beginning the features of general neurasthenia are wanting. The patients themselves often associate causally the impotence and imperfect erections with a gonorrhea.

All these symptoms without a previous blennorrhea or prostatitis, may follow masturbation, venereal excesses, especially in youth, coitus interruptus, prolonged abstinence. Experience teaches that the prostrate must also be examined in such cases. Such examinations reveal a diseased conditon which has already been often described by Porosz under the name Atonia Prostatae.

This muscular atony of the prostate is supposed to weaken the assumed sphincter of the seminal vesicles and disturb its function. This sphincter was anatomically demonstrated by Porosz and confirmed by the anatomical section of the International Congress at Budapest.

These well established facts and the author's clinical and therapeutic experience have justified his explanations and his procedure in regard to local treatment.

The treatment of other symptoms of *general* neurasthenia belongs to the domain of balneology and hydrotherapy. The therapy of *sexual* neurasthenia belongs to urology and balneology. Both divisions find a field of activity. While in the milder cases balneotherapy is not absolutely necessary, in the more severe forms the recovery of the patient is accelerated.

With hydrotherapy alone one cannot produce definite, invariable results, and if in severe cases of sexual neurasthenia the failure to use hydrotherapy is an error, the failure to use local therapy — in the author's sense — is a sin committed against the health of the patient.

*Read at the meeting of the Balneologists of Austria, at Salzburg, October 7, 1910. Author's abstract.

It is clear from the author's explanations that local therapy which is directed against the hyperemia of the caput gallinaginis is false and useless.

By treating the hyperemia with sounds, various paintings with astringents, cauterizations with concentrated silver nitrate — solutions and electro-cautery we can only contribute to the aggravation of the general neurasthenia. These methods have truly no other effects.

It must be remarked that the hyperemia is by no means rarely absent so that we sometimes must deal with an anemia of the colliculus seminalis. Also if a hyperemia is present it is merely a secondary manifestation which depends upon the prostatic atony. Svetlin has long ago shown that the venous circulation of the pars posterior passes through the prostate. The progress of the blood stream suffers from the atony of the prostatic musculature. If the hyperemia is done away with by means of the psychrophore the effect is not permanent. The main cause of the sexual neurasthenia lies in the atony of the prostate. It is here that the root of the disease must be attacked by a tning up of the prostate with the foradic current, as the author employs it.

The theoretical explanation of fatigue and irritation of the centers is not sound, for pollutions and spermatorrhea are present at the same time. The corresponding central excitations of other organs, which produce well-known disturbances of function, lead one astray in assuming an irritation of the genital centers.

The error really resides in the mechanism of the genital functions. After over a decade and a half's experience the author asserts that the morbid sexual symptoms of neurasthenia which were mentioned above can be restored to normal. The increased libido is diminished, the dribbling of urine is mitigated, urgency of urination is lessened, erections become normal, sexual pleasure is increased, ejaculation becomes normal and all the general nervous manifestations which accompany and precede intercourse disappear, while the subsequent exhaustion was likewise absent.

Contributed by the Author to The American Journal of Urology

CATHETER LEFT IN THE DEEP URETHRA AND BLADDER AFTER OPERATION FOR EXTERNAL URETHROTOMY*

By Henry J. Scherck, M. D.,

Clinical Instructor of Genito-Urinary Surgery, St. Louis University.

IN July, 1910, J. P. applied at one of the hospitals of St. Louis for relief. He was suffering from urinary infiltration due to a stricture of the deep urethra. In as much as it was impossible to introduce an instrument into the bladder, an external urethrotomy was performed. He tells me that he remained in the hospital for about two months and left there with the perineal wound closed and the urinary function satisfactorily re-established. About two months ago he began to notice a return of trouble, indicated by a very small urinary stream requiring considerable effort on his part to evacuate the contents of his bladder. The trouble gradually increased until there was complete retention, followed by rather sudden extravasation and abscess formation at two points, resulting in two urinary fistulae. This was the condition that he presented upon admission to our hospital, when I examined him for the first time. I found evidences of former infiltration in the shape of various scars about the buttocks and scrotum, and two fistulae through which urine was discharged. All attempts at passing sounds or filiforms failed, so I decided upon an external urethrotomy.

An incision through the perineum over the old perineal scar brought me to what I had concluded was the disorganized and strictured urethra. Upon introducing my finger into the wound it impinged on a foreign body which gave a rather peculiar sensation to my finger tip. I introduced the forceps in the wound and attempted to withdraw it. In doing so, I broke off a small portion of the obstruction, which I found to be part of a large sized rubber catheter. I then retracted the edges of the wound and gradually worked the forceps around the catheter, loosening

*Read before the North Central Branch of the American Urological Association, Chicago, January 5, 1911.

it up, and withdrawing it. The catheter extended for at least three and a half inches into the bladder itself, protruding into the deep urethra for a distance of about an inch and a half. Surrounding the catheter, for the most part, were phosphatic deposits. Concretions were also discovered in the fundus of the bladder, against which the catheter had remained for several months. After cleansing the bladder thoroughly and removing from the deep urethra and bladder all deposits, I concluded the operation in the usual manner. Patient recovered promptly without any ill effects.

Foreign bodies in the bladder, both male and female, are not uncommon. For the most part these foreign bodies are introduced through the meatus, either as a result of the individual's own acts or through accidents on the part of the physician. Ths patient presented two features which to my mind are rather unique, and warrant me in reporting this case.

First, here was a foreign body which remained in the deep urethra and bladder for several months without the knowledge of the patient or the physician. Second, that so long as the lumen of the catheter remained open the urinary function was carried on with comparative comfort, through it. Gradually the lumen became occluded by the deposit of the urinary salts, producing identically the same symptoms as would be produced by a stricture gradually contracting and completely obstructing the urethra. Not only was the lumen of the catheter, which was about an 18 American, occluded, but around the catheter was also a considerable deposit of concretions. This catheter had been introduced through the perineal wound into the bladder upon the completion of the first operation for drainage purposes, and by some unaccountable reason had slipped deeply into the wound, had been forgotten, and the perineal incision completely healed. (The catheter was passed around). I have not divided it as yet, though I expect to have the pathologist at the hospital make a report on the findings of the contents of the catheter, as well as the condition of the rubber, to determine as a matter of interest the effect of the urine on it, after having remained buried for several months.

Contributed by the Author to The American Journal of Urology.

SOME REMARKS ON MASSAGE OF THE PROSTATE

By Geza Greenberg, M.D., New York.

THERE seems to be a general opinion, even amongst genito-urinary specialists, that massage of the prostate should of necessity follow and complete a cure of gonorrhea. This idea prevails partly because it is held that an anterior gonorrhea invariably invades the posterior urethra and the prostate. This, however, is clinically and pathologically untrue.

In a large number of cases, the infection does not get beyond the anterior urethra; even in cases of hypospadias with a small meatus, where one might expect a posterior extension, recovery may occur without any complications. Even if there be an extension into the deep urethra, it does not necessarily follow that the parenchyma of the prostate must be affected, or if so, that it does not undergo spontaneous resolution but goes on to suppuration, as evidenced by gonorrheas with both urines cloudy.

The prostate rebels against indiscriminate massage; for vigorous massage in the acute stage of gonorrheal urethritis invariably results in some trauma, producing diapedesis of red and white cells, and the escape of some serum into the open spaces. This serum is a very good culture medium for micro-organisms and invites those present in the urethra to invide the prostate, leading up to a prostatitis which did not exist at the beginning of the treatment. It is, therefore, apparent that the prostate should not be meddled with, unless it is affected. This must be ascertained by careful routine examination. For the determination of a prostatitis, one must be guided not only by the subjective signs but by objective symptoms. I do not intend to enumerate any subjective symptoms, as they are well described in text books, but merely to emphasize the importance of some of the objective signs.

By the digital examination of the prostate, at least, some of the cardinal symptoms of inflammation may be brought out, i. e., swelling, heat, pain, which in the acute stage will be more pronounced. Enlargement of the prostate alone is not diagnostic of inflammation, unless it is accompanied with a certain degree

of tenderness, and if hypertrophy of the prostate be excluded, taking into consideration the age of the patient, the size of the organ should be determined both with an empty and a full bladder, as a prostate may be normal in size and yet appear to be enlarged with a full bladder, and the result would be an erroneous diagnosis of prostatitis. Furthermore, it must be noted whether or not the prostate is uniformly enlarged. As to tenderness, good judgment is required to gauge the amount of pressure and with the variation of pressure, the degree of tenderness and whether the tenderness is universal or localized, feigned or real. Consistency of the prostate is another important factor, whether hard or soft, or nodular, universal or localized. Heat can only be felt in the acute stage of prostatitis.

Taking all these signs collectively with the subjective symptoms of the patient, they tend materially to arouse the suspicion of the physician of an existing prostatic trouble, but by means settle it without further tests.

The next step is the examination of the exuded drop of prostatic secretion at the meatus under the microscope; for this, two smears are necessary, one to be unstained and examined with high power for the number of pus cells, and a second one to be stained and examined for bacteria. In a good many cases it is rather troublesome to stain the secretion owing to its too great fluidity. This can be remedied by incorporating the secretion with the white of an egg; then it takes up the stain more readily. In examining for pus cells, due allowance must be made for the number of pus cells in normal prostatic secretion, due probably to traumatism caused by the finger. I have seen the field covered with large numbers of red cells which were evident to the naked eye in the centrifuged urine after a vigorous massage of a normal prostate whose owner never had gonorrhea or any disease referable to the genito-urinary organs.

It is necessary (e. g. when marriage is contemplated) to have a cultural test made of the prostatic secretion, and if one is not satisfactory, even half a dozen tests, in order to be perfectly satisfied that the prostate is normal.

Does the presence of pus in the secretion, without the presence of gonococci, indicate a gonorrheal prostatitis? Not necessarily. There may be either a catarrhal prostatitis caused by

some other agent, or the process may have been started by a gonococcus which died out. It is not at all unlikely that there may be an analogy between pus tubes (in women) that are devoid or organisms, and a similar condition in the prostate in men. This condition is observed almost daily in treating chronic prostatitis in married men who had their original infection years ago, without infecting their wives. As a rule, however, if one finds a large amount of pus cells and a large number of organisms other than gonococci in the prostatic secretion, the prostate should be treated in the same way as a case of gonorrheal origin, but less vigorously.

The next important diagnostic step is the examination of the urine for shreds. The ordinary two glass test is not sufficient for an accurate diagnosis. The best method is as follows: Before the patient urinates, the anterior urethra should be washed out with sterile water until the return flow is clear; secondly, a catheter is to be passed into the bladder, the urine withdrawn and examined for shreds. Withdraw the catheter into the posterior urethra so that the eye of the catheter rests just beyond the compressor muscle and the posterior urethra, irrigated gently so as to wash out the shreds adhering to the posterior urethra. Then pass the catheter back into the bladder to withdraw the washings into a third glass. The glass No. 1 contains shreds from the anterior urethra; glass No. 2 and No. 3 contain the shreds from the posterior urethra. Then instill about 3-5 drops of 1 % methylene blue solution into the posterior urethra, allowing it to remain in there for about five minutes. Before the methylene blue is instilled, however, the prostate should be massaged in the following manner. The finger is passed into the rectum to the apex of the prostate and carried very gently along the median line to the base of the prostate, stroking it gently to and fro, but not sufficiently to express any prostatic or seminal vesicular secretion into the urethra. This manoeuvre disengages any shreds that are present in the prostatic and ejaculatory ducts. Then fill up the bladder with sterile water and allow patient to urinate. The shreds are colored blue and come from the prostate and the ejaculatory ducts. The methylene blue is not absolutely essential. It merely helps to exclude any possible error and confusion with some shreds of the

anterior urethra that might have adhered to the wall and not been dislodged by the anterior irrigations. This latter generally occurs in a strictured urethra with rigid urethral walls. The shreds that will be washed out by the last stream from the anterior urethra are not stained. Hence, in the average case where stricture is not present, the staining process may be omitted.

The next step is to massage the prostate vigorously and examine the drop at the meatus; if no drop appears, it is best to fill up the bladder again with sterile water. This will contain the secretion which flowed backward into the bladder. This can be centrifuged now, and examined microscopically. It is more suitable than urine filled with the same secretion.

While I do not intend to describe the treatment, I wish to mention some of the shortcomings due to faulty technique. Before one undertakes to massage the prostate, he must bear in mind the object sought, viz., to improve the circulation and thereby aid absorption of the infiltrate, and secondly, to express any macroscopic pus (abscess). It is more important to bear the first indication in mind and execute the massage gently, than to do it too vigorously. The procedure should cause little or no pain to the patient, be kept up for about five minutes, and not repeated oftener than twice a week, but the main reliance should not be put upon the massages alone. The peri-prostatic tissues should be gently massaged as well. The prostate can be made more accessible by making counterpressure over the symphysis pubis with the disengaged hand. The prostatic circulation can be more powerfully influenced by the prostatic vibrator which is even less painful than the finger massage. When there exists a great deal of interstitial prostatitis, as evidenced by a nodular prostate, the massages do not influence the prostate, as we cannot hope for any absorption of organized connective tissue.

63 Second Avenue.

Review of Current Urologic Literature

FOLIA UROLOGICA

Volume V., No. 6, December, 1910

1. Clinical and Operative Notes on Seventy-three Cases of Cancer of the Urinary Organs. By F. Cathelin.
2. Functional Renal Diagnosis in the Service of Surgery. By Paul Steiner.

1. Clinical and Operative Notes on Seventy-three Cases of Cancer of the Urinary Organs. Cathelin presents a summary of his observations in seventy-three cases of cancer of the genito-urinary organs observed during a period of three years in his service at the Hôpital d'Urologie. Of these there were eleven cancers of the kidney, thirty-two of the bladder. twenty-seven of the prostate, and three penile cancers. In the cases of renal and penile cancer, eleven were treated by operation, with recovery in ten, and one death. In the other classes of cases, there were six operations. Death followed, either immediately or later on, in all the six cases. The author concludes that in nearly every case of renal or penile cancer, operation is indicated, but he declares emphatically against surgical interference in cases of cancer of the prostate and in almost all cases of bladder cancer.

2. Functional Renal Diagnosis in the Service of Surgery.—Paul Steiner reviews the entire subject of the functional diagnosis of renal affections. The great advances in renal surgery, which are credited to the last decade, are due, not so much to perfection in technique, as to improvement in the methods of examination. We no longer depend upon inspection, palpation and simple urinary examination. Our aim to-day is to secure the separate urine of each kidney. The oldest methods devised for this purpose, consisted of devices for compressing the ureter on one side through the abdominal tissues, but these methods proved unreliable. Later, the ureter was exposed in the anterior vaginal wall and temporarily ligated, but this method was complicated and unsatisfactory. Simon was the first to

attempt catheterizing the ureter, but he confined his work to women. Nitze was the first to construct a cystoscope for the purpose of catheterizing the ureters, and it is from that time that modern methods of diagnosis may be said to date. The present author emphasizes the need of a thorough chemical, microscopical and bacteriological examination of the urine, in addition to the functional tests. The *freezing point* of the urine gives valuable information as to the functional activities of the kidneys, provided the urines be tested separately on each side. On the other hand, the freezing point of the blood need be used only in cases in which the separation of the urine is impossible. The method of *artificial polyuria* is theoretically well founded, but in practice, it does not always work out satisfactorily. A valuable test is the determination of the *quantity of urea* separately in each kidney urine. The value of the *phloridzin test* is limited to the advanced forms of renal disease. It is not reliable in the early stages of renal insufficiency. The *indigo-carmine* test is of no value, as it facilitates finding the ureters. *Chromo-cystoscopy* is only valuable in advanced cases, but even there, is not equal to the other methods.

All the renal operations performed by the author have been based upon the principles just enumerated. In no case did the patient die from renal insufficiency. Tuberculosis of the bladder and the kidney can be cured only by total nephrectomy. Partial nephrectomy, in such cases, is of no value. In order to avoid the formation of ureteral fistulae, it is best to cut the ureter immediately below the renal pelvis, and to ligate it, instead of removing as much of the canal as possible. The tuberculous process in the affected ureter will then heal as promptly as that in the bladder.

ZEITSCHRIFT FÜR UROLOGIE

Volume IV., No. 12, 1910

1. On the Technique of Pyelithotomy. By S. P. v. Federoff.
2. A Bladder Developed Partly within its Ligaments, with an Interesting Displacement of the Peritoneum, after Suprapubic Cystotomy. By J. Voigt.

3. Congenital Cysts in the Genito-perineal Region, and their Relation to the Accessory Ducts of the Penis. By Carl Gutmann.

1. On the Technique of Pyelithotomy.—Federoff points out that, of late, pyelotomy has become increasingly popular in cases of renal stone. The operation of opening the pelvis is a harmless one when compared to that of splitting the kidney. Pyelotomy is almost bloodless and has no secondary hemorrhages as sequels. The only disadvantage of the simpler operation is, that after opening the pelvis, there had formerly resulted persistent urinary fistulae in nearly every case. To-day this objection does not hold good, because in every such operation the surgeon secures a permeable ureter by the use of ureteral catheters or by attending to the reduction of ureteral kinks by the fixation of the kidney, if necessary. Even the largest incisions in the renal pelvis, heal readily without any sutures, while, on the other hand, the smallest incision in the kidney itself, may remain imperfectly healed for months and years, wherever there is any obstruction to the drainage of urine.

The first thing necessary for a successful pyelotomy, is to provide room in the operative field, so as to be able to examine and palpate the pelvis thoroughly, as well as to follow the upper part of the ureter for some distance. The best way to obtain this, is to expose the kidney, shell it out of its fatty capsule, and to inspect the kidney and pelvis after these have been delivered outside of the cutaneous wound. If it is impossible to deliver the kidney in this manner, one may conclude usually that the case is one unsuited for pyelotomy, and consequently, one proceeds to slit the kidney. This last contingency is apt to be encountered in a very stout patient, or one with a short renal pedicle, or in cases in which there are numerous and tough adhesions. Yet, in such cases, the X-rays sometimes show that there are stones only in the pelvis, so that pyelotomy is strongly indicated. Of late, the author has been acustomed to open the pelvis in such cases, without delivering the kidney. The advantage of this method is that the kidney is subjected to the least possible traumatism. He records eight cases in which he has adopted this method.

Federoff's technique is as follows: An oblique lumbar incision is made, or a Guyon's incision. The latter is employed in those cases in which the X-ray shows that the stone is situated at or about the twelfth rib. After penetrating through the muscles and fascial, the fatty capsule is opened over the convex border and stripped from the posterior surface of the kidney. An assistant holds the undetached fatty capsule over the anterior surface of the organ by means of clamps. If this is impossible, the lower pole of the kidney is freed completely, and the kidney is held immovable at this point. If the kidney is very high up and difficult to draw down, the twelfth rib may have to be resected. The upper pole of the kidney and the anterior surface thereof, are not disturbed. If there is too much fat behind the pelvis, it should be pushed aside by blunt dissection or cut away with scissors. A pair of broad retractors will aid in exposing quite completely the posterior aspect of the pelvis and the ureter. An incision is then made into the pelvis, the stone is removed, and the pelvis and ureter are examined with fingers and probes. The wound in the pelvis is then sutured. The entire operation is bloodless, unless there are sharp and multiple stones. Of course, not every stone can be removed by this method, for when the stones are in the kidney itself, the latter must be split in the old way.

2. A Bladder Developed Partly within its Ligaments, with an Interesting Displacement of the Peritoneum after Suprapubic Cystotomy.—Voigt reports a case of irregularly developed bladder, as indicated by the title. The patient had been treated by Voigt in 1908, for gangrene of the vesical mucosa following an attempted miscarriage. A suprapubic cystotomy was performed, the necrotic mucosa removed, and the patient made a good recovery. The pregnancy continued to term, and ended normally. About two years later, he saw the patient again, and found that she had a hernia in the lower part of the suprapubic wound. At that time, the hernia was very small, and apparently contained intestine. The hernial sac gradually increased in size, until it reached the dimensions of a child's head, and hung over the symphysis. The contents of the sac consisted of small intestine. The cystoscope showed a fairly normal bladder, but a diverticulum in the organ was found, which was

surrounded by the broad ligament. The anterior wall of the bladder could be forced into the hernial opening by means of the cystoscope, but this was done with great difficulty. There was no urinary fistula into the ruptured parts. The patient consented to an operation, which consisted in closing the hernial defect. On examining the relations of the bladder to the uterus and broad ligament, the bladder was found to extend anteriorly over the fundus of the uterus, and on the right side, a considerable portion of it was seen to pass between the layers of the broad ligament as a diverticulum, reaching close to the right side of the pelvis. Nothing was done to the bladder itself, but the uterus was fixed in the usual manner, to the abdominal wall. The patient made a good recovery, and had practically no vesical disturbances.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Vol. XXVIII., II., No. 23, December (1) 1910

1. Smooth-muscle-fiber Tumors of the Bladder. By M. M. Heitz-Boyer and Doré. (Continued.)
2. Nervous Reflex Phenomena in the Urinary Organs in Cases of Appendicitis. By F. De Meo.

2. Nervous Reflex Phenomena in the Urinary Organs in Cases of Appendicitis.—De Meo points out that there are cases of appendicitis in which the early symptoms come from the urinary apparatus, thus leading to doubt in the diagnosis. As early as 1820, when the term "appendicitis" had not yet been employed, and when we spoke of typhlitis, Balzer called attention to the fact that during the acute stage of this condition, there may be urinary disturbances and even retention of urine. Strange to say, but very little is said regarding the relation of urinary phenomena to appendicitis in the modern standard textbooks. The fact that any set of nerves in the body, no matter where situated, may have a reflex influence upon the bladder, was demonstrated in 1785 by Troia. A number of cases have been reported in literature, in which an attack of appendicitis in the acute stage was accompanied by frequent and painful urination, tenesmus, etc. But in these cases, there were also sufficient

signs to discover the presence of appendicitis. In a case reported by Giordano, in 1905, the urinary symptoms completely masked the appendicitis. In 1907, further cases were reported by Luxardo, and in 1908, still another case by Castiglione. In 1908, the present author reported two cases, while during the current year, three further cases were recorded by Cassanello. It seems, therefore, that these important cases have been particularly studied in Italy. In his great work on "*Appendicitis*," Talamon reports a case an appendical colic which was mistaken for a renal colic, and the true nature of the affection was discovered only at autopsy. This case demonstrates the difficulty in the diagnosis in such instances. To-day we know that even when the symptoms are exclusively renal or vesical, there may be only an appendicitis, and no affection of the urinary tract. The diagnosis must be made by exclusion, and by a careful examination of the urinary organs.

The explanation for the renal and vesical symptoms in cases of appendicitis, lies in the influence which the inflammatory process in the appendix, exercises upon the nerves of the vesical, renal, hypogastric, and pudendal plexuses. Therefore, when symptoms of renal colic, pain on micturition, vesical tenesmus, pain in the bladder, and burning in the urethra are present, without any anatomical signs of appendicitis, there is a possibility that these urinary signs are the early manifestations of an appendicitis which has not yet become manifest. We must be on our guard, and thus may hope to save many cases of appendicitis which otherwise would prove fatal.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Vol. XXVIII, I, No. 1, January (1) 1911

1. Aponeuroses and Periprostatic Spaces. Periprostatic Suppurations. By MM. Aversenq and Dieulafé.
2. A New Model of Opaque Ureteral Catheters. By F. Fournier.

1. Aponeuroses and Prostatic Spaces. Periprostatic Suppurations.—Aversenq and Dieulafé contribute an interesting article on the anatomy and surgery of the periprostatic

spaces. This is a subject which has received but imperfect consideration by the majority of authors on prostatic surgery, so that, clinically, we know well enough that periprostatic suppurations occur, and that they must be dealt with promptly, yet much confusion exists regarding the topography of these parts. For this reason, the following abstract is made purposely somewhat more detailed than is our usual custom.

The prostate gland is surrounded by a connective tissue membrane which is lined in some places with muscular fibres, and which adheres intimately to the glandular tissue. This structure is the connective tissue capsule of the prostate, known more briefly as the prostatic capsule. In addition to this, however, the gland is surrounded everywhere from its base to its tip, save where other viscera come in immediate contact with it, by connective-tissue layers, which are the periprostatic sheaths or aponeuroses.

The best description of these periprostatic membranous structures, is that of Denonvilliers: "the prostate and the membranous urethra are lodged between layers of fibrous tissue. The superior perineal fascia is prolonged anteriorly in the form of the anterior ligaments of the bladder which are inserted at the posterior surface of the pubis, and at their opposite ends to the prostate. Between these, a thin but resistant membrane extends, known as the pubo-prostatic aponeuroses. This constitutes the upper covering of the prostate."

This upper or anterior periprostatic aponeurosis is sometimes known now as the preprostatic fascia. This leaflet of connective tissue covers the plexus of Santorini and behind is joined to the prevesical fascia. The lateral coverings of the prostate consist essentially, of a fascia which is an expansion of the superior aponeurosis of the levator ani, which is directd upward towards the prostate and the bladder. This is the pubio-rectal fascia of the older authors. This lateral periprostatic fascia incloses a space containing numerous veins which constitute the lateral prostatic plexus.

The posterior covering of the prostate usually known as the "aponeurosis of Denonvilliers," or the prostato-peritoneal fascia, covers the posterior surface of the prostate and the vesicles. Above, it is inserted into the subperitoneal tissue of the

vesico-rectal space. Below, its insertion is variously described, but the present authors have found that it is inserted into the muscular layers of the membranous urethra, immediately below the apex of the prostate. Laterally, this aponeurosis joins the deep surface of the aponeurosis of the levator ani and unites with the latter to form the lateral periprostatic fascia.

The prostate is therefore surrounded by a series of periprostatic spaces. There is in front the *anterior space* occupied by muscles and veins. On either side, are the *lateral spaces*, very rich in cellular tissue and veins, while behind the *posterior space* is practically empty, but gives occasion for the accumulation of pus in the form of a retroprostatic cavity. This combination of spaces constitutes the "prostatic lodge." Beyond this lodge, and outside of the aponeurotic walls there are, in front, the space of Retzius; on either side, the superior pelvirectal space, while behind is the prerectal space. All these play an important rôle in the pathology of periprostatic suppurations.

The experimental portion of the author's work consisted in the injection of colored gelatin for the purpose of demonstrating the various periprostatic spaces. These injections demonstrate quite strikingly that three different cavities may be created by the accumulation of pus about the prostate; 1, the subcapsular space, 2, the posterior periprostatic cavity, and 3, the prerectal space. The subcapsular collections are always rather limited and diffuse easily into the posterior prostatic space. The retroprostatic collections insinuated themselves between the vesicles and reached upward until they touched the peritoneal cul-de-sac. Below, these collections of fluid were arrested by the insertion of the periprostatic fascia into the apex of the prostate. The prerectal accumulation filled the space which bears the same name, and reached below as far as the median aponeurosis. The rest of the article is devoted to a discussion of the clinical side of the subject, with a citation of cases. Finally, a summary is given, mentioning the rôle of the various periprostatic spaces in pathology and the methods of treatment suitable for the different varieties. Both experimental studies and anatomical researches showed the existence of spaces on all sides of the prostate within which periprostatic abscesses would accumulate. A

study of the clinical side of the subject showed that while each of the spaces described could furnish a localization for abscesses, yet these processes were very unequal in frequency. Thus, the prerectal or posterior extra-prostatic abscesses are very frequent. Posterior periprostatic abscesses are also very frequent, but the anterior and lateral periprostatic suppurations are rare, and, if present, are often the result of an extension of a phlebitis. The intimate connection with lymphatic vessels which characterizes the periprostatic tissues, accounts for the frequent complications of periprostatic suppurations with affections higher up in the pelvis.

As regards treatment, each particular type of abscess demands separate consideration, yet the perineal incision enables us to reach most of these collections of pus, although the rectal method is still in favor with some surgeons. The rectal route, however, proved insufficient in a variety of periprostatic abscesses, for it may not reach retrovesical collections, and the delay may be fatal to the patient.

2. A New Model of Opaque Catheter.—Fournier describes a ureteral catheter which is impervious to the X-rays. This new model is made by Eynard, of Paris, and consists of silk, coated with a mixture in which is incorporated a metallic powder. This catheter is made in all sizes, from 4 to 9, French, and its lumen is as large as that of other catheters of the same size. This ureteral catheter is very opaque, and shows exceedingly well upon the radiograph.

The Therapeutic Advantages of Using Mercury in the Colloid Form. G. Arbour Stephens, (*Brit. Med. Journal,* Dec. 17, 1910) says that the form of mercury that is worthy of such justification is hydrargyrum colloidalis, or colloid mercury. The subject of colloids is one that has become of great interest during the last few years, and is one that is worthy of great attention and much study.

In coilloidal mercury we have a very powerful antiseptic. A 1 per cent. solution of hydrargyrum colloidalis is a greenish-brown transparent liquid, without any smell, but has a faint metallic taste. It is non-irritant, non-corrosive, and relatively non-toxic. As a drug it can be used both externally and internally. Externally it has a very good cleansing effect on wounds, when applied in solutions of $\frac{1}{4}$ to $\frac{1}{2}$ per cent.

In ringworm of both the large and small spored varieties, as well as in two cases of alopecia areata, colloidal mercury has been very beneficial.

In these cases it is best to remove the grease on the scalp with petrol before applying the drug, otherwise it has no opportunity of coming into close enough contact with the disease.

As a mouth wash mercury in this form is very effective in very filthy states of the mouth, whilst as a spray its effect has been extremely good. In typical diphtheria cases a few applications of the spray have produced an effect almost as rapid and satisfactory as that following the injection of antitoxin. For tonsilar patches of all sorts it is of extreme value, though for mere redness or inflammation of the tonsils and pharynx it is not quite so effective.

Administered internally it is of value in acute gastritis, either of babies, children, or adults. The dose for babies is 3 minims of the 1 per cent. solution to a drachm of water, and for adults 20 to 30 minims. The ease of administration compares favorably with that of, say, grey powder.

It is in syphilitic cases, however, that the great advantage of colloidal mercury is seen. The author has not seen any unpleasant symptoms, such as salivation, sickness, or distaste for food, but in one patient who was taking 6 drachms daily the bowels were evacuated too freely until the dose was reduced by half.

Organic nervous lesions which fall into the category of syphilides respond to a certain degree to the internal administration of colloid mercury, but the other organic nervous lesions do not respond at all.

Chancroids Due to a Peculiar Cause. William J. Robinson, (*Medical Record,* Dec. 17, 1910) reports the following case: Mr. X. Y. applied to me for treatment for chancroids. That was his and his doctor's diagnosis. It was, according to his statement, a very bad case and they kept on constantly recurring. The first time he had them was about a year before he got married, but they were completely cured. And now they kept on coming back in spite of the fact that he avoided all extramarital relations, as all good men should. He had been six years married, had two children, the last three years old. The first attack since marriage he had over two years ago. The chancroids would heal in five to ten days, and sometimes they became confluent. The doctor gave him a wash, which from the description was lotio flava, then he gave him iodoform, but as he objected to the odor, he gave him some aristol powder. The chancroids would heal in five or ten days, and would remain well as long as he

would keep away from intercourse; but almost invariably after intercourse with his wife, the chancroids would break out again. I suspected that the *causa peccans* was to be looked for in the woman, and I said so. He rejected this surmise with indignation. His wife was the purest woman in the world. I told him that I did not at all impugn her purity, but that she might have an irritating vaginal secretion, or leucorrheal discharge. This was also impossible, as she was very healthy, very clean, and he was sure that he alone was the guilty party."

"When I examined him I found three small ulcers, one in the sulcus, one on the side, and one near the root of the penis. They did not look like chancroids to me. They looked like ordinary superficial ulcerations, due to some irritation or a burn. There was no adenopathy on either side. And careful microscopic examinations of the scrapings from each ulcer failed to disclose the presence of the Unna-Ducrey bacillus. Nor were there any streptococci. In fact, the field was singularly free from bacterial flora. I cleaned the ulcers thoroughly with hydrogen peroxide and gave him the following ointment to be applied twice a day:

Zinci oxidi	4.0
Bismuthi subnitr	2.0
Bals. Peruviani	1.0
Petrolati albi	20.0

and I told him to abstain from intercourse for two or three weeks. In five days the ulcerations, or the chancroids, as he persisted in calling them, were completely healed. A month later the man came back with the same ulcerations, almost in the same situations. I gave him the same treatment, but told him that if his "chancroids" broke out again I would not treat him until I had examined his wife. They did break out, and reluctantly he agreed to send her to my office. I examined her, found the vaginal mucosa harsh, dry, and shining, but no evidence of any disease or any uterine or vaginal discharge. Still I felt that here was the etiological factor to be looked for. A little parleying disclosed the fact that each time before intercourse, without the husband's knowledge, she was in the habit of inserting some antiseptic tablet. She had been doing it for over two years, as she did not want to have any more children. And she considered it too delicate a subject to speak about to her husband. I analyzed the tablets and found the principal ingredients to be citric acid and a small quantity of corrosive sublimate. And I consider the latter responsible for my patient's chancroids. The susceptibility of many people to mer-

curic chloride is well known, some being unable to use it on their hands without getting an eczematous eruption, etc. I advised her to leave those tablets alone, suggesting a milder remedy, and since then my patient's chancroids have not returned. Which is proof positive that those tablets were the only cause of the trouble."

And in this connection it is not out of place once more to sound a warning against the use of the highly toxic mercuric chloride as an anticonceptional remedy and as a vaginal injection. Some druggists in their ignorance advise the use of the 7.7 grain tablets! Of course, several cases of poisoning from the vaginal use of corrosive sublimate have been reported, some of them with a fatal issue. That more cases are not on record is a matter of great luck and is to be looked for probably in the slight absorptive power of the vaginal mucosa."

Prostatic Infection. Technique of Examination. E. G. Ballenger in an article on the Etiology of Prostatic Hypertrophy (*Medical Record*, Sept. 10, 1910) calls attention to the deficiences in the existing methods of examining prostatic secretion for microorganisms. He says in this connection:

"For a number of years I have observed patients with sexual hyperesthesia, or the so-called sexual neuroses, without demonstrable lesions to account for the persistence of the symptoms. Rarely did smears of the prostatic secretion show sufficient organisms to lead me to believe the germs to be the cause of the trouble. In studying the prostatic secretion of these patients, however, with the Reichert dark field illuminator, my attention was at once strikingly focussed upon the large number of motile organisms frequently seen in specimens free from pus cells. Later I found that a drop of this discharge, mixed with a 1 per cent. aqueous solution of dahlia, over which was placed a cover glass, enabled me to see more readily these actively motile organisms. Since that time about 140 patients have been examined in this manner to determine if there was a bacteriurio or prostatic infection. In the present report I have not included the patients where pus was present except in small amounts, as such cases come under the heading of the inflammatory conditions, which are much better understood than are these 'subchronic' infections."

"In 110 patients with very mild genitourinary irritation or slight affections of the sexual organs, a large number of mildly pathogenic organisms were observed in the prostate gland, seminal vesicles, or in the urine. Cultures of thirty-one of these showed the germs to belong to the colon bacillus group, or to the staphylococcus group. A

surprisingly uniform and well-defined symptom complex was found to attend these infections."

Technique. — An irrigation of the urethra and bladder is given according to the Janet-Valentine method with a normol saline solution until one to two quarts of the solution has been used. Having the bladder partly filled with the irrigating fluid, the prostrate is then massaged and a drop of the secretion which appears at the meatus is placed on a slide; a drop of a freshly prepared 1 per cent. aqueous solution dahlia is mixed with this drop of secretion. A cover glass then placed over it is sealed in place by applying melted white wax or paraffin around its rim with a camel's hair brush. As a confusing precipitate forms at times, and especially when the specimen contains urine, it should be placed under the lens of the microscope and allowed to remain in this position for 15 or 20 minutes or longer, to allow the precipitate to settle to the bottom and become quiet, otherwise the Brownian movement of these minute bodies might be mistaken for motile organisms.

The germs remain motile for a few days to a week, and a positive diagnosis may be easily made by a series of subsequent examinations, when their motility differentiates them from the débris which settles and becomes motionless. If preferred, the specimen may be viewed with the dark field illumination and the diagnosis thus made. Fixed smears may also be made and stained in the usual manner, but these rarely give as accurate an idea of the presence of microorganisms as does the above method.

Sodium Cacodylate in Syphilis. Runnels (*N. Y. Medical Journal,* Dec. 3, 1910) says that other organic arsenic compounds besides Ehrlich's "606" are useful in syphilis. He calls attention especially to sodium cacodylate in this connection.

From a theoretical standpoint sodium cacodylate has several advantages over dioxydiamidoarsenobenzol.

First: The latter cannot be obtained in this country at present, while the former is at hand and it is only necessary to test its purity before using.

Second: "606" will probably be very expensive, while the cost of the other is merely nominal.

Third: "606" causes pain on injection, while the cacodylates do not.

Fourth: Of the two the instability of the dioxydiamidoarsenobenzol is the more marked, for while the cacodylates break down in a few months, giving off poisonous products, it is necessary to ship

the other in hermetically sealed vacuum capsules to prevent immediate decomposition.

Fifth: The maximum dose of the cacodylates, for safety, 0.3 gramme per kilogramme, is twice the size of that of "606," 0.15 gramme per kilogramme (34), proving that in the experimental animal it is much more safe.

Sixth: The arsenic content of "606" is thirty-four per cent., while that of sodium cacodylate is 46.8 per cent.; the latter, therefore, is capable of delivering, weight for weight, thirty-eight per cent. more arsenic. Theoretically there seems to be some grounds for belief that sodium cacodylate should be more than a third more efficacious.

Seventh: The entire dose of sodium cacodylate is dissolved in the blood, whereas a large percentage of "606" (40) remains unabsorbed and therefore unacted upon at the site of injection. Which means that those who have been treated with "606" afterward carry around in their persons indeterminate amounts of arsenic. This has in no way had any therapeutic action and is worse than wasted.

It should be said in favor of Ehrlich's compound, however, that that portion of it which enters the blood possibly breaks down with more ease and therefore delivers its arsenic content more readily than does sodium cacodylate.

In the opinion of the author the cacodylates have proved themselves worthy of a fair trial. For the only way of determining their practical value and their worth as compared with dioxydiamidoarsenobenzol is by the therapeutic application. Those who have the facilities for the Wassermann reaction and spirochætæ determination have here open before them a field for work. However, neither drug has had as yet sufficient trial to prove that it is the ultimate specific, but such results have been reported from both that we have great hope that the problem of the diseases of animal parasitic origin has been solved.

But the author, while advising the use of the cacodylates for this class of disease, must emphasize the necessity for purity and the danger of deterioration. Use no sample that you have not tested, and if kept for any length of time retest the purity. Keep in glass stoppered or rubber corked bottles and make up all solutions fresh on the day of use.

Gonococcus Infection of the Kidney. F. R. Hagner, (*Medical Record,* Oct. 1, 1910) reports a case of pyelitis in which a pure culture of the gonococcus was obtained. He found sixteen cases of

mixed infection of the pelvis, with gonococci, and nine cases of infection with gonococci alone in the literature. In the majority of cases the infection seemed to be ascending in origin. The author's patient was a man aged 35 who had been treated for a long time for a discharge containing gonococci. Although he improved under the usual treatment the urine continued to contain pus. On cystoscopy worm-like masses of pus were found escaping from the right ureter. This ureter was catheterized and pure cultures of gonococci were obtained from the purulent urine from this source. Argyrol solution was injected into the pelvis and a radiograph was taken, resulting in the finding of a normal pelvis. Lavage of the pelvis on the affected side was carried out with 25 per cent. argyrol solution, later with a 1 per cent. solution of silver nitrate. Gonococcus vaccine was also given (25 to 30 millions). There were in all five washings of the pelvis. The patient made a complete recovery and was found with clear kidney urine on the affected side five months after the treatment.

Lactic Bacillus Cultures in the Treatment of Chronic Specific Urethritis. G. A. Pearson (*Medical Record,* Sept. 24, 1910) reports 34 cases of chronic gonorrhœa which he treated with urethral injections of a culture of lactic acid bacilli. Six patients were not benefited. In the remaining twenty-eight cases the specific microorganism disappeared, and all clinical symptoms subsided.

Preparation of the Culture — A strain of the lactic acid bacillus, which coagulated milk at room temperature in twenty to twenty-four hours, was planted in the following media: Milk, 10 parts; physiological salt solution, 25 parts; nucleanic acid, 5 per cent., 5 parts, and incubated for twenty-four hours, when plate cultures in agar were made. The first colonies appeared on the agar plates in from eighteen to twenty hours; these were selected for sub-cultures in a media of: Milk, 60 parts; physiological salt solution, 33 parts; nucleanic acid, 5 per cent., 7 parts, which were grown in the incubator twenty-four hours, when again plate cultures in agar were made and the first colonies appearing were transplanted. By this method the quantity of milk was gradually decreased, the physiological salt solution and nucleanic acid correspondingly increased, until good growth was obtained in a media of 85 parts of physiological salt solution and 15 parts of 5 per cent. nucleanic acid, which culture was used as the urethral injection.

Conclusions—Secretions present in the infected urethra inhibit the growth of a common strain of lactic acid bacillus. Suspension in physiological salt solution of lactic acid bacilli grown on slant agar

was injected into the infected urethra and cultures obtained by means of a sterile platinum loop from the urethra — these cultures were planted in milk in the following intervals: First culture, one minute after injection; second culture, five minutes; third culture, ten minutes; fourth culture, fifteen minutes; fifth culture, twenty minutes; sixth culture, thirty minutes. After forty-eight hours' incubation there was complete coagulation in culture three; in cultureetaoinetao there was complete coagulation in cultures one and two; slight coagulation in culture three; in culture four, acidity but no coagulation; in cultures five and six, no growth.

It was observed that the disappearance of the gonococci bore a constant relation to the length of time the lactic acid bacilli retained their virulence in the urethra.

In each of the six unimproved cases the bacilli were killed almost immediately after injection and although several different cultures were tried, none proved effective.

Cultures of lactic acid bacilli grown in nucleanic acid media, such as used in the treatment of the cases here reported, retain virulence when injected into the infected urethra for a much longer period of time.

In a number of instances cultures which coagulated milk in thirty-six hours have been obtained from the urethra of the patients under treatment ten hours after the injection was made.

Hot Air Treatment of Phagedenic Chancroids. E. W. Ruggles (*N. Y. Med. Journal,* Nov. 26, 1910) reports a second series of four cases of phagedenic chancroids treated with hot air. The original device for applying this treatment was an oven which the author found unsatisfactory. Hence he constructed a new model. This consists of a box, eight and a half by six and a half inches, and five and a half inches high, with a detachable cover. A flat iron heater, one and a quarter inches in diameter and five inches long, is inserted near the end of one side a little below the center. Extending across the box is a vertical shield, awo and a half inches wide, its lower edge being one and a quarter inches from the bottom. This is necessary to prevent radiation and the consequent unequal heating of the penis. An orifice, two and a quarter inches in diameter, in the center of the remaining floor space, six and a half inches square, admits the penis. An aperture, five-eighths of an inch in diameter, near the bottom of this end of the oven provides ventilation. The thermometer, extending to within one half inch of the floor, is inserted through the cover near one of the distal corners. A rheostat enables the patient to keep the

temperature at the required degree by enlarging or narrowing the aperture.

Both sides of the shield and the entire oven, inside and outside, are lined with asbestos paper. The oven with a kerosene (incubator) lamp as heater is also now being made with a detachable cover, since it facilitates the determination of the position of the penis and whether the lesions are properly exposed. These ovens can easily be sterilized without injury in an ordinary cook stove oven. They are made by the Kny-Scheerer Co., New York.

An Improved Operating and Observation Endoscope for the Anterior Urethra. J. F. McCarthy (*N. Y. Medical Journal*, Nov. 26, 1910) describes his endoscope for the anterior urethra. The instrument does not differ materially from the ordinary direct vision urethroscope of the Valentine-Chetwood type, but in order to make the urethral lesions more easily detectable, a lens attachment has been placed at about an inch from the opening of the tube. The author has also provided an improved handle which carries the electric connection to the lamp. (The use of magnifying lenses in connection with the ocular end of direct urethroscopes is not a new device.— *Ed.*)

AMERICAN UROLOGICAL ASSOCIATION

At the special meeting of the Association held in New York City on February 1, 1911, it was decided to hold the next Annual Meeting of the Association at a time and place independent of the meeting of the American Medical Association. It was voted to hold our next Annual Meeting in Chicago, Sept. 26 and 27, 1911.

Details of arrangements will be announced later.

Members are urged to send the titles of their papers to the Secretary as early as possible, as the program has been crowded the past three years. No title will be received after August 1, 1911.

Address: Dr. H. A. Fowler, Secretary, The Cumberland, Washington, D. C.

THE AMERICAN
JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII MARCH, 1911 NO. 3

A REVIEW OF THE SALVARSAN TREATMENT OF SYPHILIS.

By PROFESSOR E. TOMASCZEWSKI.

Chief Physician of the Polyclinic.

(From the University Polyclinic for Skin and Venereal Diseases in Berlin. Director: Professor Lesser.)

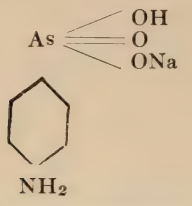
PAUL EHRLICH discovered salvarsan as the result of many years of indefatigable and purposeful labor. The discovery of this latest remedy for syphilis has been made possible through a series of other discoveries which we are beginning to appreciate only at this time: The finding of the spirochaeta pallida, the inoculation of syphilis to monkeys and rabbits, the discovery of atoxyl, and its application to the treatment of infections due to trypanosomes and spirilla.

Chemistry.—Ehrlich's work began by studying the constitution of atoxyl, which led him to the distinction between the saturated quinquivalent and the non-saturated trivalent arsenic compounds He next sought a compound which would combine the most intense spirillo-tropic properties with the very mildest possible toxic (organo-tropic) action. In this manner, he prepared, in succession, arsacetin, arsenophenylglycin, and finally, salvarsan.

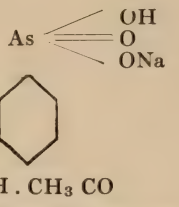
In order to show the relation of these compound, I shall

We consider Prof. Tomasczewski's paper the best presentation of the subject of salvarsan at the present time, and well worth the space we are giving it.—ED.

insert here the constitutional formulae of atoxyl, arsacetin and salvarsan.



Sodium p-amidophenylarsinate
(Atoxyl)



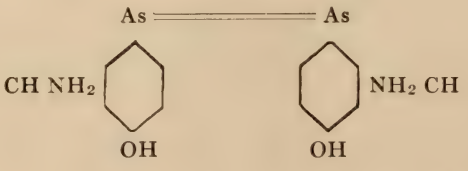
(Acetyl-Atoxyl= Arsacetin)

(Dioxydiamidoarsenobenzol= Salvarsan.)

The antisyphilitic action of this last compound was first noted by Hata in syphilitic rabbits. This investigator noted the interesting and important fact that when salvarsan was employed intravenously, the tolerated dose (T) per killigram of animal, was 0.1 gram, and that the curative dose (C), was very much lower, i. e., between 0.01 and 0.05, so that the relation between C and T was $\frac{C}{T}\ \frac{1}{10} = \frac{1}{7}$

The first use of salvarsan in the treatment of human syphilis should be credited to Alt, and his assistants, Hoppe and Schreiber.

Salvarsan occurs as a pale yellow powder, becomes speedily oxidized, and, therefore should be kept in sealed glass tubes which are filled with an indifferent gas. In its character as an amin, salvarsan is a base, and forms a hydrochloride with hydrochloric acid, having the following formula:



In its character of phenol, it is an acid, and forms a sodium salt with sodium hydrate, having the formula:

Solutions.—The hydrochloride is the salt which occurs in commerce, as salvarsan, and is soluble in hot water. A perfectly clear solution of a greenish-yellow color may be obtained by dissolving 0.5 or 0.6 gram of the substance in from 6 to 8 c.c. of distilled water (acid solution). If, to this acid solution, sodium hydrate be added, a gelatinous precipitate forms, which upon further addition of the alkali, again disappears, leaving a perfectly clear solution, yellow in color (alkaline solution). For this purpose, one requires about 0.7 gram of normal sodium hydrate (4 per cent.) for each 0.1 gram of salvarsan. If we add only enough sodium hydrate to redissolve the gelatinous precipitate, we obtain the so-called "cloudy alkaline solution."

NEUTRAL EMULSIONS

Wechselmann and Michaelis have endeavored to introduce a "neutral emulsion." Michaelis dissolved the substance in hot distilled water and added enough sodium hydrate solution to obtain a perfectly clear alkaline solution. He then added two or three drops of a $\frac{1}{2}$ per cent. alcoholic solution of phenolphthalein (red color) to serve as an indicator for the subsequent neutralization with 1 per cent. acetic acid. When this acid was added, salvarsan is precipitated in the shape of yellow flakes. By shaking steadily and adding acetic acid drop by drop, the red color is made to disappear, showing that the solution has been neutralized.

Wechselmann dissolves the substance first in one or two c.c. of 15 per cent. sodium hydrate solution. He next adds glacial acetic acid, drop by drop, until a fine yellow mud is precipitated. The latter is suspended in one or two c.c. of sterile distilled water, and then is tested with litmus paper. If the reaction is acid, it is neutralized with decinormal sodium hydrate solution; or with 1 per cent. acetic acid, if the reaction is alkaline. The neutral suspension is then centrifuged for the purpose of removing the sodium acetate which has formed during

the process of neutralization. The clear fluid is decanted from the precipitate in the centrifuged tube, and the remaineder is suspended in from 4 to 6 c.c. of sterile physiologic salt solution.

OILY SUSPENSIONS

Kromayer, Volk and others have devised and recommended suspensions of salvarsan in oily media, such as liquid paraffin, olive oil, oil of sweet almonds, etc. These mixtures are prepared by finely triturating the substance in a mortar with a little oil, or paraffin. Usually, 5 or 6 c.c. of oil or liquid paraffin are employed to each dose of salvarsan.

OTHER EMULSIONS

Finally, Citron and Mulzer have recommended an emulsion prepared by treating the acid solution with 10 per cent. calcium carbonate, while Jessner makes an emulsion of salvarsan by adding 8 per cent. of a solution of sodium bicarbonate. Neither of these last-mentioned modifications have been adopted to any extent thus far.

HOW TO EMPLOY THE VARIOUS SOLUTIONS

The *acid solution* is very easy to prepare, but it is very perishable, and, therefore, must be prepared shortly before every injection. It is injected intramuscularily into the buttocks with the aid of a 10 c.c. "record syringe" with a needle measuring 5 or 6 c.m. in length. The only authors who have recommended the acid solution, are Taege and Duhot. Alt and Hoffman warn against its use, inasmuch as it impairs the heart action. Hoffman reports one case in which the use of the acid solution was followed by a febrile attack which, in all probability, was due to a central embolic pneumonia followed by pleurisy, which originated in a thrombus following the injection of the acid solution into the gluteal muscles. In Lesser's clinic the injection of the acid solution was followed by the appearance of a so-called late exanthem with the threatening general symptoms. Hata, moreover, states that the acid solution is very slowly absorbed, so that it is not therapeutically efficient.

The preparation of the *alkaline solution* is also simple. It is not stable, and therefore, must be freshly prepared before each injection. The technique of injection is the same as that used for the acid solution. The alkaline solution is recommended

after numerous trials by Alt. And yet, its use has not become popular. The reason for this seems to be as follows: Salvarsan at first was difficult to dissolve. A large quantity of water and of sodium hydrate solution was required. The volume injected, therefore, at first measured from 30 to 40 c.c., and the liquid was markedly alkaline. The result was that extensive and very painful infiltrates occurred at the sites of injection. Later on, the preparation was improved markedly, so that now 0.5 or 0.6 gram of salvarsan, as sold in the market, is soluble in from 6 to 8 c.c. of water, and 2.5 or 3.0 c.c. of normal sodium hydrate suffice for the preparation of a *cloudy alkaline solution* which does not give rise to extensive infiltrates nor acute pains, provided the patient remains in bed for several days after the injection. *From our experiences in Lesser's clinic, I consider the intramuscular injection of this solution as the most efficient method of administration which we have yet used with salvarsan.*

The *neutral emulsion* owes its existence to the extensive and painful infiltrates which followed the injection of the alkaline solution in so many cases in the earlier stages of the work. It was apparently necessary to neutralize carefully in order to avoid the irritant action of the alkali, and also to reduce the volume injected to the smallest possible amount, in order to make the injection itself quite painless. These were the principles that guided Wechselmann in the preparation of his neutral emulsion. The method of Michaelis is based chiefly upon the necessity of a neutral reaction.

Both these authors recommend *subcutaneous injections* into the scapular or submammary regions. The expectations which were cherished when the subcutaneous injection of a neutral emulsion was first employed, have not been fulfilled. Even the proper execution of a subcutaneous injection is difficult, even in the hands of experts. Furthermore, the pain at the time of these injections is very slight, but there is considerable pain afterwards, for several days.

The most important point, however, is that the conception that it is necessary to inject a neutral emulsion was based upon an erroneous premise. It was supposed that the violent local reactions were due to the acid or alkaline character of the solutions, and the fact was lost sight of that the real cause of these

reactions lay in the nature of the remedy itself. Naturally, the irritating properties of salvarsan must appear very prominently when a concentrated suspension is introduced subcutaneously, a method which does not present as favorable conditions for absorption as the intramuscular. This was, indeed, found to be the case. After subcutaneous injections of the neutral emulsion there occurred in from 2 to 3 per cent. of the cases, and according to some authors, even more frequently, areas, of very characteristic softening with extensive tissue necrosis from four to ten weeks after injection. At first, a slightly painful, vaguely fluctuating *infiltrate* is formed at the site of the injection, with very little pain. In one place this infiltrate, then, shows a fistula which secretes some pus. Gradually the skin over a considerable area *becomes necrosed*, and a grayish-black, dry, slightly painful mass is formed, which is often surrounded by a border of skin which has been undermined by the necrosis. These areas of necrosis are very slow to heal, are cast off very sluggishly, and often require excision through healthy tissues, in other words, an operative method of considerable seriousness. These necroses are not due to the bacterial infections, but merely to the necrotic effects of salvarsan. On the other hand, these infiltrates may be infected secondarily (Martius, Neisser). In the milder cases there is a more or less extensive solid, scarcely painful infiltrate, which may remain unchanged for many weeks or months. The action is slow, and even in the favorable cases, a deposit remains for a long time. *The subcutaneous administration of the neutral emulsion must, therefore, be abandoned.* I should not even advise the use of this emulsion intramuscularily, because it is difficult to prepare and because it gives rise to necrotic areas, particularly readily, on account of its concentration.

The attempts to incorporate *salvarsan with oily media*, were intended to make its administration painless and simple. Volk and Kromayer were the first to recommend this method. The oily suspensions have the advantage of keeping much longer unchanged, provided they are preserved in a dark place. Still, it is advisable to prepare the mixture freshly in each case, immediately before injecting. Oils seem to be more adapted to this purpose than liquid paraffin, especially if the entire amount is injected at once. The injections are given intramuscularily

and are almost painless. In the course of a few days, however, there appear small or larger, more or less painful infiltrates which persist for quite some time, as a rule. *The therapeutic effects are not so good* as those obtained with the cloudy alkaline solution, according to the experiences of Lesser's clinic. Kromayer recommends the injection of 0.1 or 0.2 gram of the substance at intervals of several days. Isaak and Friedlander inject 0.1 gram weekly until the symptoms disappear. Both emphasize the fact that by this method they are able to carry out the treatment in *dispensary patients.* To my mind, it is not a matter for indifference when so many deposits are created and when the injections are distributed over a period of several weeks. In using oily or paraffin mixtures, when the entire dose is injected at once, it is best to employ a 10 c.c. syringe with asbestos piston. When repeated injections of smaller amounts are given, a syringe, holding 1 or 2 c.c. should be used. In both instances, needles of large calibre, 5 or 6 c.m. in length, should be employed.

Intramuscular Injections. Local Effects.—The fact that inflammatory foci which tend to necrose, are formed in the vicinity of the injected mass, is dependent upon the chemical constitution of salvarsan. This was made clear by the investigations of Orth, Löhe, Martius and others, who proved that reactions occurred in muscles as well as in the subcutaneous tissues, with this difference, that in the muscles the conditions for absorption seem to be more favorable, and therefore, the rule is that intramuscular injections usually terminate in cicatrization, while the formation of abscesses which point outward, is exceedingly rare. The intensity of the reaction, furthermore, depends upon the individual injection. We find the same differences in employing soluble and insoluble mercurial injections. In this manner, we can explain the great differences in the local reaction which occurred in individuals in spite of the fact that the method of injection was the same in all cases. Naturally, the *site of the injection* has also something to do with the intensity of the reaction. If the injection be made in the neighborhood of the sciatic nerve, then the formation of the infiltrate which followed the injection, may give rise to severe pain and even paralysis, due to the irritation of the sciatic nerve.

These effects may be discerned in the peroneus and as Martius states, also in the pudendal nerves. *The injections should therefore always be administered in the upper external quadrant of the buttocks, and the needle should not be introduced too deeply in thin persons.*

The local manifestations which occur with intramuscular, and particularly with subcutaneous injections of salvarsan in doses of 0.5 to 0.6 gm. are certainly great disadvantages. Much may be gained by abandoning the subcutaneous method entirely, yet the intramuscular infiltrates also interfere with any repetition of the salvarsan treatment, as well as with subsequent mercurial injections. These points have been gaining importance clinically, as we have gradually realized the impossibility of effecting a cure of syphilis with a single salvarsan injection.

Intravenous Injections.—This accounts for the changes in the technique of administering the new remedy which have been effected during the past few months, i. e., the gradual transition towards *intravenous injections.* These are preferred by an increasing number of workers, not because they act better, but because they do not give rise to any local reaction, can easily be repeated, and seem to be especially intensive in their effects when used in conjunction with intramuscular injections.

Iversen, Schreiber, and Weintraud share the credit of having perfected the *technique of intravenous injections of salvarsan,* and having observed the effects of these injections in a large number of cases. Their technique has now attained a high degree of perfection. It is not exactly simple, yet it is by no means very difficult. In Lesser's clinic we employ exclusively the apparatus devised by Weintraud-Assmy, made by Louis & Lowenstein (Berlin, Ziegelstrasse). The use of this apparatus requires, naturally, a trained assistant, but is much simpler than the use of Schreiber's syringe. The apparatus consists of a standard measuring 1 meter in height, bearing supports for two cylinders, each holding 200 c.c. These cylinders taper to a coupling-piece to which a rubber tube is attached. Both tubes are provided with a two-way stopcock, and the latter ends in a conical tip which fits into a venepuncture needle. Into one of the cylinders physiologic salt solution at a temperature of 40° C. is poured. The other cylinder is filled with salvarsan solution.

The latter is prepared by dissolving to a perfectly clear solution 0.4 to 0.6 gm. salvarsan in the requisite amount of normal sodium hydrate and diluting to 200 c.c. with normal salt solution. A rubber bandage is applied to the arm above the elbow. One of the larger veins is punctured with the needle and the band is removed. Immediately a small amount of salt solution is allowed to flow into the vein, to make sure that the needle is in the venous lumen. The stopcock is next changed to allow the salvarsan solution to flow in, and finally about 10 or 15 c.c. of normal salt solution is allowed to flow into the needle. In this way a venous thrombosis can occur, but very exceptionally.

If the technique has been perfect, *no local reaction whatever will follow.* Experience has shown that these intravenous injections are well borne by persons with intact internal organs, especially hearts, and that they may be repeated and combined with intramuscular injections. Jadassohn recommends that the salvarsan-tolerance of the patient be tested beforehand with a smaller quantity of the intravenous solution. After the intravenous injection the patient must at once go to bed, where he should remain about two or three days, inasmuch as the general reaction takes about that length of time to disappear, and proper rest materially aids the action of most drugs.

UNTOWARD EFFECTS OF SALVARSAN.

For the present, and perhaps for all time to come, we must face the necessity of producing unpleasant local effects with intramuscular injections of salvarsan. Intravenous injections, however, as we have seen, do not give rise to any local disturbances, provided the technique has been perfect.

The *general untoward effects* of salvarsan depend, in the first place, upon its chemical constitution, and partly also upon its arsenic content, as well as upon the dose injected and, finally, upon the peculiarities of individual patients.

The general reactive symptoms which are noted usually after *intravenous injections* of salvarsan are as follows: Fever, nausea, vomiting, diarrhea. Rarely there is a total absence of any temperature elevation. Most patients begin to feel chilly even during the first hour after the injections. Some of them get a regular chill. Then the temperature rises, reading 38-39°

C.—rarely 40° C. and over. Almost invariably the temperature then sinks to normal after 24 hours. In all probability these phenomena are due to the intravenous infusion as such, for they may be observed after the use of ordinary normal salt solution. Naturally the salvarsan and the alkali in the solution also add their quota to the effects, but I do not believe the reaction has anything to do with the disintegration of spirochaetae.

Schreiber found that the second intravenous injections often pass off without fever. Nausea, vomiting, and diarrhea are almost never absent. Sometimes the gastric symptoms are more pronounced,—sometimes the intestinal arsenic is found in the feces and the vomitus. These phenomena may be interpreted as local effects of salvarsan, and are to some extent dependent upon the size of the dose, as Weintraud points out.

In many coses the patients complain of heavy sensation in the head, headache, or vertigo. Skin eruptions are apparently rare. On the other hand, the so-called Herxheimer's reaction occurs with marked intensity. This phenomenon, which had been previously noted by Welander and Jarisch, consists is a rekindling of a faint eruption which appears with greater intensity, or in an unmasking of a previously latent eruption. The reaction is noted most intensely in fresh exanthems which had not yet been treated, especially in the case of the first generalized syphilitic rashes. The reaction occurs in 12 to 24 hours after an injection of salvarsan. Similar local reactions are noted in syphilitic lesions in the mucous membranes or in the internal organs. From our experience with mercurial treatment we can conclude that this reaction is primarily due to the absorption of a rapidly acting spirochaeta-killing remedy.

The pulse, which is accelerated during the infusion, and is often small, usually runs a parallel course with the temperature. Nearly all the patients feel perfectly well after 24 or 48 hours.

After *intramuscular* and *subcutaneous* injections there is either a complete absence of general reaction, or the general symptoms occur later or differ from those described above.

Temperature.—On the day of the injection the temperature usually remains normal, but arises to 38 or 39° C. and falls again in the following days. Very rarely higher temperatures have been noted, and very rarely, also, the temperature remains quite normal throughout.

There seems to be no regular relation between the size of the dose, the extent and type of the manifestations, and the course of the temperature. A significant fact is that congenitally syphilitic children do not show high temperatures usually, in spite of the large number of spirochaetae which they harbor in their bodies.

Pulse.—The pulse usually runs parallel to the temperature curve, yet there may be a tachycardia lasting for days. A slow pulse, however, seems to be the exception.

Gastro-intestinal Tract.—Nausea and vomiting are very rare, and the same is true of diarrhea. When the latter does occur, it is usually severe, lasts for days, and may be combined with annoying tenesmus. Constipation is noted for a few days in most cases.

Kidneys.—According to Jadassohn, there is frequentlly a trace of albumin in the urine. In some cases there were transient symptoms of a hemorrhagic nephritis. Frequently there is an oliguria of short duration, with a polyuria following.

Bladder disturbances have been noted in a number of cases. Difficult urination, transient or moderately prolonged urinary retention, vesical tenesmus,—all of which in a number of instances occurred in conjunction with intestinal tenesmus (Bohac and Sobotka, Bering, Schlesinger, Polland and Knaur, Eitner, Malinowski, Buschke, Volk-Lipschütz, Rille). The origin of these vesical disturbances is still in dispute. In the cases of Eitner and Malinowski the salvarsan had been exposed, either as salt or as solution for days to the air. A crack in the glass ampul may be a similar cause. As Martius point out, there is also to be considered the possibility of pressure upon the pudendal plexus, due to the formation of deeply located infiltrates in the musculature of the buttocks. None of these explanations suffice to account for all the cases, yet we must not forget that until now the cases on record are few in number among many thousands of patients, in spite of the early attention which was called to these symptoms by the reports of Bohac and Sobotka. Finally, we must bear in mind that even with these untoward effects the cases have gone on to favorable results.

Nervous System.—This system deserves particular attention in connection with salvarsan treatment, because the toxic

effects of this remedy may assume a stealthy, deceptive manner, because the impairment of the nervous system often means the involvement of important organs, and especially because our previous experiences with atoxyl and arsacetin warn us to be especially careful in this direction.

It may be said that salvarsan has been watched with especial care, in regard to its action upon the nervous system. What, then, has been the experience of the clinicians who have thus far recorded their observations in this respect.

The *central nervous system* is not affected by salvarsan, provided it be intact or the seat of limited secondary or tertiary lesions. The same holds good for the *spinal nervous system.* The peripheral nerves seem to be practically never affected by salvarsan. Naturally, we must except here the cases in which more or less severe symptoms have been caused by the injections of the remedy into the region of the sciatic nerve. These disturbances include sciatic pains which may continue, in some cases, for days or weeks (Wechselmann and Lange, etc.) radiating pains (Zieler, Herxheimer, etc.), paralysis of the peroneal muscles, (Wechselmann and Buschke). All these disturbances are the immediate effects of the local inflammatory reactions, due to the injection itself.

In a few cases there was noted the diminution or disappearance of certain reflexes (abdominal, cremasteric, and tendon reflexes). The first observations of this sort were reported by Bohac and Sobotka. Yet, these seem to be very rare and, what is important, transient manifestations.

The *cerebral nerves* require a few special remarks. It was expected that in dealing with an organic arsenic preparation, as with atoxyl and arsacetin, the effects of salvarsan upon the *optic nerve,* would have to be reckoned with. This anticipation has not been realized, so far as present experience goes. No organ was so carefully examined before and after the administration of salvarsan as has been the eye, and especially the fundus of the eye. In spite of this, atrophy of the optic nerve has been noted thus far, only in one case reported by Finger. Owing to the importance of this question, and the peculiar character of the case, I shall report its history in detail:

"The patient was 22 years of age, and had been treated

almost constantly during the past two years for malignant syphilis. In addition to mercury and iodides, this patient also received in April, 1909, 30 injections of arsacetin and in November, 1909, eighteen injections of enesol. On July 30, 1910, he was admitted to the hospital for gummas of the nose and pharnyx. The fundus of the eye was found to be normal. On July 6th, he received an intramuscular injection 0.4 gram of salvarsan, according to Wechselmann's method. On July 13th, the syphilitic symptoms were considerably improved, and the patient was discharged. On Sept. 5th, he developed a small gumma on the septum of the nose. On Oct. 5th, that is, three months after the injection, the patient came to the clinic, complaining of disturbances of vision. An examination of his eyes in Dimmer's Clinic, showed a sluggish papillary reaction, anisokoria, bilateral narrowing of the visual field, pallor of the temporal half of both papillae, in other words, beginning double atrophy of the optic nerves.

It is probable that the treatment with arsacetin and enesol, which had been used in this patient before the salvarsan, may have had something to do with preparing the optic nerves for the unfavorable effect.

To sum up all that has been said, it may be stated to-day that one or two injections of salvarsan, in doses of from 0.5 to 0.6 gram, *do not produce any clinically discoverable damage to the visual nerves.* Lately, another important question has arisen. Fischer found a very severe papular iritis in four cases, and in another case neuro-choroidoretinitis, occurring as relapses two or three months after the injection of salvarsan. Wechselmann reports a case of iritis and choroiditis, Kowalewski noted in one case and Blaschko in two cases, an optic neuritis. Finger reported a peripheral choroiditis of the right eye, with central clouding of the vitrous body, a double optic neuritis with paresis of the ocular-motor. Rille reported a marked choked disk on the right side, with facial paralysis upon the right side, accompanied by a unilateral neuritis of the vestibular and cochlear nerves. Furthermore, a case of double optic neuritis, with right-sided paralysis of the facial and the trochlear, has been reported.

In the majority of these cases, all of which belong to the

early period, the complications were undoubtedly relapses of syphilis. In some cases the authors who reported them, left this question open, but all of them, with the exception of Wechselmann, regard the occurrences as suspicious, and believe it possible that the seat of the relapses and the manifestations themselves are attributable to the salvarsan treatment. This question must be left undecided, in my opinion, until further clinical observations have been collected.

Milder or more severe affections of the *other cervical nerves* have also been observed after salvarsan injections in the early period, as, for example, of the facial and the *various ocular nerves* (Wechselmann, Spiethoff, Finger, Rille and Stern). The number of these cases is small, and similar manifestations have also been noted, though very rarely, as relapses after mercurial treatment. Yet, it seems certain that, for the present, one must admit the possibility that salvarsan is responsible for the seat of these recurrences. According to K. Stern, there was no doubt that salvarsan was responsible for the untoward effect in his case of paralysis of the ocular muscles.

The communications of Finger, Rille, Beck and Matzenauer concerning disturbances of the *nerves of the internal ear*, as, for example, difficulty in hearing, disturbances of equilibration, vertigo, vomiting, and nystagmus are even more important. All these cases belonged to the early stages of syphilis.

In four cases the symptoms appeared very soon after the injection, after from three hours to three days, and recurred after ten or fourteen days. In two of these cases the syphilitic eruption showed a Herxheimer reaction (see below). It is certainly probable that the disturbances in the labyrinth, in such cases, may be dependent upon a similar reaction in syphilitic foci which had previously remained clinically latent (Ehrlich, Urbantitsch). At any rate, it seems suspicious that such disturbances have not yet been observed with injections of mercury which, as we know, do develop the Herxheimer reaction quite frequently and intensely.

In two cases the disturbances in the labyrinth occurred in the fourth and eighth week after injection. In one case, there was also a double choked disk, and right-sided facial paralysis, together with a papular syphilide. In the other case there was

a double optic neuritis and a right-sided facial and trochlear paralysis. In both cases, the symptoms disappeared under mercurial treatment, in one of them very slowly, in the other rapidly. We are certainly dealing in both cases, with recurrences of syphilis which have become peculiarly localized.

Finally, we must speak of two cases reported by Finger, in which labyrinthine disturbances occurred nine and twelve weeks after injection respectively. The Wassermann reaction was negative and there were no symptoms of secondary syphilis. The condition remained stationary. In both these cases, it is probable that we were dealing with a toxic neuritis of the acoustic nerve, due to salvarsan.

Injections of salvarsan quite frequently give rise to *skin eruptions*. Usually these eruptions occur in the first days after injections, are accompanied by rise of temperature and disappear rapidly. As a rule, these eruptions are erythematous or urticarious, rarely hemorrhagic. In some cases the eruption occurs only after a repetition of the injection (Wechselmann, Jahassohn.)

In is noteworthy, in my opinion, that the skin eruptions peculiar to arsenic, have been seen but rarely after the use of salvarsan. Keratosis has never been noted, while arsenical-zoster has been reported in but a few cases (Ledermann, Bettmann, and others). Marked pigmentations (melanoses) are also very rare, but it might be noted that the eruptions of the earlier stages of syphilis have a tendency to heal with a more brownish discoloration than we are accustomed to see in mercurial treatment.

The so-called *late eruptions* (Wechselmann, Goldbach) occupy a special position, and prevent a very characteristic clinical picture. After a chill, the temperature rises to 39° or 40° C. and may remain at this level for several days in succession. At the same time, there appears a measles- or scarlet-fever-like eruption, frequently accompanied by redness and swelling of the pharyngeal ring, with or without false membranes. The patients complain of headache, feel miserable and are sometimes temporarily in a state of depression. The pulse is usually very small and very frequent. All these cases have thus far terminated favorably. After five or eight days the fever disappears, the eruption vanishes, often with desquamation, and the patient

feels well. Abortive cases also occur. For a few days low temperatures are noted and the eruption rapidly fades. In other cases, the patient merely feels very ill. It has been repeatedly noted that these late eruptions occur in conjunction with renewed painful swellings at the sites of injection. Possibly, these eruptions may be due to the action of toxic derivatives of salvarsan which have formed in these deposits. Thus far these late eruptions have not been noted after intravenous injections.

The conclusion from all this is that salvarsan is by no means an indifferent remedy. On the other hand, it has been shown by the rarity, the mildness and the rapid disappearance of nearly all the general effects that have been observed thus far, that the dose of 0.5 or 0.6 gram is relatively non-toxic and that *but very few human beings have a congenital idiosyncrasy for salvarsan.* It is questionable whether this holds good for repeated injections. In this respect, we lack sufficient experience. We know, however, quite surely that one injection does not seem to produce a specific hypersensitiveness.

THE ELIMINATION OF SALVARSAN.

After intravenous injections the elimination of appreciable amounts of arsenic in the excreta is terminated within four or five days. After subcutaneous and intramuscular injections the elimination is prolonged to six or eight days, (Fischer and Hoppe), or for fourteen or eighteen days, according to Greven. Very small amounts of arsenic may be demonstrated in the urine for a number of weeks, provided a deposit is present, (Fischer, Scholtz, Stern and others). It is this fact that warns us to be very careful,—all the more so because we are not obliged to use repeated injections of salvarsan, save in exceptional cases.

THE MORTALITY OF SALVARSAN: CONTRAINDICATIONS.

Deaths have been reported after injections of salvarsan (Spiethoff, Hauck, Ehlers, Willige, Martius, and others). These cases have led Ehrlich and others to formulate strict contraindications against the use of the remedy, as follows: Serious disturbances of the circulatory organs. (Even compensated cardiac lesions are contraindications for intravenous injection). Cases with degeneration of the blood vessels, aneurisms, transient cerebral hemorrhages, patients with irritable cardiac and nervous

systems, old persons with advanced degeneration of the central nervous system, particularly cases of marked locomotor ataxia and progressive paralysis, cases with fetid bronchitis, with severe diabetes, even when the urine does not give any acetone reaction, severe nephritis, gastric ulcers, all forms of cachexia, which are not directly due to syphilis, and finally, all cases which have been treated with any of the arsenic compounds mentioned in a previous paragraph, even when this treatment has been employed a year or more previously.

In addition, it is not an exaggerated precaution to exclude from salvarsan treatment, for the present, all cases of specific affections of the eye, the optic nerve, the eye-muscles, etc. Disturbances in the internal ear, in the acoustic nerve, should also be contraindications of salvarsan treatment, especially all cases which have shown symptoms of an affection of the labyrinth after one injection of salvarsan.

THERAPEUTIC EFFECTS.

The effect of salvarsan upon the manifestations of syphilis, can no longer be disputed by anyone. Nearly all forms of primary, secondary and tertiary syphilis yield with remarkable promptness to this treatment. An enormous mass of clinical material gathered during the last few months, demonstrates this. Some forms, however, require further discussion. Thus, the swollen lymph nodes, especially in the primary stage, diminish very slowly in size. The large papular eruptions also showed quite frequently a sluggish respone to treatment, while the acne-like and small papular syphilides usually disappeared rapidly. The secondary syphilitic affections of the mouth and throat disappeared rapidly, and without any traces, save in rare exceptions. The same is true of the various tertiary lesions. The tertiary affections of the bones and joints, particularly, are affected favorably by this treatment. The most brilliant results, however, are noted in the so-called precocious tertiary forms, the malignant forms of syphilis, whether they affect the skin or the nose and throat, as they often do.

At first, it was feared that salvarsan would not be applicable in *congenitally-syphilitic children.* The effects of a sudden destruction of such large numbers of spirochetae in this form of syphilis, it was feared, would react unfavorably. Ehrlich him-

self expressed this doubt. Experience showed, however, that salvarsan could be employed even in the first weeks and months of life, and that the results were excellent. The best summary of this subject was that of E. Lesser: "Of nine children, between the ages of five and twelve weeks who had been treated by salvarsan, none died, while in the years 1908 and 1909, there had been ten deaths among twenty-seven cases between the same ages, a mortality of almost 40 per cent." The spirochetae disappear, the symptoms improve and the children develop in a normal manner.

Of course, some of these children die in spite of this, because they are unable to live on with the profound changes which have already taken place in their various organs. Thus, Herxheimer and Reinke found that "in two cases of hereditary syphilis no spirochetae were present in any of the internal organs save in the lungs two and four days respectively after the administration of the Ehrlich-Hata remedy. In the lungs the spirochetae were in a state of agglutination and of a high degree of degeneration and even disintegration." These investigations show how rapidly and intensely salvarsan destroys spirochetae, not only in the skin and mucous membranes, but also in the internal organs.

It might be noted here how slight a reaction is produced in the body of an infant when spirochetae perish in it in such masses. In these infants there are neither symptoms referable to an intoxication due to the swamping of the body with toxins which have been set free, nor is there any remarkable high elevation of temperature.

The successes with salvarsan treatment in older patients with congenital syphilis with *parenchymatous keratitis* have been but slight. According to Igersheimer, the sum total of the observations made to date by himself, and by Treupel, Neisser and Kuznitzky, Lindemeyer, Schanz, Sandman, Wechselmann and Seligsohn, Fehr, Glück, Fränkel and Grouven (and also Jadassohn), is that the cornea is never or almost never influenced with any degree of certainty by the use of Ehrlich's remedy, no matter in what form the latter may be administered. When there is, in addition, beginning labyrinthine deafness, I regard the use salvarsan as absolutely prohibited.

After the astonishing, sometimes quite remarkable results obtained with salvarsan in almost all lesions of acquired and congenital syphilis, it seemed natural that attempts should be made to treat with this remedy the so-called *meta-syphilitic affections*—tabes dorsalis, and progressive paralysis. Some reason for this might be traced to the fact that Alt, to whom the credit must be given of having first applied salvarsan in the clinical treatment of syphilis in human beings, has reported very early concerning the action of salvarsan in the early stages of these diseases. Nobody expected to get any good results in advanced types of these conditions, and if such cases have been treated at all, it was usually at the urgent requests of patients or their families. Experience has demonstrated that such cases may become acutely worse after injections of salvarsan. All experienced observers agree upon this point (Oppenheim, Treupel, Willige, etc.). It has not even been definitely settled whether—undoubtedly good effects have been obtained in the early stages of these diseases, in the sense of a specific action upon their lesions. Whenever a diagnosis of progressive paralysis is made, and when it is found that antisyphilitic treatment produces remarkable and durable improvement, there are always some doubts as to the correctness of the diagnosis. It would be justifiable to regard such improvement after salvarsan as conclusive evidence only if a large number of cases of paralysis were arrested for a long period or were improved to a marked degree. Such reports are still lacking.

The value of salvarsan seems to be somewhat more pronounced in locomotor ataxia. It is true, pupils insensible to light remain insensible and lost patellar reflexes do not reappear. But all the symptoms which are subject to wide spontaneous fluctuations often show a remarkable improvement, frequently after a transient turn to the worse, or, these symptoms do not recur for a considerable length of time. On this point the observations of almost all authors appear to be identical. In addition, according to Alt, the treatment changes the positive Wassermann reaction in these cases into a negative one, and the reaction remains negative for a number of months, up to a year and a half, possibly for a longer time. For these reasons the injections of one dose of salvarsan is at least permissible in cases of tabes dorsalis and paralysis in their early stages.

RATIONALE OF THE ACTION OF SALVARSAN

The action of salvarsan sets in very rapidly in almost all cases. In the lesions which are rich in spirochetae and occur in the early stages, these organisms are first affected. They lose their mobility, assume bizarre shapes, and disappear entirely. This process takes from 24 to 48 hours after an injection, but may last longer, depending chiefly upon the anatomic and pathologic conditions present. The action of salvarsan must needs rest primarily upon its *bactericidal specific action* (spirillotropic effect). It seems, indeed, difficult to understand that there are still authors who doubt whether the remedy has any specific action whatever, or who regard such action, as possessed by salvarsan, as of no special importance." (Ehrlich). The rapidity of its action, the importance of giving the right dose, the Herxheimer reaction, the successful influence upon other diseases caused by spirilla in man. Recurrent fever, framboesia, Vincent's angina, and in animals: Spirillosis in hens and geese, —all these speak so eloquently, that not the slightest doubt can be raised now regarding the specific action of salvarsan upon the spirochetae.

Before the onset of improvement is noted after an injection of salvarsan, one often sees a so-called Herxheimer's reaction in the lesions. Usually this phenomenon appears sharply only in macular or maculo-papular eruptions. The eruption becomes more distinct, larger, and many new macules or maculo-papules appear. Similar focal reaction, or phenomena which can be interpreted as such, have been also noted in sclerotic, mucous, or osseous lesions of the early stage, and even in the tertiary stage. The general impression is that this Herxheimer's reaction is more frequently and more intensely noted after the use of salvarsan than after the use of mercury. The simplest and most plausible explanation for it is found in the theory that the infective agent is rapidly destroyed, and that in consequence there is an increase in the intensity of the local lesions. Many authors regarded this phenomenon as an unfavorable sign, an expression of an irritation of the spirochetae due to a too small dose. Later experience has shown, however, that this assumption was quite unfounded.

Ulcerating lesions become clean and covered over with epithelia so quickly that some observers have asserted that salvarsan possesses not only spirillotropic properties but also *promotes the growth of epithelial tissues.* This may be so, but of course, is very different to prove.

The improvement in the lesions is accompanied in very many cases by a marked *increase in weight*, and an improvement in the general well-being which has a marked euphoric note. This is clinically of great value, for under energetic mercurial treatment there is usually some loss of weight towards the end of the treatment, as well as an impairment of the general health. The probability is that the arsenic in salvarsan has something to do with the improvement noted.

Finally, we must say something about the question of the *formation of antibodies.* Taege, Duhot, Scholtz, Meriowski Grouven, and others, have noted that when a mother is treated with salvarsan, the hereditary syphiliis of her infant can be favorably influenced. The authors quoted believe that this action is due to the formation of antigens through the massive destruction of spirochetae in the mother's body, and that the antigens are transferred to the child with the milk. In some of these cases (in Lesser's clinic also) arsenic was found in the mother's milk, in others, it was not found. Most important, however, was Ehrlich's negative result with the feeding of sick animals with salvarsan, the hereditary syphilis of her infant can be favor-Blaschko. To this we may answer that the salvarsan in mother's milk may exist in an easily assimilable form, and that even minute quantities are sufficient to produce improvement. The question has, therefore, by no means been solved not even by the experiments of Meirowski, Scholtz, and others, who injected the blood serum of patients who had been previously treated with salvarsan, into other patients, and obtained a slight improvement in some of the symptoms. It is certain, however, that in the case of infants the treatment through the mother's milk is not sufficient, and that, moreover, similar phenomena have been long since seen with mercurial treatment.

THE PERMANENCY OF THE EFFECTS: COMPARISON WITH MERCURY.

The effect of salvarsan upon syphilitic lesions is no longer doubted by anyone. A single injection of 0.5—0.6 as a rule

removes all the clinical syphilitic manifestations. This is probably most surely attained with the alkaline solution, and somewhat more slowly with the neutral emulsion and the oil of paraffin mixture. The intravenous injection must generally be repeated a second time within ten or fourteen days, in order to influence all the morbid foci. In fact, I believe that as yet we do not know the exact value of the intravenous method, and that further clinical studies are needed to make our experience complete in this direction.

Symptomatically speaking, therefore, a single injection of salvarsan is equivalent to a course of treatment with mercury or with mercury and the iodides, only salvarsan in many cases is more efficient in that it removes the symptoms more rapidly, but also because it heals lesions often in a short time which are not influenced by prolonged mercurial treatment, are but partly influenced by the latter, or else recur in spite of repeated courses of mercury injections. Naturally, there are, among the cases cited in support of this, many which cannot stand critical examination, and in which a course of calomel injections would have produced the same beneficial effects as salvarsan. This, however, only proves the superiority of salvarsan, for we cannot use calomel injections in all patients, nor can we use the chronic intermittent treatment in all cases.

Most authors cite, as a proof of the superiority of salvarsan, its action in malignant syphilis. They seem to be right, for in no class of cases is salvarsan so immeasurably superior to mercury and the iodides as in these types of the disease. But it must be remembered that atoxyl also produced remarkable improvement and cure in such cases, in spite of the fact that this remedy had an insufficient symptomatic effect in the ordinary forms of primary and secondary syphilis. I mean that the so marked and so striking superiority of salvarsan in malignant syphilis does not prove, without any further examination, that a similar advantage exists for all remaining syphilis cases. Only a prolonged clinical observation of a large number of syphilitics can solve this question.

The first curative trials with salvarsan were made in experimental syphilis in rabbits. In animals with large primary lesions rich in spirochetae a single intravenous injection of 0.01—0.015

gm. salvarsan per kilogram of the animal's weight suffices to produce permanent cure. In animal experiments, therefore, Ehrlich's ideal—*therapia sterilisans magna*—has been fulfilled. We must not overlook the fact, however, that while identical, etiologically, syphilis in rabbits is quite different clinically from human syphilis. In rabbits the disease remains essentially localized, has a tendency to spontaneous cure and but rarely shows relapses. On the contrary, human syphilis is always generalized; and even after apparent cure shows relapses in almost every case, lasts for years, and is inclined to give rise to after-diseases of a serious character.

The treatment of human syphilis with mercury and iodine has not succeeded in arresting the spread of the germ throughout the system, to change the chronic relapsing character of the disease, nor to protect against metasyphilitic affections. Does salvarsan do more than this, aside from the fact that as a purely symptomatic remedy it is equivalent to the action of an energetic course of treatment with mercury and in some cases completely overshadows the effects of mercury? Is the use of salvarsan really a *therapia sterilisans magna?* or at least is salvarsan able more frequently to prevent the generalization of the disease, to prevent relapses and after-diseases? No definite answer can as yet be given to these questions.

DOES SALVARSAN ABORT SYPHILIS?

Very early cases of syphilis, with an infection but two or three weeks old, apparently have been treated with salvarsan in but a few instances. The literature is very meagre on this point. The success of the treatment in such cases is indicated by the absence of local and constitutional symptoms, generalized glandular swellings, and lesions of the skin and mucous membranes, together with a negative Wassermann reaction. Naturally the patients must be observed and their serum tested for months, and even then it is doubtful whether a permanent cure has been effected. Wechselmann, Neisser, E. Lesser, Finger, and others have reported such cases. From the reports which have thus far appeared it seems clear that salvarsan acts very well in the very early cases of syphilis. At any rate we must admit the possibility that in these cases the disease has been successfully

aborted, by means of a *therapia magna sterilisans*. An energetic salvarsan treatment should be inaugurated in every case in which the disease has been discovered at its earliest stage. According to Alt this is best done by giving an intravenous injection of salvarsan, then following with an intramuscular injection, and excising the chancre if situated so that it can be reached.

Cases in which first syphilitic infection has occurred a short time after a salvarsan treatment also speak in favor of the abortive action of the new remedy when applied early enough. Schreiber and Milian each have reported one such case. In my opinion, however, the lesions in these cases were so called "Thalmann's chancres" which are merely expressions of an incomplete abortive treatment.

One of the principal tasks of the future will be to gather material for the solution of this question. This problem is of great practical importance, and if the abortive effect of salvarsan be demonstrated, the remedy will be undisputably placed far above all other antisyphilitics hitherto employed.

SALVARSAN IN THE PRIMARY STAGE.

Many cases of chancres with regional glandular enlargement, without generalized symptoms, have been treated by means of salvarsan. It is as yet impossible to say whether a large percentage of such cases remain free from symptoms clinically and serologically. One thing seems certain, however, namely, that nearly every author with considerable experience has seen recognizable clinical symptoms develop sooner or later in these cases, in spite of the fact that the chancre and the adenitis had disappeared. These observations seem to be of great importance for they show that *salvarsan treatment, in the sense of a therapia sterilisans magna may fail, even when the clinical conditions are favorable for its success.*

SALVARSAN IN THE SECONDARY AND TERTIARY STAGES.

No one can deny at this time that salvarsan acts very favorably in the majority of cases with secondary and tertiary lesions. And yet it must be admitted that the number of "failures," *i. e.*, of cases which remain entirely uninfluenced or only insufficiently influenced, is far larger than might be expected from the first, and from many of the later reports. In some of these cases the dose of salvarsan might have been too small, in others the ab-

sorption may have been insufficient. In a small number of cases we must also admit the possible presence of " arsenfast " spirochetae, for some " failures " remain uninfluenced even by a second injection of salvarsan in larger dose.

THE PERMANENCE OF THE EFFECTS IN THE FAVORABLE CASES.

Even in those cases of secondary and tertiary lues in which injections of salvarsan produce rapid and complete disappearance of the lesions, it is difficult to judge of the permanence of the effects. We know that tertiary cases treated with mercury remain free from relapses even when the Wassermann reaction is positive. It is not astonishing, therefore, that the cure in some cases of tertiary syphilis remains permanent after salvarsan treatment. On the other hand, relapses are of special importance in this stage of the disease. One or more such cases are recorded in almost every more important report.

The chronic-relapsing character of syphilis is particularly noted in the earlier stages, and especially the first eruptions which very frequently recur even after energetic mercurial treatment,—according to Bruhn's in 75 per cent. of cases. There is even a regular interval for the recurrence of these lesions,—usually 2 or 3 months. We know now that after salvarsan treatment there may also be recurrences of the early eruptions. It is a question whether the frequency of these recurrences is greater with mercury treatment than with salvarsan. It is remarkable that the number of recurrences of the early eruptions is greater in proportion to the length of observation to which the various series of cases have been subjected. Some authors, e. g., Wechselmann, emphasize the mild character of the recurrences, and their locally limited extent. It is still an open question as to whether the opinions of these authors deserve general acceptance. Other writers have pointed out that the relapses frequently affect the eyes and the cranial nerves. (See above.)

THE INFLUENCE OF SALVARSAN ON THE WASSERMANN REACTION.

Naturally, the behavior of the Wassermann reaction has been studied with special care in the cases treated with salvarsan. A number of striking facts have developed in the course of these investigations. In the first place, it was found that, like in cases

treated with mercury, the disappearance of clinical symptoms and the negative Wassermann reaction do not occur simultaneously. The symptoms disappear first, then the serum reaction becomes negative. The only difference is that in the use of salvarsan the difference in time between the clinical disappearance of symptoms and the vanishing of the positive Wassermann test is greater, simply because the symptoms disappear more promptly than under the use of mercury; while the Wassermann reaction usually takes about the same length of time to become negative.

Thus C. Lange reports 250 cases of syphilis with positive Wassermann's in which salvarsan was used. Of these 153 showed negative reactions within from four to five weeks. In 97 the reaction remained positive, and in 54 the reaction, which was watched for a period of three weeks, did not diminish in intensity. These figures correspond to those of nearly every other author. The reaction seems to remain positive for a longer period, or even permanently in tertiary cases, just as in patients treated with mercury. This is especially the case in patients who had no treatment for many years after infection. We may also note here that, as Lange, Neisser, Stern, Citron, and Blaschko, and many others have reported, a reaction which had been negative during the primary stage may become positive some time after the injection of salvarsan. Similar events were noted also in cases of secondary and tertiary syphilitic affections where the reaction had been negative before the treatment. The most plausible explanation for this apparent paradox is that the "positive phase" is accelerated by the sudden destruction of many spirochetae.

The diagnostic value of the Wassermann reaction is firmly established at the present time. The reaction is therefore an indispensable part of the control of cases in which the disease is supposed to have been aborted, and which have remained free from symptoms,— and also of cases in which no treatment has been used after the first two or three years but which showed no symptoms. On the other hand, it may be said that the value of the Wassermann test as a criterion if an antisyphilitic treatment has been exaggerated, save in cases in which repeated negative results are obtained and in which clinical symptoms are also absent. *If we use the Wassermann reaction as a criterion for*

each course of treatment, then salvarsan does not present any superiority over an energetic mercury treatment.

SUMMARY AND CONCLUSIONS.

An enormous amount of work has been accomplished in order to determine the value of salvarsan in the treatment of syphilis. In spite of this we have reached only the very earliest stages of clinical experience in this direction. *And yet, many of our expectations which were legitimately aroused by the genial discovery of Ehrlich, have already been shown to have been vain, expectations which were fostered by an unbounded, often incomprehensible optimism by many experienced clinicians.* (Italics translator's.)

It may be stated to-day:

1. That a single intramuscular or subcutaneous injection, possibly a repeated intravenous injection, certainly a combined intravenous and intramuscular injection of a sufficient amount (0.5 to 0.6 gm.) of salvarsan produces marked symptomatic effects in cases of *malignant syphilis*, often effects of very long duration, and not infrequently saves life in these cases.

2. That salvarsan treatment attains the value of an energetic mercurial course (calomel injections) in all other types of syphilis, with relatively rare exceptions.

3. That it is possible that a permanent cure, a *therapia magna sterilisans* may be effected early in the primary stage, but that undoubtedly most of these cases remain clinically and serologically free from symptoms for a long period.

4. That in cases of syphilis in any stage in which *mercury was not tolerated*, or very badly borne, or in which new recurrences appeared in spite of repeated courses of mercury, salvarsan almost invariably produced excellent results,— if not permanent cures, at least cures lasting a long time.

5. That salvarsan produces certain local more or less severe tissue changes in all cases save when used intravenously, and that it gives rise to a series of untoward general effects, no matter what mode of administration be used. These untoward effects vary greatly in character and intensity in different individuals. Untoward effects of serious nature have thus far been noted in a very small proportion of cases after a single injection, and in some of these cases they were referable to faulty technique or some other preventable cause.

6. That we must continue to employ the chronic intermittent treatment of syphilis and must maintain as before the necessity for a complete course of treatment in deciding such questions as transmissibility, consent to marriage, etc., in every case.

7. That all our experiences thus far (indications, contraindications, etc.), are essentially based upon single salvarsan injections, and that we as yet know practically nothing of the action and untoward effects of a chronic intermittent salvarsan treatment.

8. That neither an injection nor an infusion of salvarsan excludes a simultaneous or subsequent course of treatment with mercury and iodides, but, on the contrary, the special therapeutic effects of these three remedies may be happily combined.

THE NORMAL AND PATHOLOGICAL POSTERIOR URETHRA AND NECK OF THE BLADDER*

A STUDY WITH THE CYSTO-URETHROSCOPE

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PATHOLOGICAL LESIONS.

IT is not my purpose here to give a comprehensive account of the pathological lesions found in the neck of the bladder and posterior urethra, for the material examined up to the present writing is not sufficient to explain all the doubtful findings, nor have I been able to satisfy myself regarding the nature of all of the lesions encountered. It seems best, therefore, to allude only to those changes which were seen often enough to leave no doubt as to their nature. The superiority of the cysto-urethroscope in diagnosticating the finer and more minute lesions of the trigone, especially near the sphincteric margin, has already been referred to elsewhere. The so-called *cystitis colli* gives a most remarkable and beautiful picture. Fig. 23 shows the mucous membrane of the bladder just beyond the sphincter margin, with the cysto-urethroscope turned sligtly to the right side of the patient. The small bulbous excrescences are well depicted. With the cystoscope these bodies are markedly enlarged and the picture

*Continued from February.

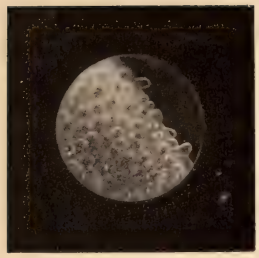


Fig. 23

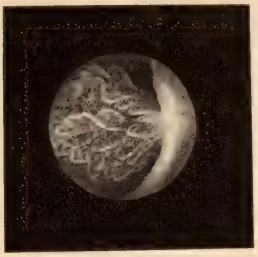


Fig. 24

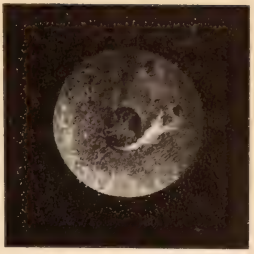


Fig. 25

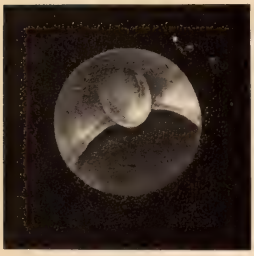


Fig. 26

Fig. 27

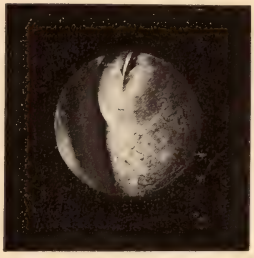
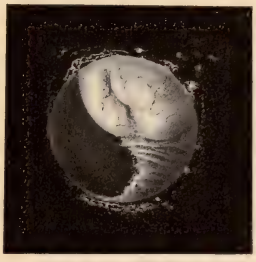


Fig. 28

Fig. 29



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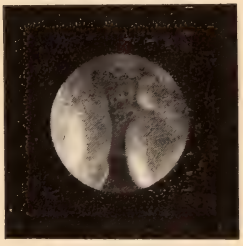


Fig. 31

Fig. 23. Juxta-sphincteric region to right of median line, at the floor of the bladder in one type of cystitis colli.

Fig. 24. Papilloma at the left margin of the internal sphincter.

Fig. 25. Large (pathological) crypts in roof of pars supramontana with purulent contents.

Fig. 26. Solitary cyst at the roof of the internal sphincter.

Fig. 27. Small cysts in roof of the pars supramontana.

Fig. 28. Cyst on left side wall of prostatic urethra; knife is piercing the cyst; drawn with knife in situ.

Fig. 29. Collection of cysts in the right margin of the internal sphincter.

Fig. 30. Conglomerate cysts in the left margin of the sphincter.

Fig. 31. Symmetrical cystic bodies at margin of roof of the sphincter. The cysts encroached upon the internal urethral orifice, obstructing it.

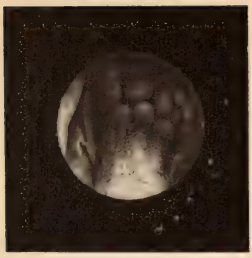
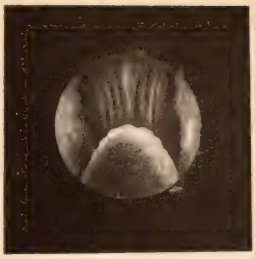


Fig. 32

Fig. 33



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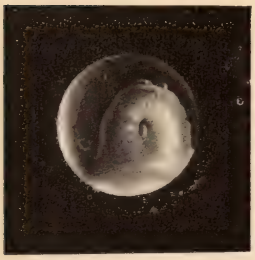

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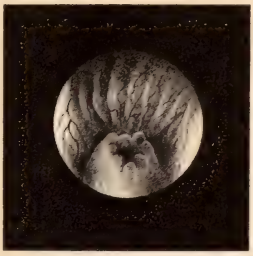

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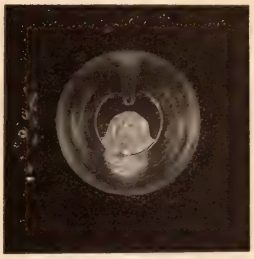


Fig. 37

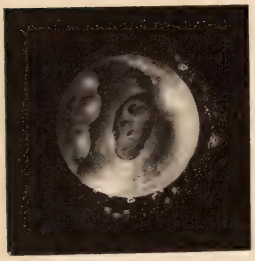


Fig. 38

Fig. 39

Fig. 40

Fig. 32. Fossula prostatica and declive of same case as shown in Figs. 29-31. Above, in the figure, is seen the bulbous degeneration of the frenula; on the left, the deep cleft is an enlarged prostatic duct.

Fig. 33. Cystic degeneration of the colliculus.

Fig. 34. Turgid colliculus with irregular contour, in subacute urethritis.

Fig. 35. Inflammatory excrescences on the colliculus.

Fig. 36. Crater-like distortion of the summit of the colliculus, the result of chronic inflammation.

Fig. 37. Colliculus as seen without the telescope, with an endoscopic light carrier.

Fig. 38. Left sulcus lateralis contains an oval scar. On the left, in the figure, is seen the bulbous left margin of the enlarged, distorted colliculus: case of atrophy of left testicle.

Fig. 39. Enlarged prostatic duct in depressed scar tissue in the right sulcus lateralis; displaced and distorted colliculus.

Fig. 40. Papilloma arising from the summit of the colliculus; common variety at the usual site.

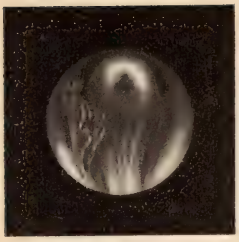
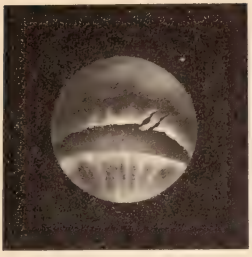


Fig. 41



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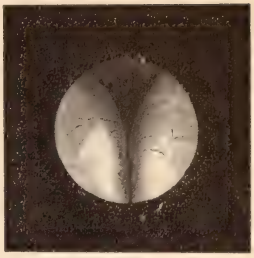

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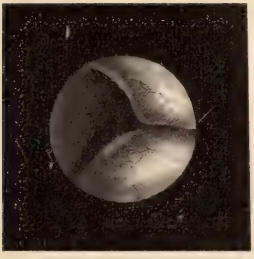

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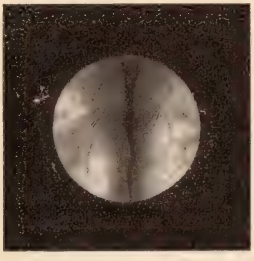

Fig. 45

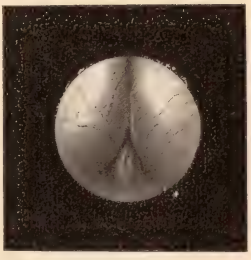

Fig. 46

Fig. 41. Small papilloma lying against colliculus and arising by a slender pedicle from the foot of that body.

Fig. 42. Stricture of the bulbous urethra, showing a tear after dilatation to Charrière 24.

Fig. 43. Floor of the sphincter in hypertrophy of the prostate showing enlarged lateral lobes.

Fig. 44. Left side of the sphincter in prostatic hypertrophy.

Fig. 45. Floor of pars supramontana in prostatic hypertrophy.

Fig. 46. Montane region in prostatic hypertrophy; note prostatic lobes and small colliculus.

Fig. 47

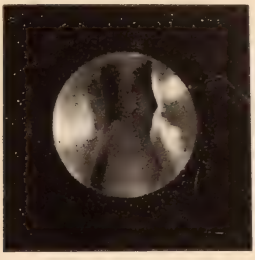

Fig. 48

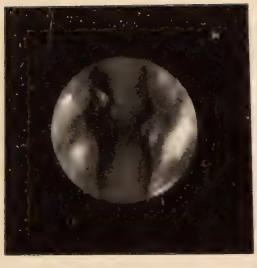

Fig. 49

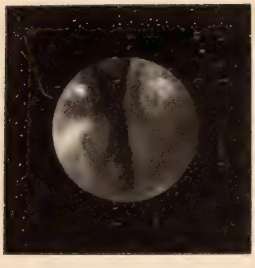

Fig. 50

Fig. 47-50. Series showing excavation left after perineal prostatectomy. Consecutive fields taking in the floor of the prostatic urethra are represented, beginning with number 47 as the field nearest the bladder.

is very dark and distorted. We have here a very good example of cystitis proliferans or papillomatosa if we so wish to designate it.

We occasionally encounter papillomata at the margin of the vesical sphincter. Such a tumor is represented in Fig. 24. This papilloma springing from the left margin of the sphincter followed the removal of a very large villous tumor of the bladder by suprapubic cystotomy. Owing to the fact that the larger number of its villi were lying in the posterior urethra, it appeared only as an irregular shadow through the observation cystoscope. It was completely destroyed by means of the high frequency current * through the author's operating cystoscope.†

Inflammatory processes involving the floor of the sphincteric margin showed themselves not only in the effacement of the longitudinal markings, but also in an increase of the depth of the red color, as well as in a general velvety appearance of the mucous membrane. Chronic inflammatory processes leave their traces in a hypertrophic condition of the mucous membrane, and in the production of folds which evidently represent sub-mucous infiltration. Here, too, as well as in the supramontane region we encounter a bulbous hypertrophy of the mucous membrane which may simulate true cysts.

Although we not infrequently meet with a slight protrusion of the central portion of the floor of the sphincteric margin, it would seem to be either an anomalous development or a pathological lesion which would cause this part to be unduly prominent. This hypertrophy, if such we may call it, may be so marked that a beginner would be apt to take it for a hypertrophy of the middle lobe of the prostate. When it is present we can recognize it by the fact that the trigone takes a sudden drop downward from the sphincter, leaving almost an excavation behind the sphincteric margin. At the present writing I am unable to say what the significance of this hypertrophy is, for it seems to be due rather to a hyperplastic condition of the sphincteric muscle than to a thickening of the mucosa. Perhaps it is only an anomaly of the so-called *uvula vesicae*.

* Reported by Buerger and Wolbarst: *New York Medical Journal,* Oct. 29, 1910.

†This instrument will be described in a future publication. See reference to it in the *American Journal Dermatology,* Jan., 1911.

Small white patches of mucous membrane indicate the sites of old scars. Such mucous membrane is very thin and is evidently bound by scars. The cicatrices may cause such rigidity that the passage of a sound causes distinct linear tears or cracks comparable to those seen in the cases of hard infiltration of the anterior urethra.

Supramontane Region: The sphincteric margin and beginning of the supramontane urethra is a favorite site of that proliferative condition of the mucous membrane which we may designate as *urethritis proliferans* or bulbous hypertrophy. Beginning at the sphincteric margin and extending for varying distances into the posterior urethra, we find hypertrophic folds of velvety mucous membrane, with bulbous vesical knobs, the nodular thickenings resembling cysts very closely. The most common site for this rugous condition of the mucous membrane is at the roof and lateral walls of the sphincteric margin.

A very interesting sequela of the gonorrhoea is the presence of widely dilated crypt orifices, either in the roof or in the floor of the supramontane region. We have not met them in the region of the side walls. Fig. 25 illustrates three such openings, and shows a peculiar cribriform appearance of the largest one with a flake of pus exuding from it. In the floor, particularly in the neighborhood of the colliculus these openings may be considerable in size and sometimes represent the perforations of small submucous or prostatic abscesses.

In a paper on *urethritis chronica cystica*, * the subject of cysts formation was discussed in detail. Cysts were found in about twenty cases of my series but accurate notes were obtained in only fourteen of these. Although all the patients had had either one or more attacks of gonorrhoea, I gained the strong impression that there are two types of cystic disease of the neck of the bladder and posterior urethra. The first and most common of these is undoubtedly an inflammatory process, the end result of a gonorrhoeal inflammation, and the second presents itself in the form of simple lesions of retention such as belong to the involution changes of the senile period. The inflammatory type (namely, those cysts that belong to true *urethritis chronica cystica*) are most frequently found in the pars supramontana, although they

**Folia Urologica,* Nov., 1910.

are often seen in the montane portion, and may even involve the colliculus itself. The supramontane region was diseased in all of the cases, whereas the pars montana only in six instances. The verumontanum was found markedly diseased in two of the patients. The cysts vary considerably in size, the smallest measuring about a millimeter in diameter, the larger one 3, 4 and 5 millimeters or more. At times we meet with a confluent form that may take on considerable dimensions. The simple discrete variety is the most common (Fig. 26), tiny hemispheres or ovoid bodies occurring frequently near the sphincter margin. In order to appreciate their color properly it is important to regulate the amount of light so that the illumination is sufficient. When the light is adequate, their surface seems to be made up of a fine pearly veil-like membrane, over the surface of which very fine oborescent vessels ramify. The mucous membrane upon which they lie, or more properly in which they are imbedded, is usually found to be thickened and velvety, but the fine vessels as a rule become lost as they are traced into the neighboring mucous membrane in which they undoubtedly arise. When the illumination is insufficient the true milky surface becomes a pale yellow and the cystic nature of the body is not easily detected. They then appear to be solid bodies or bulbous hypertrophies. In the region of the pars supramontana the larger more sessile, less prominent oval cysts were more frequently encountered lying on either side of the colliculus at the junction of the supramontane and montane region. These are more apt to be solitary although at times such large oval cysts may be surrounded by smaller satellites. I have often seen single cysts near the sphinteric margin in the roof of the pars supramontana. Fig. 27 shows the typical tendency of the small cysts to aggregate in one locality. Here the mucous membrane showed marked disease, and in the figure the small areas represent depressions in the mucous membrane giving a cribriform appearance. This is probably produced by scarring consequent upon a previous inflammatory process. It is the roof of the pars supramontana which seems to be the favorite site for the lesions just described. Fig. 28 shows a larger cyst that is being incised by the endoscopic knife. At the junction of the pars supramontana and montane region we encounter the larger, more elongated cysts that

seem to have a predilection for the side walls. The small cysts are seen in the fossula prostatica, where tiny bodies are found in depressions between the posterior frenula and may even ride upon the frenula themselves. Although we would gain the impression that the changes thus far described are rather insignificant, experience teaches us that the same type of pathological change may become very extensive and profound in some cases. In eleven out of fifteen patients the cysts were few in number, and the evidences of an old inflammatory process in the mucous membrane was not very striking, although they were definite enough to be diagnosticated. The more severe type of lesion presented itself in three cases, and could be regarded as of sufficient magnitude to warrant the appellative, *urethritis chronica cystica*. In one case both the roof and the floor of the vesical sphincter, the roof of the pars supramontana, the fossula, the left wall of the junction and the colliculus itself were beset by small cysts. The picture presented here was one of intense cystic degeneration of the larger part of the posterior urethra. A still more striking instance was afforded by a patient in whom the confluent, large type of cysts was encountered. Here the roof and sides of the sphincteric margin were converted into a mass of grape-like bodies, some composed of tiny cystic patches, others being lobulated. The latter may be bilocular, trilocular, or somewhat sausage-shaped cysts. All of these have the typical glistening pearly surface, with large arborescent vessels which can be traced here and there into the surrounding mucous membrane. Fig. 29 shows a collection of cysts at the right side of the sphincteric margin, the mucous membrane being much thickened especially below where two cysts are seen to lie in a granular or follicular mucous membrane. Fig. 30 shows the opposite side of the sphincter, the upper part of the illustration showing a portion of a lobulated cyst which was found upward and inward almost to the median line. In Fig. 31 we can see the continuation of the cystic bodies on the roof of the sphincter. There is only a small space free above, where the cribriform and granular variety of mucous membrane is found. Although these pictures give one an idea of the condition at the *annulus urethralis*, or at the beginning of the posterior urethra, in the case under consideration it gives no conception of the extent of the process in the supramontane portion and the region of the colliculus. On the right, cysts could be

traced along the side walls down into the *fossula prostatica*, where numerous bead-like hypertrophies of the posterior frenula were seen (Fig. 32). The colliculus presented the remarkable picture shown in Fig. 33. The utricle was plainly evident at the summit. There was a thin strip of red mucous membrane in the center of the colliculus, but on either side, this body was converted into a number of cystic masses.

The Montane Region: Inasmuch as our observations were confined to the post-gonorrhoeal stage, we but rarely met with instances of acute inflammation of the colliculus. Hyperemia of the colliculus was frequently encountered. Those cases of acute and sub-acute inflammation of the posterior urethra which we had the opportunity of observing, showed considerable enlargement of the colliculus, a velvety condition of its mucosa, an absence of all vascular markings, the utricle still visible but the ejaculatory ducts being buried and unrecognizable in the swollen mucous membrane. As a result of a posterior urethritis, the mucous membrane of the colliculus loses its smoothness, the outlines of this body becomes rough as is shown in Fig. 34, and in many cases we find the development of cock's-comb-like vegetations at the summit or over the declive. Fig. 35 shows a turgid colliculus with inflammatory excrescences, two enlarged prostatic ducts appearing on the left side of the field. After treatment the villous condition of the colliculus may become considerably reduced, but as a rule a close scrutiny of the mucous membrane at close range will reveal pale, pointed, finger-like bodies over the declive even after all evidences of inflammation have disappeared.

In cases of chronic prostatitis we have met with evidences of previous involvement of the colliculus. Fig. 36 illustrates an instance in which the summit of this body has been converted into a veritable crater surmounted and bounded by a series of polyp-like excrescences in the form of an irregularly shaped crown. Fine vessels were discernible even on the surface of the individual tufts, but the mucous membrane had lost the smooth appearance characteristic of the normal picture. The polyp-like excrescences, it seems to me, are but the lobulations produced by a cicatrizing process. In this case we were dealing with the result of a prostatitis of long duration.

We wish to emphasize here that in our experience enlargement, hyperemia and inflammation of the colliculus are not as frequent as one would suppose from the writings of those who have relied upon direct endoscopic examination. In the cysto-urethroscope we have at our disposal a reliable means of detecting the slightest increase of size, and the most minute changes in the colliculus. The turgescence of this body during erection could be frequently seen and its varying size under different conditions was made the subject of thorough study. Although it may be urged against this method of urethroscopy that the presence of the irrigating fluid may cause a considerable reduction in the size of the colliculus, experience shows that with the proper manipulation of the flow we have within our control an effectual means for overcoming this objection.

In order to control the apparent size of the colliculus under the conditions that obtain in "irrigation urethroscopy" by a direct view in air medium, we frequently removed the telescope, aspirated the fluid in the sheath and examined the colliculus with the aid of an endoscopic lamp. Fig. 37 shows the picture that is thus obtained. Often the utricle can be recognized, especially if a magnifying lens is used.

Varying degrees of cystic disease of the colliculus were also encountered. An extensive degree of cystic degeneration of the colliculus is show in Fig. 33, where the summit and a small strip of mucous membrane in the center are alone unaffected by the degenerative process.

Argyria occurs in cases of chronic urethritis that have received a great deal of treatment with silver nitrate. It was usually found affecting the summit and declive of the colliculus, more rarely the acclive. In a number of instances the fossula prostatica was also markedly pigmented. The declive is apt to be rough and stippled, covered by minute black dots; or the whole of the declive may have a blue-black appearance. It is not difficult to differentiate this condition from prostatic sand. The granules of prostatic sand are much larger, are not confined to any particular portion of the colliculus, are very often encysted, and are more frequently seen in the region of the acclive and sulci laterales. In the pars supramontana, larger collections of gravel-like ma-

terial are often deposited between the frenula. The bulb is also a favorite site for silver nitrate discoloration.

It would take us too far to go into a detailed description of the anomalous conditions that were encountered. As a result of repeated instrumentation traumatism, or chronic urethritis, considerable distortion of the colliculus may be produced. Thus we have found these bodies to be converted into a number of knob-like masses; peculiar bands have been seen to divide the colliculus into irregular portions, and an atrophic condition with considerable reduction in the size of the colliculus was encountered. These are some of the peculiar types of disfigurement amongst the many in our series.

Fig. 38 shows the left sulcus lateralis and a small portion of the colliculus in a most interesting case. The patient consulted me because of atrophy of the left testicle. He had received an injury about eight years previously, having fallen astride on the perineum. As a result of this trauma the urethra was ruptured, and two operations for the restoration of the canal had been since performed. At the time of examination the urethra admitted a No. 27 Charrière sound and showed a peculiar lesion in the prostatic urethra. The colliculus was scarred and much enlarged, showing a number of bulbous bodies represented in the figure. In the left sulcus lateralis there was an oval depressed cicatrix, at the bottom of which there were smaller scars and deep pits. There seems to be little doubt but that this lesion represents a connective tissue change in the prostatic urethra and in the prostate, possibly involving the ejaculatory duct on that side and in all probability the cause of the atrophic condition of the left testicle.

As the result of repeated infections with gonorrhoea and (as I have interpreted the pictures) following the evacuation of purulent collections on the prostate, certain prostatic ducts on either side of the colliculus may become permanently enlarged. Their orifices are oval and usually lie in depressions that are probably the seat of scar tissue. Fig. 39 shows the right sulcus and the colliculus in such a case. The colliculus is somewhat distorted, is elongated and carries enlarged vessels. The sulcus is pale where it lodges a fossa whose wall is lined by pearly ridged mucosa. At the bottom of this oval depression a duct opening is the most striking feature of the picture.

Papillomata of the prostatic urethra are not uncommon. A favorite site is a point near the summit of the colliculus, to the right or left of the utricle orifice. Usually there is a long slender pedicle bearing a swollen bulb-like extremity, as depicted in Fig. 40. This particular case was treated by the fulguration method through the cysto-urethroscope, a number 5 Charrière, fulguration wire being employed. Sometimes the bulbous end is absent and a number of delicate villi radiate from a slender stalk in sceptre-like fashion. An interesting finding is illustrated in Fig. 41, where there was a small villous tumor arising from the foot of the acclive.

We must be careful to recognize the minute, conical, coxcomb excrescences that beset the declive, and less frequently the acclive of the verumontanum, in the healed stage of a severe posterior urethritis and prostatitis. These are not true papillomata. The differential diagnosis may be diffcult when the outgrowth is small and when it simulates the broken pedicle of a true papilloma. I had the good fortune to verify the urethroscopic diagnosis of papilloma in one case by microscopic examination of the tumor after it had been removed through a straight tube by means of a forceps.

Less striking lesions, such as follicular hypertrophy and scars, were seen now and then. My material is not large enough to describe these in full, and I shall therefore refer to them in a future publication. My conception of the lesions in the membraneous and bulbous urethra, as seen with the cysto-urethroscope, is also not complete enough as yet to warrant a description of them here. A thorough study of this region is now in progress.

At the time of the present writing I have had occasion to examine but a very few cases of stricture of the urethra.* I can not refrain, however, from citing one instance, because it permitted of such satisfactory inspection of the site of the lesion. In the bulb not far from the bulbo-pendulous junction depicted in Fig. 42, there was a shelf-like or ridge-like band which projected above the surrounding mucous membrane and was slightly torn by the passage of a sound.

In prostatic hypertrophy the cysto-urethroscope affords us an excellent means of diagnosis, as well as of estimating the exact

*Since writing the above a number of additional cases have been examined, some of which have been treated by fulguration through the cysto urethroscope.

extent of the intravesical and endo-urethral enlargement. In the series of illustration 43 to 46 inclusive, we have pictures which demonstrate clearly the changes produced by hypertrophy of the prostate. Fig. 43 shows the prominence of the lateral lobes at the floor of the sphincteric margin. Comparing this figure with the illustration of the normal sphincteric floor, we note a total absence of the tranverse line, and the presence of two rounded bodies separated by a V-shaped incisure. The tortuous blood vessels are plainly visible. A lateral view of the sphincter is seen in Fig. 44, where the typical concave margin is absent, and the left lateral lobe overlaps the sphincter. With the fenestra of the instrument still looking downward and including a portion corresponding to the supramontane urethra, a picture illustrated by Fig. 45 presents itself. The prostatic lobes look like two large vocal chords separated by a deep cleft. Evidently the shaft of the instrument rides upon the prostatic lobes whose rigidity prevents contact with the region of the fossula, and effectually masks this part of the urethra. By increasing the force of the irrigating flow we can make the two lobes separate, the telescope looking down into a deep cavity, the bottom of which remains dark. The montane urethra and the distal portion of the montane region of the same case are shown in Fig. 46. The peripheral termination of the lateral lobes is seen to lie somewhere near the junction of the montane and membranous urethra, and the small size of the colliculus becomes evident. This is a feature which is frequently encountered in hypertrophy of the prostrate and is of some diagnostic value.

There are cases of prostatic hypertrophy in which there is little or no distorsion of the sphincteric margin. In these there may be very marked endo-urethral changes. Beginning our observation with the floor of the sphincteric margin in such instances, and drawing the instrument outward, we soon meet with projections of the lateral lobes which form a V-shaped cleft in the supramontane region. Distally, these become more prominent and form two ridges such as are seen in Fig. 45. The prostatic lobes have a tendency to overshadow the distal part of the supramontane region and the fossula prostatica. They separate as we approach the region of the colliculus, but even this body may be shadowed, as it were, and elude the unpracticed eye. I have frequently resorted to the following maneuver in demonstrating the colliculus to stu-

dents in such cases of prostatic hypertrophy. The ocular of the instrument is raised somewhat with the right hand and the shaft of the instrument is pressed downward towards the perineum with the left. In this way the shaft descends between the rigid lobe upon which it tends to ride, and the fenestra approaches the fossula prostatica and colliculus. What would otherwise appear as a deep chasm, the bottom of which is imperfectly illuminated, now becomes bright and distinct.

We have already elsewhere referred to the fact that after the age of forty-five we may meet with small cysts of the prostatic urethra, sometimes enclosing prostatic sand: an evidence of senile change. Although such cysts usually occur in the fossula prostatica, they are not strictly limited to this region. And so we also find them on hypertrophied prostatic lobules. In those cases of prostatic hypertrophy where we have to deal with an added chronic cystitis, we may meet with an interesting lesion. The cystic bodies become enlarged by virtue of edema, and we see a collection of such cysts on one or both prostatic lobes, some pedunculated, forming small pyriform masses with milky contents.

In a case of perineal prostatectomy followed by the establishment of a perineal fistula that came under my observation, the cavity left by a somewhat incomplete removal could be completely mapped out and the opening of the fistula in the prostatic urethra could be detected after the injection of methylene blue. Fig. 47 to 50 inclusive, show the irregular somewhat ragged oblong cavern as it could be traced from the supramontane urethra towards the membranous. The central and distal terminations of the cavity are shown in Figs. 47 to 50 respectively. The region seen in Fig. 49 contained the orifice of the fistula which is not indicated in the drawing, inasmuch as it could be only seen upon considerable dilatation, being hidden by the ragged left residual lobe of the prostate. Two small lobulated masses, somewhat pyriform in shape, also occupy this region. For a study of the endo-urethral and sphincteric aspect of the hypertrophied prostate, in those cases where but slight enlargement can be felt per rectum and particularly in the early cases, the cysto-urethroscope gives most reliable information.

THE UROLOGISTS OF THE MIDDLE AGES

DURING the Middle Ages, that interregnum of science during which a damper seemed to have been put on all intellectual activity and the progress of the earlier centuries seemed to have remained at a standstill, or, indeed, to have retrograded, the word "Urology" was first used to designate the art of examining the urine. The term urology came to be applied to urinary surgery very much later; in fact, this term has been in use extensively only within the past quarter of a century. A number of treatises upon the so-called urology of the Middle Ages are extant. The earliest of these was published by a certain Theophilus in the seventh century. Other works of this sort were the treatises of Isaac, translated by Constantine, and the quaint book of Gilles de Corbeil, physician to Philippe-Auguste, which was written at the end of the twelfth century in Latin verse. The examination of the urine in the thirteenth century became the chief diagnostic measure practised by physicians, and the importance of this procedure at that time might be surmised from a reference in a popular collection of fables published under the title "Roman du Reynard" (The Story of the Fox). The sick lion consults the fox, who is pictured as a sagacious physician, and in order to make his ailment plain, the lion says:

> "Bring unto me a urinal,
> And you shall see therein my trouble."

The fox thereupon examines the precious fluid and gives the lion a potion intended to cure him. In the beautiful works of Richer and Meige there are numerous reproductions of paintings, engravings and drawings, dating from the thirteenth to the eighteenth century inclusive, dealing with "Urology," *i. e.*, the art of inspecting and examining the urine. We reproduce two of these cuts, showing that the attention of artists was directed to a considerable extent toward the depiction of the mystic process of making a diagnosis by the mere inspection of receptacles containing urine.*

*The figures reproduced herewith are taken from a lecture by Professor Albarran, which appeared in La Presse Medicale, November 17, 1906, and to which we refer for further data upon the early history of urology.

In most of the pictures of that period the physician was represented as holding a urinal in one hand, raising the receptacle to the light in order to judge of the character of its contents by inspection. Sometimes this examination is pictured as taking place at the bedside, at other times the patient is absent and the urologue has nothing but the urine to base his diagnosis on and

Fig. 1

to give a clue as to the necessary treatment. The Flemish school of painters, with their passion for realism and for exactness of detail, is particularly noteworthy for the illustration of the methods of the mediaeval "urologists." Thus, in Gerard Dow's famous painting which hangs in the Louvre, *La femme hydropique,* the physician examines the urine of a woman who probably has Bright's disease.

In the treatise upon urology published by Montagnana, in 1487, the frontispiece of which is reproduced here (Fig. 1), there

is a colored plate showing twenty-one urinals containing urine of the greatest variety of colors. This plate was intended as a guide to the diagnosis of disease by the color of the urine.

Just as in these days we have always with us the host of quacks who pretend to be omniscient and omnipotent, so in the Middle Ages there was, in addition to the urologues, who represented the honest "scientific" medicine of that day, a numerous class of pretended experts on the urine known as "uromants"

Fig. 2

or "uromancers" who, like all other charlatans, exploited the credulous public by pretending that they could see everything and even predict the future by examining the urine.

The pictures representing the doing of the "uromancers" are even more interesting and amusing than those showing the methods of the "urologues." The fake urologists seem to have flourished as late as the end of the eighteenth century. One of the popular superstitions, traces of which survive to this day, was that one could diagnose pregnancy by looking at the urine. Thus in one picture Schalken shows a "urolomant" holding up the urinal which had just been handed to him by a young woman.

In the fluid one can recognize quite distinctly the shadowy shape of a child. Bilcocq, in a painting which we reproduce herewith (Fig. 2), shows another characteristic scene. A venerable physician with a long beard is sitting in his study with the paraphernalia of his calling about him, and with a young assistant — the

Un Urologue au XIXe siecle

mediaeval prototype of the modern office boy — in the background. In an adjoining room one sees through the open door a mother and daughter, and the embarrassed attitude of the latter shows plainly her fear of the indiscreet situation that might be revealed by the examination of the bottle.

For centuries mediaeval " urology " continued to be a mixture of guesswork and charlatanry, and it was not until the spirit of exact logic and of exact biological and mechanical principles, fathered by Bellini and Boerhaave, had entered medicine that the old urology began to be discarded in order to give place to the earliest data of modern urology.

THE AMERICAN JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII APRIL, 1911 NO. 4

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

CONTRIBUTION TO THE STUDY OF PHENOLSULPHONEPHTHALEIN AS A TEST FOR RENAL FUNCTION BEFORE OPERATION

By E. L. KEYES, JR., New York.

THE following cases are cited to illustrate both the difficulty of drawing any accurate conclusion from any one test of renal function, and also the general accuracy of the phenolsulphonephthalein test.

In the first case this test declared that the patient would die whether operated upon or not, though the urea output was fair, and operation certainly hastened his death.

In the second case the test agreed with other tests of the kidney function, and suggested that any grave, operative interference would probably be fatal; yet careful preparation and operation avoided a fatal issue. Prostatectomy was performed by the method of Young in both of these instances. Both because it seemed probable that the wound thus produced would be less liabe to grave infection than if the suprapubic prostatectomy was done, and also because this test has been used chiefly in reference to this method of prostatectomy, and it seemed interesting to continue this comparison.

It is by no means evident that the operation in case II did the patient any good. He still carries his suprapubic tube. Yet his clinical history, both before and after operation amply attests the accuracy of the phenolsulphonephthalein diagnosis.

The third case seems interesting in that it illustrates the impossibility of prophesying with absolute accuracy the func-

tional reaction of any organ to a given set of circumstances, until the actual circumstances arise.

The test in this case asserted that the patient's left kidney was competent to sustain life; actually the failure in function of this kidney was the cause of death, as proven by pathological examination; yet Dr. Symmers was unable to find in this kidney any evidence of abnormality antedating operation. The test was accurate enough pathologically, but not clinically.

In short, these three cases illustrate (though of course they do not prove) the accuracy of the phenolsulphonephthalein test and the fact that while it is by no means infallible, its fallibility lies more in the difficulty of interpreting the findings than in any inaccuracy in the test itself.

Case 1

G., 65 years of age. At St. Vincent's Hospital.

Denies syphilis. Frequent urination two years. Catheter life six months. Has lost 30 pounds, and now weighs 150 pounds.

Dr. Fisher finds Argyll-Robertson pupil, static ataxia, and increased reflexes.

The patient passes daily from thirty-five to fifty ounces of urine containing a trace of albumen, no casts, 0.8 % to 0.9 % of urea, and pus. Prostate feels long, but not large by rectum, and the cystoscope shows a moderate, general prostatic enlargement.

November 9, 1910.—Dr. G. D. Stewart drains the bladder suprapubically, using local anesthesia.

November 11, 1910.—1 c.c phenolsulphonephthalein injected. It appears in thirty minutes, and in two hours thereafter only traces of the color are passed. The patient has been very weak, and cold, and is apparently losing ground.

November 16, 1910.—Four cmc. of stovaine injected into the lumbar spine. Anesthesia not quite complete.

Prostatectomy by Young's method in twenty minutes.

After operation saline enemata. The patient remained perfectly comfortable and afebrile, but the tongue became absolutely dry, and he hiccoughed quite constantly. No difficulty with the bowels.

November 20, 1910.—He passed 1035 c.c. of urine, containing 0.9 % urea.

November 22, 1910.—Delirium. Temperature dropped to 97° F. Great hyperaesthesia. Hiccough and dry tongue continued.

November 23, 1910.—Patient died at 1 A. M. No post mortem.

CASE 2

W., 55 years of age.

June 2, 1910.—The patient complains of frequent urination, anemia, and loss of weight. Last winter he had repeated chills and vomiting. This was called malaria. He still has occasional chills, urinates every two hours, and is said to have cancer of the bladder. His weight has fallen from 176 to 162 pounds.

He is feeble, slightly jaundiced, and utterly pale. The feet are considerably swollen. He is wet from incontinence of urine. The prostate is moderately large by rectum. I draw off a pint of moderately purulent urine of very low specific gravity. Thereafter, he is introduced into catheter life by his own physician.

July 15, 1910.—In six weeks he has lost 19 lbs. The jaundice is less. The feet no longer swell, and he feels much better.

October 7.—Under tonics, urotropin, and regular catheterism, he feels much better, and has regained 6 lbs., but has had a chill, and is still so white and weak that it seems wise to attempt operation, for fear of the catheter.

October 28.—Cystoscopy reveals general hypertrophy of the prostate, and a saeculated bladder. One c.c. of phenolsulphonephthalein injected, does not come down in forty-five minutes, but the specimens are lost.

November 4.—Passes in 24 hours 1450 c.c. of urine, containing 0.5 % albumen by weight and 0.9 % urea. Other 24-hour specimens show 0.8 % and 0.7 % urea.

November 6.—1 c.c. Ph. injected appears in fifty minutes; 2 % in the first hour, 4 % in second hour.

November 7.—Suprapubic drainage under cocaine.

November 11.—Passes 3500 c.c. containing 0.3 % albumen, 1.1 % urea and no casts.

1 c.c. Ph. injected. Delay 50 minutes: 2.5 % in first hour, and between 5 % and 6 % in second hour.

November 17.—Spinal anesthesia. Prostatectomy by Young's method. No bad post-operative reaction whatever.

November 19.—Packing withdrawn from perineal wound, after which the patient became drowsy, temperature went to 104° F., tongue became dry, and in twenty-four hours he passed but three ounces through the suprapubic tube. Treatment by saline enemas, hot pack, and stimulations. In the following twenty-four hours he passed fifty-four ounces of urine, and all was well.

November 26.—Fistula closed. Passes 45 to 60 ounces a day, with about 1 % urea. 1 c.c. Ph. injected, and experimental polyuria by drinking three glasses of water at the beginning of the second hour. The color came in 25 minutes. During the first hour he passed 107 c.c. containing 9 % urea and but a trace of color. Second hour 99 c.c. 1 % urea, and 16.6 % color.

December 12.—Fistula almost closed, but no attempt at urination. I passed a catheter, and he had a chill, and temperature of 104°, but no suppression. Accordingly, I reinserted the suprapublic tube, and a week later sent him home with this.

He is now in about the same physical condition as before operation, but wears a suprapubic tube, and has had no further chills.

Case 3

H., 45 years of age.

December 26, 1910.—In 1889 he had colic on the right side, and thereafter passed bloody urine, but no stone. Numerous colics since, but he never passed stone.

In 1896, straddle injury to perineum, followed by perineal abscess, and a year later by another abscess. No sounds passed for a week, then gradual dilatation to 28 F. Internal urethrotomy was also performed.

In 1907 he was in bed 22 weeks with what was called a " right kidney abscess." This emptied through the natural passages, and since that time his urine has been extremely purulent, and its odor most offensive.

In 1908, Dr. Ayres found that the right kidney pelvis was the source of the pus, and would contain " two and a half ounces of fluid," while the left kidney was normal. Since then no treatment. Early in the Fall he had a number of chills, and

since then has felt very badly. His weight has fallen from 170 to 159 lbs. He urinates every two hours, night and day, with difficulty, and has a great deal of pain in the perineum.

Urine very foul, acid, sp. gr. 1015, 0.5 % albumen, 1 % urea. Prostate by rectum a little large. Stricture in bulbous urethra dilated with Banks bougie, and 14 and 16 F. sounds. He empties the bladder. Liver enlarged (he has been a heavy drinker). Kidneys impalpable and insensitive. He is kept on helmitol since urotropin irritates.

In two weeks the stricture was dilated at 27 F., the last passage of sounds causing a chill in spite of helmitol and bladder wash.

January 5.—1 c.c. Ph. injected, appeared in 13 minutes, and in the first hour he passed 38.4 %, in the second hour 16.6 %.

January 7.—Cystoscopy revealed cystitis of the base, dilatation of right ureter orifice, and much pus from the right side.

A 6 F. catheter introduced 20 cm. into the right ureter drew 27 c.c. of urine in 20 minutes. This contained 0.4 % urea, and during the same period 10 c.c. containing 1.3 % urea, were collected from the bladder. The ureter catheter then became plugged, and thirty minutes later, 10 c.c. containing 1.5 % urea were obtained from the bladder. All the specimens were purulent (on account of extra-catheter flow), but only that obtained from the right kidney was stinking.

January 13.—Negative X-ray by Dr. Caldwell. In 24 hours the patient passed 1650 c.c. of urine containing 1 % urea, 0.5 % by volume of albumen, no casts, and many acid fast bacilli.

January 14.—Right nephrectomy in 50 minutes. Kidney was a pyonephrotic sac, densely adherent about the hilum. Clamp left on vessels. Kidney ruptured in removal.

Patient left the table in good condition, and saline enemas, q. 2. h., were ordered. Later these were made q. 4. h. He had a good night, except for occasional vomiting and great thirst. He passed in the first 24 hours about 10 ounces of urine, and his pulse and temperature did not rise above 100. Enemas were then discontinued, and he was given three ounces of water, q. h., by mouth. He vomited three or four times during the day, and passed only six ounces of urine in 12 hours. Pulse rose to 120, and temperature remained at 100°. The stomach was then washed, nitro-

glycerine, gr. 1-50, given q. 3. h., and saline enemas resumed. A specimen of urine at this time contained 3.3 % urea and only a faint trace of albumin. At the end of the second day he had only passed 20 ounces of urine since operation, and his pulse suddenly went to 160. The vomiting continued in spite of repeated stomach washing, and although the bowels had moved freely, and there was no abdominal distension. The respiration was very labored, and the patient failed rapidly, and died three hours later. He did not hiccough. An hour before his death his tongue was perfectly moist, and he remained entirely rational to the end.

The remaining kidney was removed post-mortem and examined by Dr. Symmers, who reported, as follows:

"Specimen consists of a kidney 10 c.m. in length. Capsule is thin and surface is smooth, except for a few retained fetal lobulations. The organ is diffusely bluish-red in color, and on section cuts readily. Cut surface is smooth, deep bluish-red in color and drips blood on pressure. The consistence is that of a normal kidney. The cortex and medulla are well proportioned and well differentiated. The cortex does not bulge markedly beyond the cut edge of the capsule. The cortical markings are distinct, especially the vascular apparatus, in which the Malpighian bodies are unusually prominent, standing out as minute bright red points. Microscopically, the vascular apparatus throughout is deeply engorged. The inter-tubular capillaries are widened and tortuous, and the red cells in them are closely packed and show marked effect of reciprocal pressure, or are even fused. The epithelium in the convoluted tubules is in a state of advanced granular degeneration.

"*Note*: The histological changes in this kidney correspond entirely with those occasionally encountered in athletes who, after severe exertion, have suddenly subjected the overheated body to the effects of cold, in which event contraction of the peripheral vessels is followed apparently by loss of vasomotor control in the kidneys. The vessels dilate and become tortuous and the red cells in them fuse. At the same time, stagnation of blood results in nutritional changes in the lining epithelium of the tubules and granular degeneration occurs. Very similar changes are met with in the kidney in subjects dead of tetanus,

of hydrophobia, or of certain irritant poisons. The condition is relatively rare, but by no means unknown, as a sequence of simple ether anaesthesia and sometimes follows nephrectomy of the opposite kidney. In the latter circumstance, the combination of anaesthesia and suddenly increased functional demands upon the remaining kidney consequent upon the removal of its fellow, is possibly the best available explanation. Death usually succeeds upon complete anuria and may occur within a few hours or be delayed for days; thus in one patient death occurred on the twenty-first day after an operation for epithelioma of the penis." No evidence of tuberculosis could be found in the pyonephrotic kidney.

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

VALUE OF VACCINES IN THE TREATMENT OF INFECTIONS OF THE URINARY TRACT[1]

By HUGH CABOT, M.D., Boston, Mass.

THIS report is based upon the study of cases seen at the Massachusetts General Hospital and in private practice. One case, No. 22, was a patient of Dr. A. T. Cabot. The bacteriology and preparation of vaccines has been done largely by Dr. H. F. Hartwell and E. C. Streter, to whom my best thanks are due.

In looking over the material it seemed best to exclude the cases of tuberculosis treated with tuberculin and infections due to the gonococcus, as the number of cases of the former class is as yet too small to warrant conclusions and our results in the treatment of gonococcus infections were reported last year in a paper by Hartwell.

This report will, therefore, be confined to infections due to the colon bacillus and the pyogenic cocci. The cases dealt with in this report have been rather carefully selected, with the view to utilizing only such as have been thoroughly studied for a considerable period of time. Practically all the cases have been examined by means of preliminary cultures from the urine, guinea pig inocula-

[1] Read before the American Association of Genito-Urinary Surgeons, at the Eighth Congress of American Physicians and Surgeons, 1910.

tions to exclude tuberculosis, examination with the cystoscope and ureter catheter where indicated, X-ray and finally cultures from the urine at a considerable period after cessation of treatment. They may therefore be regarded as showing the end results.

In estimating the therapeutic value of vaccines, or bacterins as they are now commonly called, surprisingly different results may be obtained, according to the point of view of the investigator. Thus the general practitioner who is particularly interested in the relief of symptoms will be impressed by the success or failure in the relief of symptoms, while at the other end of the line the clinical bacteriologist will be interested in the ability of this form of treatment to rid the urine of bacteria. The very varied conclusions of different observers have been largely due to this different bias. In fact, several cases in this series have already been reported as cured, by other men, though their urine still contains bacteria. Without attempting to reconcile this difference in viewpoint, it should be borne in mind that the persistence of bacteriuria undoubtedly renders the patient liable to a recurrence of the symptoms.

RESULTS.

Site of Infection in the Urinary Tract. It is not easy to determine at what point the disease is primary, but it is generally possible to locate it either in the upper (kidney and ureter) or lower (bladder, prostate and urethra) urinary tract. The upper urinary tract was definitely involved and was believed to be the primary focus in fifteen cases. Of the remaining fifteen, seven had obstructive lesions of the lower urinary tract, prostatic or urethral, while the remainder are cases of chronic cystitis in which the origin of the infection is not clear.

Of the three cases showing sterile cultures all were infections of the upper urinary tract, one of which may have been associated with stone.

Bacteria. In the thirty cases here considered, the colon bacillus was the infecting organism in twenty-two. The colon bacillus mixed with the streptococcus or a staphylococcus was found in three. The streptococcus in two. The staphylococcus

albus and streptococcus in two. The staphylococcus albus in one. The great predominance of the colon bacillus in these infections is about the same as that reported by other observers.

Operative Cases. In thirteen cases vaccines were given after operation in order to help eliminate the remains of the infection. In eight the symptoms were relieved, in five not relieved. The bacteriuria was cured in one.

Sex. Of the thirty cases, thirteen were males, seventeen females, so that the basis of comparison is fairly equal. Of the thirteen males, eight were relieved of symptoms. Of the seventeen females, eleven were relieved.

Duration of Vaccine Treatment. The duration of the treatment by vaccines varied from two months to two years, the average being ten months minus. All of the cases were under observation for a considerable time, both before and after treatment by this method, so that a sound estimate of the effect on the symptoms can be given.

Effect on Symptoms. In nineteen cases there was a definite relief of symptoms, varying from marked improvement to complete symptomatic cure. In the remaining eleven cases there was no definite or permanent relief, though many of them showed transient improvement which may or may not have been due to the treatment.

Effect on Bacteria. In all cases the culture has been obtained from two months to two years after the cessation of the treatment. Three are and have remained free from bacteria, the remaining twenty-seven all showed bacteria and were therefore not benefited as to the presence of bacteria.

Conclusions. The study of these cases seems to warrant the following conclusions:

1. The use of vaccines is followed by improvement of the symptoms in more than half the cases.

2. Vaccines have little effect on the bacteriuria.

3. The results are practically the same whether the lesion is in the upper or the lower urinary tract.

THE TIME AND METHOD FOR PROSTATECTOMY[1]

By Benjamin Tenney, M.D.,

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WITH all that has been written and demonstrated of the operation of prostatectomy and its results there is yet too large a part of the profession and the public who look back to the early days of surgery for their decision. Abdominal surgery has not offered safe treatment for much more than twenty years, and prostatectomy is a later operation to be put on the safe list. In 1906 Dr. Chase and I published a paper on the mortality from prostatectomy,[2] its fatal periods and its causes. Among other records we looked up the mortality in public hospitals from 1895 to 1905 and found it remarkably high. In one splendid institution one case in three had died, and in another one case in five. During that period thousands of house officers, students, dressers, nurses, ward men and members of the medical staff had seen a few of these cases and decided that the risk was too great to justify the operation on their patients and friends, and that impression still clings to them and influences their advice. It is with the hope of altering this impression among some of my medical friends that this paper is written.

There are few classes of men over forty who consult a physician for symptoms which may be due to prostatic obstruction. First, those with residual urine, without cystitis, whose complaint is of frequent urination, night urination, difficult urination or albuminuria. Second, those with residual urine and infected bladders. Third, those more or less dependent on a catheter.

With all these patients the same fact applies. It is not the hypertrophy of the prostate that makes the patient suffer; it is the obstruction. I have removed a nodule the size of the end of my thumb from a man who had passed no urine without a

[1] Read before the Malden Medical Society, Jan. 14, 1911. *Boston Med. and Surg. Jour.*

[2] *Jour. Am. Med. Asso.*, May 12, 1906.

catheter for more than a year, and a huge prostate weighing 256 gm. from a man who had used a catheter but three times and had but 2 oz. of residual urine. Both men were uncomfortable, and the man with the larger prostate was the more so, but the first had complete obstruction, while the man with the big prostate could still urinate and had but two or three night urines.

The number of men over forty who complain of frequent urination, night urination, difficult urination or albuminuria is very large and includes some who have no prostatic obstruction, but the important thing is that it *does* include all those who do have prostatic obstruction in the early stage. There must be many such now under treatment or neglect with a diagnosis of cystitis, pyelitis, pyelonephritis and even Bright's disease who are suffering from prostatic obstruction. A simple catheter is usually enough to settle the diagnosis. If the catheter will not go in with ease there may be some other form of obstruction which will keep the urine from flowing out, but if the catheter passes easily and residual urine is found, the diagnosis of prostatic obstruction is made.

Should we operate on these early cases? If we can relieve the obstruction by massage, sounds, dilators, the answer is, No. So long as a man can empty his bladder there is no good reason for removing an organ which may trouble him later but does not now. If the measures suggested are not successful, there is still opportunity for a difference of opinion. To me the fact that there is residual urine proves that the bladder is working harder than it was intended to, and the compensatory thickening of the bladder wall is a warning of a contracted bladder to come later. Operating through a thick bladder wall is less easy than through the normal, but that is a small matter beside the fact that a contracted bladder is exceedingly slow to resume normal capacity after a removal of the obstruction. The disappointing operative results are found among the patients whose bladders will hold but two or three ounces before they have been operated. They continue to have night urination and daily frequency for a long time after they leave our hands.

The comparative risk of operating on men with clean bladders and septic trabeculated bladders is to be considered as

well as the chance of ascending and general infections. Personally I do not think the increasing age of the patient is of great consequence except as these progressive results of obstruction appear.

My youngest patient was forty-six, and I was able to sew up the bladder and send him home at the end of ten days with a tight bladder. I have not felt justified in trying it with my others, all of whom have been above sixty with one exception, but the contrast between the rapid convalescence of this patient and that of the patients with infected bladders was almost as great as that between patients with interval and drainage operations for appendix inflammations. I believe the time has come to advocate early operation, that is, operation as soon as prostatic obstruction can be demonstrated by the presence of constant residual urine, because there is present an anatomical condition which will by no possibility disappear and which will probably increase; because this condition will produce pathological changes in bladder, ureters and kidneys; because as a result of these changes general health will suffer, discomfort will increase and the period of usefulness be shortened; and because at this time the operation is less of a shock, practically without danger if properly done, and the convalescence is comfortable and short.

Recent statistics as to the frequency of malignant disease in hypertrophied prostates furnish another argument for early and complete removal.[3]

The second class of patients includes the majority of all who call for help. They have not begun to use a catheter and they are often ignorant of the condition which sends them to a physician. They are slowly going down hill, losing sleep, losing strength, growing old faster than their years warrant. Their urines are alkaline, contain a little albumen, often a few casts and white and red blood corpuscles. They rise two or more times at night to urinate and pass urine every two or three hours by day. Many of them think they have a "little kidney trouble" and have gone the rounds of physicians and proprietary remedies. It is unfortunately true that they can find a

[3] Cohn: *Deut. med. Wochenschr.*, Berlin, April 1, 1909. Young: *Ann. Surg.*, January, 1910.

large number of physicians who will accept this ready-made diagnosis when confirmed by the albumen findings in the urine and who will try to work the miracle of curing them of a mechanical difficulty by pill and potion. For these patients we have but two alternatives; we can put them into the third class and let them use a catheter more or less frequently, or we can operate. There is no other alternative if they are to live with any comfort. The first alternative is often chosen from fear of death from the operation and sometimes from the knowledge of some one who has been operated and has incontinence or the need of using a catheter after the operation. For four years I have had the opportunity of watching the progress of such a case living under the most favorable conditions. He had a stone crushed and evacuated in 1901. Symptoms of obstruction appeared in 1904. In 1906 he had three ounces of residual urine, alkaline and cloudy. He rose every hour to urinate by night and was called to the same function every hour or hour and a half by day. After a few weeks of treatment his residual dropped to one ounce and his nights were disturbed but two or three times. Gradually the residual increased to four and five ounces and his night urines to three and four in spite of the best non-operative treatment that I could give him. He has been comfortable all the time except on one occasion when his plans were interrupted by another physician who was alarmed at the amount of pus in the urine and sent him home from a vacation trip. The case has taught me much that can be done for the patients who utterly refuse to consider any operative procedure. I did not suppose they could be kept as comfortable for so long a time. On the other hand, this man is now seventy-nine and the chance he once had of a comfortable convalescence and a prompt recovery is growing more remote, and he requires the constant attendance of a nurse.

For a man who can have every comfort and care, the problem is different from the one whose care is fitful and not of the best. Such a patient is likely to suffer much and die within a year or two unless he can be taught to use a catheter cleanly and regularly or have unusual powers of resistance. One of my patients who had frequent attacks of cystitis in spite of much washing of hands and boiling of catheters used to mourn

his hard luck when he had a neighbor who carried his catheter in his hat band and lubricated it with saliva with no unpleasant results.

Even the man who is most comfortably situated is better off with a bladder that empties itself than he can be with the most minute care possible.

One of my patients had depended on a catheter for six years, during which time he had been operated for hemorrhoids and had perineal section for stone. After the enucleation he was two months in recovering perfect control of his sphincter, which had not been exercised during his catheter life. The change in his general condition and his delight in nights of undisturbed sleep were as striking as his regret that the prostatectomy was not done earlier.

I believe in operating on prostates with cystitis because the operation will cure the cystitis and guarantee against a return; because, with relief from the discomfort and opportunity to get their sleep, they will gain in general health and usefulness; and because it allows proper drainage of the ureter into a clean bladder instead of keeping its orifice submerged in a pool of purulent urine.

I do not see room for a difference of opinion about the desirability of operating on these cases. The danger and discomfort of the operation is less than the danger and discomfort of going without, and the successful removal of a benign hypertrophy promises absolute and permanent comfort so far as the bladder is concerned.

The third group will include all who use a catheter one or more times daily. If they are entirely comfortable using a catheter four or six times in twenty-four hours they may safely be allowed to continue if they prefer it, but they should have the option of the operation and freedom from such annoyance. Such cases are ideal for operation because of their proved resistance to infection, their toleration of urethral instruments, their normal bladder capacity and the probability of a definite, easily removed obstruction. Just as soon as the frequency of catheterization begins to increase there is proof of beginning infection, and unless a short course of antiseptic washing re-

stores the normal intervals, operation should be prompt. They go from bad to worse more rapidly than any of the others here described, and the risk of the operation increases just as fast until a point is reached where the prostatectomy must be preceded by a long drainage period to be safe.

I believe in operating on both classes of catheter patients — those who are comfortable because of the slight risk and the guarantee against future trouble offered by the successful operation, and those with painful cystitis because there is nothing else to do to save life and comfort for their remaining days.

THE METHOD

Castration and the cautery knife are now historical. The literature of to-day refers only to the perineal and suprapubic operations.

Of the former there are two variations, the urethral and the transcapsular, and in operating by the suprapubic route some prefer removal in one or at most two portions, while others enucleate as happens to be most easy.

Anatomically almost all hypertrophies of the prostate are in part at least intravesical. This may be denied by some whose knowledge is limited to cystoscopic views and perineal operating, but I am positive of its truth from the cases I have operated, from autopsy specimens, from the lengthening of the urethra in most cases and from the fact that the mucous membrane and internal sphincter of the bladder offer less resistance to upgrowth than is found in any other direction. There is probably no hypertrophied prostate which cannot be removed through a perineal incision, but no large one can be dragged out through the urethra without injury to ejaculatory ducts or sphincter unless in small pieces, and the same must be in less degree true of the transcapsular operation.

If twenty per cent. of hypertrophied prostates are in some degree cancerous, the objection to morcellation is evident. If the wound be left entirely open, or a large tube be left from the bladder to the dressing, an ideal drainage is provided, but the importance of this may be overestimated. In gross, recovery from operations through the perineum has been a little better

than from the suprapubic operation, but as Dr. Chase and I have before pointed out, there is a much greater difference in mortality reported among men doing the same operation than there is between the gross statistics of the two operations, and these gross statistics are coming nearer together each year. It is generally admitted that the late results of the suprapubic operation are more satisfactory.

The reported higher mortality of the suprapubic operation is really the only one argument against its adoption as the general rule, and the perineal operation for occasional use. The preference of men already experienced, in other perineal operating, for perineal prostatectomy may partly account for a difference in results. Another explanation has occurred to me. The tables previously referred to show an admitted mortality due to " shock and hemorrhage " nearly three times as large in the suprapubic as in the perineal results. Most of these cases really mean hemorrhage, and the source of the hemorrhage becomes important. It is mostly venous and the veins are most numerous where the hypertrophied prostate is in contact with the internal sphincter.

In urethral perineal prostatectomy the separation is downward, the finger is hooked over the top and the masses are dragged out. The same result is accomplished by the retractor and traction forceps in the transcapsular operation. In doing a suprapubic enucleation the natural movement is to use the same hooked finger before the prostate has been fully separated from its upper attachments all around. Doing this, one is likely to peel up a strip of the bladder wall itself and open into the rich plexus of veins. I have seen strips of mucous membrane and even portions of a seminal vesicle in the material removed by premature "hooking."

A suprapubic enucleation should be done with a straight finger until the hypertrophied gland is entirely separated from *all* its lateral attachments. I cannot help thinking that the enucleation downwards which is a feature of the perineal work has been one of the reasons for its better operative record, especially in the matter of " shock and hemorrhage."

I have had one death two days after operation on a cardiac

case whose removed and remaining tissue showed extensive carcinoma, and no other mortality in the seven years Dr. Chase and I have been doing suprapubic prostatectomies. We have had no case of incontinence, injury to rectum or peritoneum. We have had one case showing infection of the prevesical space, five cases of epididymitis, and one patient who has developed cancer and resumed the use of his catheter four years after operation.

One case took forty-three days to close his suprapubic bladder wound, another twenty-seven days, and one was sewed up tight at time of operation. The rest have been tight in from fourteen to twenty-one days. The flexible metal catheter as perfected by Dr. Chase is an improvement over the gum elastic tube previously used, because it will not kink, rarely stops up, empties into a urinal without any extra piping, and gives all the "drainage" necessary.

We use no suprapubic tube and many of our patients keep their dressings practically dry after the first twenty-four hours.

The statistical difference in fatal results between the high and low methods of approach is steadily growing less. Either method well carried out if preceded and followed by minute and unsparing care will have a low mortality. Carelessness in technic or average after-care will send the mortality up with either operation. A prostatectomy is not a completed piece of work when the surgeon has washed his hands. The results of a perfect operation may be lost or a less perfect operation turned into a success by careful preparation of the patient for the ordeal and equally careful watch for and prompt action on danger signals after the operation.

I believe in the suprapubic prostatectomy because we are dealing with a tumor which is partially intravesical at least; because even the largest prostates can be removed entire or in two pieces without injury to rectum, sphincter or ejaculatory ducts; because recent studies of hypertrophied prostates show cancer formation to be comparatively frequent and morcellation, therefore, undesirable; because the slight excess of mortality does not seem necessary if enucleation be downward and the after-care correct; and because it has given results satisfactory to my patients and to me.

SOME UNTOWARD CONSEQUENCES OF PHIMOSIS AND OF CIRCUMCISION

By George H. Edington, M.D., F.R.F.P.S.G.,

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IN the practice of medicine and surgery one cannot but be struck with the way in which it becomes the fashion from time to time to attribute various morbid conditions or symptoms to disease of a particular organ. One of the most recent examples of this is the so-called "Appendix-dyspepsia," concerning which there has lately been so much discussion. Another example, by no means recent however, is the fact of phimosis having been looked upon as the cause of a variety of more or less remote ailments, such as spastic palsies, simulated hip-joint disease, muscular inco-ordination, convulsions.[1] The performance of circumcision was not, however, universally followed by relief from the symptoms supposed to depend on the abnormal tightness of the prepuce, and opinion as to the etiological relationship of phimosis to the ailments in question underwent a change, or at least a modification. Surgeons continued to perform the operation; but they were more chary of giving a glowing prognosis. In his recent work on the *Surgery of Children*, Kirmisson,[2] referring to Sayre's view that phimosis may cause reflex contractures and even paralysis, states that he has not seen any case which has convinced him of the truth of this statement. I may add that my experience is in agreement with that of the French surgeon.

No one can deny that there are some conditions which undoubtedly result from phimosis, and that in these cases circumcision will effect a cure on the principle "causa sublata, tollitur effectus." I do not intend to deal with all of these conditions. I wish merely to mention two cases in which phimosis caused obstruction to micturition, and in which surgical interference became a matter of utmost necessity. In recording these

[1] White and Martin's *Genito-Urinary Surgery and Venereal Diseases*. Fifth edition. London. 1902. Pp. 8.

[2] *Handbook of the Surgery of Children*. Translated by J. Keogh Murphy. London. 1902. Pp. 141.

cases I would expressly state that such examples are by no means common.

Retention of Urine.—In March of this year (1910) I was asked by his medical attendant to see a gentleman aged eighty-four. The patient was the subject of congenital phimosis, and occasionally suffered from retention of urine during attacks of balanitis. On these occasions his doctor was in the habit of relieving him by the passage of a No. 4 rubber catheter. The present attack of retention commenced in the morning, and when the medical man saw him in the evening it was found that the catheter could not be introduced into the meatus.

There was no redundancy of the prepuce, but phimosis existed to an extreme degree, and the bladder was greatly distended. The preputial orifice was so tight that I could not get the point of a scissors-blade through it. After subcutaneous injection of novocaine and suprarenin, access to the glans was obtained by cutting down in the medial line of the dorsal surface of the prepuce. When the mucous layer had been penetrated some urine retained in the preputial sac escaped. The incision was then extended forwards and the orifice of the prepuce laid open. At first no appearance of a meatus could be seen, but very soon urine was ejected with considerable violence from a minute orifice, the stream continued till the patient had emptied his bladder, and his groans were exchanged for expressions of relief.

It was difficult to recognise the preputial orifice on account of its small size. Its edge was hard and gristly, but did not seem to be near the seat of any acute inflammatory change. There was dense adhesion between the mucous layer of the prepuce generally and the glans, extending forwards on the dorsum and on the right to quite close to the meatus: the corona could be exposed only in the ventral portion of the left half of the glans, and the prepuce could not be stripped back. The mucous layer was stitched to the skin at the margins of the incision. Recovery was uneventful.

Phimosis may cause considerable difficulty in urination, and the difficulty may be greatly increased by the swelling accompanying balanoposthitis; but it seems to me that actual retention of urine occurring in the absence of marked inflamma-

tory swelling of the parts is distinctly uncommon. At any rate, I had not before seen an instance of it. The condition of affairs is comparable to what one is familiar with in the case of urethral stricture.

Perineal Peri-urethral Abscess.—In March, 1905, a lad aged twelve, the subject of very tight phimosis, was admitted to the Western Infirmary under the care of Sir Hector Cameron, to whom I am indebted for permission to record the case. There was a history of pyuria and elevated temperature of four days' duration. There were signs of extravasation in the perineum, extending forwards into the posterior part of the scrotum. Circumcision was performed, and the perineum was incised in the median line, giving vent to pus, but without opening the urethra. The meatus when exposed by circumcision was seen to be atresic. After his return to bed he micturated before he had recovered consciousness, and at the close of the act pus was observed to come away in the urine. He made a good recovery, and when I saw him about a year ago he had no trouble with his urinary organs.

These two cases are interesting as extreme results of obstruction. In the second the obstruction was not complete; but it had been sufficient to act on the wall of the urethra in a way similar to what occurs in the case of tight stricture of the urethra. In both cases there was some atresia of the meatus; but in neither was this sufficient to produce complete obstruction, and in the first it was quite evident that the retention was due entirely to the condition of the preputial orifice.

Circumcision.—The frequency with which circumcision is performed on the children of non-Jewish parents has almost ceased to be a matter for comment. Infants are being constantly brought to the out-patient department of the Royal Hospital for Sick Children in Glasgow for circumcision, although there may be no phimosis, and the extent to which the custom has spread may be appreciated from the remark made by a young mother when I told her that her child did not require the operation: "I thought," said she, "all boys were circumcised." It is well, in view of this frequency, to bear in mind a post-operative condition which I do not think has received sufficient attention. I refer to acquired stenosis of the urethral meatus.

Post-operative Meatal Stenosis.—Such stenosis is the result of superficial ulceration of the lips of the meatus, the ulceration being caused by irritation of the exposed meatus by the child's clothing. The fact that it is hardly ever observed in the children of well-to-do parents shows that with care it may be prevented; but in the majority of hospital cases cleanliness is not an outstanding virtue, and it is in these cases usually that this troublesome result is found.

The usual sequence of events is that the patient is brought back to the hospital, in the course of two or three weeks after circumcision, with the story that he seems to have pain and difficulty in passing urine. Examination of the glans shows moist scabbing occluding the meatus, the lips of which are more or less ulcerated. Ultimately healing is followed by contraction of the meatus.

In circumcision cases treatment may be directed to prevent this ulceration. Such treatment consists in frequent bathing and in covering the part with vaseline or some unirritating ointment. If ulceration has occurred, the same treatment may be adopted, and when the ulcerative condition has been cured the meatus may be slit downwards into the fraenum, and the cut edges of the urethral mucous membrane united by suture to the skin of the fraenum. It may be objected by some that the condition is really a congenital stenosis which, as is well known, not infrequently accompanies phimosis; but if the precaution be taken of inspecting the meatus at the time when circumcision is done, it will be found that narrowing of a previously normal meatus may occur in the way I have mentioned.

Constriction of Post-Coronal Sulcus by Hair.—I have quite recently observed a case in which, from want of attention, this unusual condition was present. I record it as a curiosity. Baby C., aged six months, was brought to the out-patient department of the Royal Hospital for Sick Children in November, 1910, on account of great swelling of the glans of one day's duration. He had been circumcised at the age of three weeks, and no trouble had ensued till the present. The glans was enlarged to about the size seen in the adult. It was quite pale and showed no signs of venous congestion. A deep furrow was present behind the corona, and on retracting the skin of the penis

there was observed in the furrow what looked like dark hairs wound round the organ. Examinations under an anaesthetic confirmed this, and showed further that the hair, two or three ply, had actually produced a ring of ulceration, which on the ventral aspect had extended right through the fraenum. The constricting hairs were divided with scissors and removed, and the mother was directed to bathe the parts frequently and to annoint with vaseline.

That this condition may arise independently of circumcision was demonstrated a week later, when a boy aged 7 was brought to the hospital on acount of soreness of the penis of one week's duration. This boy was uncircumcised, but he had retracted the prepuce, which was shorter than usual, and in the exposed post-coronal sulcus was a constricting wisp of hair and wool. The constricting material had produced a ring of ulceration which extended round behind the corona and involved the fraenum. The treatment adopted was the same as in the former case. In neither of the cases was there any suggestion of intentional ligation of the penis. The nature and bulk of the constricting material pointed rather to its having come either from the patient's clothing or from towels in common use. I mention these conditions of meatal stenosis and post-coronal constriction as examples of dangers to which the exposed glans is liable. Their prevention depends on proper care and cleanliness being seen to by the child's mother or nurse.

PERINEAL PROSTATECTOMY[1]

By Alex. Hugh Ferguson, M.D., Chicago.

DIFFERENT surgeons employ different incisions of the skin and subcutaneous structures to gain access to the enlarged prostate. The median incision is the one of choice in the vast majority of cases, because through it rapid and efficient work can be executed with excellent results, especially by a man whose hand is not too large and who is dextrous. Some excellent surgeons have such large fingers that they are practically excluded from attempting perineal prostatectomy. While a short slender finger is at a disadvantage as compared with a long slender digit, still, with the aid of instruments which

[1] Read at a meeting of the Chicago Medical Society, March 16, 1910.

drag the gland down into the perineum, the former can do satisfactory work. As one surgeon has aptly said, "A short finger becomes longer by experience," but I might add that a stout finger acts as a cork.

Incisions: Median, transverse, Y-shaped, T-inverted, semilunar and modification of these.

From a sufficient number of cases to enable me to have an opinion, I am compelled to say that the median perineal incision is my preference. In a very limited number of cases the entire prostate can be removed without injury to the prostatic or membranous urethra (Macewen and Ferguson). This can never be done suprapubically. Nearly all the operations by the perineal route open the membranous and prostatic urethra; the one for the purpose of introducing instruments which aid in the operation; the other to afford ample room for the enucleation of the gland. In the intracapsular method the capsule must be opened to find cleavage for the finger to separate the gland from its capsule.

While this is true, we must admit that some cases are more suitably dealt with by the suprapubic route. In my opinion, they are vastly in the minority. From my experience I would advise that almost all cases should be first explored through the perineum. If certain portions of an hypertrophied prostate cannot be removed through the perineum, it does not compromise either the surgeon or the patient to open suprapubically and complete the operation. It seems to me that this is much safer than suprapubic prostatectomy alone, or the combination operation reversed. More knowledge can be gained of the size, shape and extent of prostatic protrusions into the bladder by the finger in the perineal wound than by cystoscopy before operation.

Operation.—The bladder is washed out with an antiseptic solution. Six or eight ounces of the fluid is then left in the viscus. A plug of gauze is next inserted into the rectum. A grooved staff is passed per urethram into the bladder. Then the patient is placed in the extreme lithotomy position and held by assistants.

Now pass the middle finger of the left hand into the rectum. Split the perineum in the median line from behind forward. Open the membranous urethra and prostatic urethra as far back

as the sinus pocularis, and pass the index finger of the left hand into the wound as the staff is withdrawn. In exposing a membranous urethra to median incision it is probably better to teach that the skin be cut first and careful dissection made through the other soft structure down to the urethra in order to insure against injury to the bulb. Remove the finger from the rectum and pass the prostate depressor into the bladder as the finger is withdrawn.

Remove the glove from the left hand and reinsert the finger into the wound and search for a line of cleavage within the capsule of one or both lobes of the gland. Usually the cleavage can be found near the apex of the prostate and to the left, because the knife generally cuts a little to this side as it opens the prostatic urethra. If cleavage is found, a small transverse incision is made alongside of the finger through the capsule. By means of the prostatic depressor the gland is pulled down as it becomes enucleated by the finger, sometimes in less time than it takes to describe the process. It will be found that the separation of the gland is interfered with where it is covered with vesical and prostatic urethral mucosa. Pulling and tearing should be avoided here; large portions of prostatic tissue may be grossly cut away by means of my prostatic cutting forceps. Both lobes being removed, the interior of the bladder may be readily explored by the finger. If there are protrusions of prostatic tissue in the shape of a pathologic middle lobe, or prolongations from either or both lateral lobes, the first thing to determine is whether the growth is sessile or pedunculated. If the former, it is an easy matter to enucleate it with the finger or remove it by morcellement. If the growth is pedunculated and cannot be delivered through the perineal wound, then the operation should be completed suprapubically.

Where enucleation is easy and the bladder is not septic, deep sutures (No. 0 chromic catgut) are employed to close the urethra and bring together the edges of the levator ani muscles. A small cigarette drain is employed to take care of the discharge from the perineum alone, and the skin is closed by horse-hair.

In septic cases and in very old men with marked prostatic deformity, the gland must be removed as rapidly as possible. The safety of the rectum from injury and the rapidity of the operation may be increased by the use of a double-edged gouget

with a beaded point which strikes the groove in the staff and the knife is passed through the prostatic urethra in a firm, gentle curve. The gouget splits the prostatic urethra laterally, its flat posterior side is toward the rectum and protects it from injury. This is not the operation of choice.

Total enucleation of the prostate gland by Freyer has taught us one thing, viz.: that the preservation of the prostatic urethra is not of so great importance as the advocates of perineal prostatectomy believed. With this in mind we can attack the enlarged prostate without regard to the prostatic urethra and rip it from its bed where all the structures are in reach of the finger. One type of gland, the chronically inflamed prostate, usually atrophied, can only be removed piecemeal. A chronically inflamed prostate cannot be removed suprapubically at all. This is also true of prostatic abscess and calculi, and recent experience of Young demonstrates that a malignant prostate can be best removed through the perineum.

In my opinion, it seems unsurgical to attack a contracted bladder from above, except possibly in two steps. Bilateral incisions of the capsule as devised by Proust and exploited by Young, in order to save the ejaculatory ducts, is not considered by decent old men. While the many tractors and depressors are often clumsy and inefficient, though not all immaterial, I prefer my own.

Practically all the sequelae formerly obtained in perineal prostatectomy in a small percentage of cases are now prevented by the experienced operator. The worst result that can be obtained in prostatectomy is death. "While old age waits to hear the keel upon the other shore" and the old man welcomes death to misery, still life is dear and endurable even though it be almost intolerable.

It is interesting to note that for years the mortality of suprapubic prostatectomy (McGill) when combined with lithotomy has been less than when no calculus was present.[2] Burckhardt gives 13.8 per cent. mortality (4 deaths in 29 cases) for the former operation, and 20.8 per cent. (16 deaths in 77 cases) for the latter. This difference can only be explained on the assumption that the presence of the stone necessitated operative interference earlier, and while the patients were better able to endure an operation than when no calculus existed. . . . The

[2] Deaver's Enlargement of the Prostate, pp. 210-212.

death rate from McGill's operation (partial suprapubic prostatectomy) has always been higher and always will, it seems.

Belfield collected 88 cases of McGill's operation with 12 deaths, a mortality of 13.6 per cent.; Moullin in 1892 collected 94 cases, with 19 deaths, or 20.2 per cent. mortality.

Watson collected from various sources 243 cases of total suprapubic prostatectomy, with 28 deaths, a mortality of 11.5 per cent., while among perineal operations he found 33 deaths, a mortality of 6.2 per cent. . . .

I have now had 185 consecutive cases of perineal prostatectomy with seven deaths as recorded, a mortality of 3.7 per cent. This includes all of the early cases, when the operation was in a developmental stage and much less satisfactory—the patient being confined to bed and the drainage not removed for much longer periods. It certainly does not represent the true mortality. "During the past two and one-half years there have been one hundred cases with only two deaths, a mortality of 2 per cent. But the most convincing evidence of the benignity of the operation is the fact that in the last sixty consecutive cases there has not been a single death or bad result."[3] (Young.)

[4] "My experience, then, has been that the restoration of function is more complete and lasting after the perineal than after the suprapubic. . . . In the past four years I have operated on 35 cases of perineal prostatectomy. Two cases have died, one three days after operation, the other at the end of a month."

[5] A study of 485 cases of prostatectomy for hypertrophy of the prostate, occurring in the practice of 13 different operators, wherein the cause of death is given, shows in all 33 deaths. Of these deaths ten were due to such causes as cancer of the liver, pulmonary tuberculosis, etc., in no way connected either with the operation or the pathologic condition for which the operation was undertaken. Eight of the deaths were due to exhaustion, pneumonia, pulmonary embolism and sepsis, conditions caused by the operation itself or the anesthesia. It would be nearer

[3] Johns Hopkins Hospital Report, 1906, iv, 115. Hugh H. Young, Study of 145 Cases of Perineal Prostatectomy. Final Note as to Mortality Jan. 7, 1907.

[4] Cabot, A. T.: Modern Operations for Complete Removal of the Prostate, 1907.

[5] Porter, Miles F.: *Jour. Am. Med. Assn.*, May 23, 1908.

the exact truth, perhaps, to say of the deaths due to sepsis, that most of them were due to conditions existing before the operation was done, but for the present, at least, we will consider them as deaths due to the operation *per se*. The remaining 15 deaths were due to pyelitis, pyelonephritis, and other conditions secondary to and caused by the hypertrophy of the prostate, and existing at the time of the operation. Miles F. Porter.

The total death rate in this series of cases then, is less than 7 per cent. "The death rate of the operation is less than 2 per cent., while the conditions secondary to and caused by the enlarged prostate is 3.5 per cent. In other words, half of all the deaths following prostatectomy are due to conditions set up by the enlarged prostate. The deaths from these conditions outnumbered the deaths from the operation *per se*, two to one. This means that the death rate in hypertrophy of the prostate, treated without operation, is about 4 per cent., while timely prostatectomy will yield a death rate of 2 per cent. or less. If there is any error in these statistics, it consists in attributing to the operation itself, too many deaths, and charging to the pathologic conditions secondary to the enlarged prostate, too few. Fuller, speaking of his personal experience with prostatectomy in over 300 cases, says: "I feel that if cases complicated with very marked uremia are excluded I can operate with an average risk to the patient of not more and probably under 5 per cent. *Death from the operation itself is practically nil.*" (Fuller's cases are not included in the 485 cases studied.)

Goodfellow has done 105 prostatectomies with but two deaths. Watson gives the death rate in enlarged prostate treated by catheterization as 7.7 per cent.

C. H. Mayo, including his brother's cases with his, says: "In two hundred and ninety-one cases, including 26 for carcinoma, we have had 28 deaths."

Willy Meyer writes as follows: "I have done, outside of some 85 Bottini operations for prostatic enlargements, 41 suprapubic and 8 perineal prostatectomies. . . . Personally I prefer the suprapubic to the perineal operation."

Crile says: "In my experience in about 25 operations for prostatectomy the patients themselves were pleased with the result."

My own experience (Porter) is limited to 25 cases. There

were three deaths, all due to septic conditions (pyelonephritis and cystitis) which existed at the time of the operation and because of which condition the patients finally asked for relief. . . . The fatalities following prostatectomy are largely due to conditions resulting from the hypertrophy and existing at the time of operation. Prostatectomy, in the absence of serious complications, entails a risk of life of less *than 2 per cent.* The death rate in enlarged prostate treated by catheterization is only five per cent. (Miles F. Porter.)

[6] Dr. Stanley Stillman of San Francisco referred to the custom of Sir William Macewen, of performing the suprapubic operation in all cases in which the urine could be rendered fairly healthy, but when this could not be done he performed a double lithotomy incision for drainage purposes, followed by an interval of a week or ten days, during which time granulation tissue lined the incisions which were made, and the capsule of the prostate retracted; in that time the cut surface of the prostate protruded from the wound, the prostate itself was reduced in size as the result of complete dissection, and ten days later he would shell out with his index finger each lobe of the prostate, with no bleeding, and little danger of infection, inasmuch as the urine had become fairly healthy in the interval. Dr. Stillman had followed this plan himself for two years with much better results than he ever obtained from our methods of prostatectomy. His preference is distinctly for the suprapubic methods of operation where the urine is healthy and for Macewen's method where the urine cannot be rendered healthy prior to the operation.

[7] *Percentage of Mortality.*—Including cases of cancer of the prostate in which the typical operation of conservative perineal prostatectomy was employed, 13 recent cases which have not been tabulated above, 20 cases in which operation has been performed since the above paper was written some months ago, and a few cases in which the technic was not the typical one and which had not been tabulated above, there have been 400 cases of perineal prostatectomy, with 13 deaths, a mortality of 3.25 per cent. . . . During a period of two years and eight

[6] *Jour. Am. Med. Assn.,* July, 1909.

[7] Young, H. H.: Perineal Prostatectomy, *Jour. Am. Med. Assn.,* March 5, 1910.

months 128 consecutive cases were subjected to the operation of conservative perineal prostatectomy without a single fatal result; 43 of these 128 patients were over 70 years of age and two were over 80 years of age.

[8] Suprapubic enucleation of the prostate. In Freyer's series of 644 operations of enucleation of the prostate to date, there have been 48 octogenarians, and nine bordering on this period, with six deaths. . . . In connection with these 644 operations there have been 39 deaths in periods varying from six hours to thirty-seven days after operation, or a mortality of 6.05 per cent. The mortality has been gradually diminishing from 10 per cent. in the first 100 cases, to 4.24 per cent. in the last 200. Freyer mortality 6.05 per cent.

[9] M. Tuffier believes that the suprapubic operation is easier and quicker to perform than the perineal. When the gland is very small and the abdomen very fat, he selects the perineal operation, and quotes from Proust, Watson, Horwitz, Leque, Hartman, Pauchet, Rafin, Young and Albarran, to the effect that there were 2,222 cases, the average mortality being 6.23 per cent.; out of the total number of cases operated on the per cent. of deaths is about the same in both operations (35 per cent. perineal and 33 per cent. suprapubic). Shock is given as the cause of death in 17.8 per cent. operated on by the suprapubic method.

The general mortality is about 4 per cent. in perineal prostatectomy. Re-establishment of spontaneous urination and relief of vesical infection are the rule. The genital loss is habitual. The age of the patient and the lesions are not contraindications. The relative integrity of renal activity is necessary. Patients with grave organic deficiency, such as diabetes and albuminaria, succumb to pretended shock. The two methods have their advantages and disadvantages.

Mortality.—Mortality after prostatectomy is the subject of a paper by Drs. Tenney and Chase,[10] in which they accept

[8] Ricketts: *Jour. Am. Med., Assn.,* Jan. 29, 1910.

[9] Ferguson, Alex. H.: *Jour. Am. Med. Assn.,* 1906.

[10] Ann. des Mal. G. U., October, 1902; *Jour. Am. Med. Assn.,* Oct. 25, 1902; Centralbl. f. krankh. d. Harn. u. Sex.-Org., 1901, p. 571; *Philadelphia Med. Jour.,* June 8, 1901; "Treatment de l'Hypertrophie de la Prostate," Report au xv, Cong. Intern. de Med., 1905.

as possibly due to the operation every death reported as occurring within six weeks. From their table we find that 2,342 patients were operated on through the perineum, and 667 suprapubically. It will be seen that the average mortality by the peritoneal route is 7.9 plus. The average mortality by the suprapubic route is 13.2 plus, nearly twice the mortality of the operation through the perineum.

In my own cases I had no deaths in the first series of 21. Following that I lost three cases, one from renal insufficiency in 48 hours. This was considered a very unfavorable case for any operation. Another patient died in twelve hours from an overdose of morphin, and the third succumbed on the third day, an unfavorable case because of old age and emaciation. This makes my mortality between 3 and 4 per cent, in 103 cases, and does not include five deaths following prostatectomy, three from carcinoma and two from acute tuberculosis.

There have been no permanent fistulae seen in those with pus-furnishing bladders, which were inflamed, trabeculated and with stones, pouched or diverticulated. The natural tendency of the perineum is to close spontaneously, but, so long as pus emits, a fistula is likely to persist or recur. I had two of these cases. Injury to the rectum during operation is more of a blunder than an accident, and secondary rectal fistulae are caused most frequently by rough treatment from the eighth to the twelfth day, when granulation is profuse. This latter has occurred in the case of two of my patients in whom the after-treatment was not carried out by myself. Three patients were wearing urinals on account of partial incontinence, which was more acceptable to them and to their relatives than death. One of these, aged 70, accepted the operation only when life became unendurable from pain due to cystitis, etc. Considerable sloughing at the seat of operation from the skin inward occurred. There was one man, with impotence following, who avers he proved his vigor two nights previous to the operation. One case of stricture secondary to operation was cured by perineal section. Five patients had epididymitis. One had unilateral intranephritic and extranephritic abscess developing three weeks after operation. I cured him by incision and drainage. Stone in the bladder was present in six cases.

Review of Current Urologic Literature

FOLIA UROLOGICA

Vol. V, No. 7, January, 1911

1. A New Case of So-called Primary Actinomycosis of the Kidney. By J. Israel.
2. Four Cases of Distended Bladder Due to Diabetes Insipidus. By H. Strauss.
3. Urethral Pain Occurring in Completely Cured Urethritis. By G. F. DeMeo.
4. Contribution to the Study of Syphilis of the Bladder. By G. Von Engelmann.
5. The Treatment of the Urethra by Means of Hot Sounds for

1. A New Case of So-called Actino Primary Actinomycosis of the Kidney.—J. Israel reports a case of primary actinomycosis of the kidney, involving also the tissues immediately about the organ. After nephrectomy, a small fistula persisted which had not healed ten months after the operation. The author calls attention to certain similarities between actinomycosis of the kidney and tuberculosis of this organ, prinicipally as to the mode of infection, the clinical appearances and the anatomical distribution.

2. Four Cases of Distended Bladder Due to Diabetes Insipidus.—H. Strauss reports four cases of diabetes insipidus in young persons in whom he noted markedly distended bladders. The disease was always characterized by a positive result with the alimentary sodium chloride excretion test. The author believes that distended bladders are more common a feature of diabetes insipidus than is generally believed. His four cases represent a larger number than have been reported by other authors. In one of the cases, he was able to examine the bladder with the aid of the cystoscope and found that the organ was somewhat trabeculated. The origin of these dilated bladders in diabetes insipidus resembles that of bladders in chronic retention of the urine, although this question is still unsettled. For the purpose of a functional diagnosis of diabetes insipidus itself, the author recommends the alimentary salt excretion test. The absence of fer-

ments in the urine, may also be possibly a useful means of diagnosis.

3. Urethral Pains Occurring in the Completely Cured Urethritis.—G. F. DeMeo remarks that there are urethral pains occurring in completely cured urethritis. The pain may be the only symptom of the affection, or some other trouble might appear with it after the cure of the urethritis. The beginning, the duration, the intensity, the localization and the irradiation of the pain differ widely. The pain indicates alterations in the deeper layers of the mucous membrane of the urethra. The cicatrization of the mucous membrane after the cure of the inflammation causes an alteration of the nerve-ends within the mucous membrane. The physiological and anatomical lesions of these nerve endings cause irritation and pain. By cicatrizations in the urethra neuralgic crises may be produced, due to congestion compressing the anatomical elements, nerves included. Medicinal treatment alone does not favorably influence the pain; but gradual dilatation and gentle massage of the infiltrates over a metal sound will improve the circulatory and anatomical conditions of the mucous membrane and indirectly also influence the nervous elements. These procedures facilitate nerve metabolism and stretch the sensible nerve fibers. This is the best way to treat persistent neuralgias. In the more severe cases the effect of the mechanical treatment can be increased successfully by a moderate hyperemia of the perineum and by large irrigations of the urethra and bladder with antiseptic and anesthetic remedies.

4. Contribution to the Study of Syphilis of the Bladder.—G. Von Engelmann reports 3 cases of pronounced gummatous lesions of the bladder which he has treated with the aid of the cystoscope during the past 3 years. Syphilitic affections of the urinary bladder are very little known and are scarcely mentioned, or their existence is even denied in the text books. A number of cases are on record, however, in which syphilitic ulcers of the bladder have been found postmortem. A few cases have also been reported in which the disease was discovered through the cystoscope. The patients whose histories are here related, two women and one man, gave histories of syphilitic infection many years previously (15 or 20 years). Hemorrhage was the chief symptom. There were but a few subjective symptoms in

the two uncomplicated cases, while in the third case, complicated with intense cystitis, there were severe pains and frequency of micturition.

Cystoscopic examination showed multiple ulcers covered with crusts in the case with general cystitis. In the two other cases there were tumor-like growths with ulcerated surfaces surrounded by areas of inflammation in the region of a ureter. In two of the cases there were no other syphilitic symptoms except the affection of the bladder, while in the third, an involvement of the spinal cord was noted as well as some ulcerated papules in the genital regions. In all cases, the treatment with mercury and iodides effected a complete cure, with distinct cicatrization of the ulcers.

5. The Treatment of the Urethra by Means of Hot Sounds for the Purpose of Producing Hyperemia.—M. Porosz contributes an article on this subject, a translation of which has appeared in the January issue of the American Journal of Urology.

ANNALES DES MALADIES GÉNITO-URINAIRES

Vol. XXIX, I, No. 2, January 2, 1911

1. Operations Upon the Kidneys, and Pregnancy, By Prof. Hartmann.
2. Operations Upon the Kidneys and Pregnancy. By Prof. Pousson.
3. Reflex Calculous Anuria. By Henri Eliot.
4. The Treatment of Chronic Urethritis by Aspiration. By Dr. Bronner.
5. Calculous Anuria in a Single Kidney Treated and Cured by Ureteral Catheterism. By Dr. Audré.

1. Operations Upon the Kidneys and Pregnancy.—Professor Hartmann remarks that many physicians do not like to see pregnancy in a woman who has had an operation upon her kidneys, especially in one who has had a kidney removed. He asks whether this fear is justified. Some believe that it is, basing their opinion upon purely theoretical grounds. As a matter of fact, patients with one kidney have as much chance to go through pregnancy without any mishaps as any other patients. Hart-

mann has watched seven of his women patients who have had operations upon the kidney through pregnancies, which did not seem to be influenced by the previous operation. In another case, Hartmann was consulted regarding the advisability of marriage for a woman who had had one kidney removed for renal tuberculosis. After having found that the urine of this patient was normal, and that guinea pigs inoculated with its sediment did not develop tuberculosis, the author gave his consent. In addition to the eight cases thus observed, Hartmann summarizes 16 additional cases which had been communicated to him, making, in all, 24 cases of nephrectomy in which the operation seemed to have no influence upon subsequent pregnancy. In addition to these unpublished cases, the author collected 89 cases previously published, thus making a total of 113 operations accompanied or followed by pregnancy. A study of these cases leads him to the conclusion, that after operations upon the kidneys, particularly after nephrectomy, pregnancy goes on normally, labor is accomplished without incidents, and lactation is possible. These conclusions may seem contradictory as compared with the ideas of some physicians, but they are based upon facts, which Hartmann collected and they agree with the opinion of Israel. We are therefore justified in authorizing the marriage of young women, who have had a nephrectomy performed, even if this operation had been done for the presence of tuberculosis of the kidney. If the urine is examined carefully, and if it is found, especially after inoculating animals, that it does not contain any tubercule bacilli, it is quite safe to allow such women to marry.

2. Operations Upon the Kidney and Pregnancy.—Professor Pousson, remarks in connection with the same subject that nephrectomy is nowadays such a common operation that we must consider seriously the various social problems which arise in patients who have been thus operated. The questions which come up, in this connection, include the indemnity for accidents requiring the removal of a kidney, accident insurance, military service and marriage. It is this last point which the author considers in connection with a study of 66 cases, which he has been able to collect. Life is certainly not impossible with a single kidney. It has been found that an animal could be deprived of three-quarters of the total weight of both kidneys with-

out causing any fatal results. Whenever the tissues of the kidney are so reduced in quantity, they begin to hypertrophy, and this takes place both in animals and in man. Moreover, providentially, the healthy kidney often has already become hypertrophied when the operation is undertaken. This hypertrophy usually persists and continues to assure the sufficient secretion of urine. The remaining kidney, may however, sustain serious changes, which would have to be considered in connection with the question of marriage for women in whom one kidney had been removed.

Among 66 women who had become pregnant after varying intervals had elapsed after nephrectomy, seven had miscarriages. The remaining 59 passed through their pregnancies without any disturbance, and were delivered at term. Of these women, 46 were pregnant but once, 8 twice, and five three times after the operation. In all of them, the confinements were free from all complications, even in those cases in which instrumental delivery was found necessary. Most of the women nursed their infants. All these patients were living at the time of writing, except five, who died long after delivery, so that their deaths could not be connected with the pregnancy.

The results above recorded ought to set at rest the fear that women who had lost one kidney by operation, were incapable of bearing the strain of maternity. This does not mean, however, that we must allow such women to marry in every case, without thoroughly investigating their general health, the functions of their various organs, and especially the condition of the remaining kidney. Functional tests may show that the remaining kidney is intact, and that marriage can be authorized without hesitation. If the urinary secretion is not normal, permission to marry should be given only after a thorough examination of the patient and of the renal secretions. In a third class of cases, marriage should be prohibited, if the kidney is found markedly altered. The character of the affection which had lead to the removal of the first kidney is not of such importance in this connection as might be supposed. Thus, of 32 patients in whom nephrectomy had been performed for tuberculosis, the author noted but three in whom miscarriages occurred, while the remaining 29, with one exception, pregnancy went on to term, and the

child was living. Of these women, two died a considerable time after labor. Of ten women operated upon for stone in the kidney, only one had a miscarriage.

3. Reflex Calculous Anuria.—Eliot, discusses the question of reflex anuria, due to the obstruction of one ureter by stone. In France, Guyon and Albarran, have been the advocates of this theory in certain cases of stone. On the other hand, Legueu, has combatted this idea. It is curious to note that, while the possibility of a reflex anuria, due to the obstruction caused by stone, has been strenuously opposed, yet every one agrees that the same reflex process can produce anuria, in cases without any stone; as for example, an injury to one kidney, etc. The author examined critically the literature and clinical records of cases of calculous anuria. He cites 20 cases which he believes are eloquent witnesses for the cause of reflex calculous anuria. In most of these cases, modern methods of renal diagnosis alone permitted the recognition of the fact that the opposite kidney did functionate, although imperfectly. If these methods of examination were more universally adopted, there is no doubt that a larger number of cases of reflex calculous anuria would be recorded.

As regards the path pursued by the inhibitory reflex and as regards its mode of action, we are as yet unable to make any positive assertions. One thing is evident; namely, that the kidney in anuria is always congested, purple, and bleeds readily. This does not seem to favor the idea that the secretion of urine is arrested by a spasm due to the action of vaso-constrictors. As regards the explanation for the persistence of the reflex, the author points out that it is well known that the inhibitory reflex is especially noted in kidneys already diseased. Normally, the kidney is able to furnish a certain amount of resistance against the toxic agents which give rise to uremia. The diseased kidney, on the other hand, is unable to furnish this resistance. In reflex calculous anuria, the symptoms of uremia occur quite promptly, as a rule, although they may remain latent for a time. The persistence of the reflex therefore, in Eliot's opinion, is probably due to the presence of latent or active uremia.

4. The Treatment of Chronic Urethritis by the Aspiration Method.—Bronner, in a preliminary note, announces the

results which he has obtained with a method of treatment which he calls, "aspiration," in cases of chronic urethritis. The apparatus constructed for this purpose by Lowenstein, of Berlin, is composed of a straight metallic sound, hollowed in its interior and pierced by a number of openings over its entire surface. The upper end divides into two arms, to which are attached two rubber bulbs provided with metallic stop cocks. One of these bulbs is intended for aspiration, the other for irrigation. The apparatus is used as follows: After having irrigated the entire urethra, and filled the bladder, the sound is well lubricated, and is introduced without its bulbs. The glans is then surrounded with a thin layer of cotton, and the latter is held in place by a few turns of thread, thus preventing the entrance of air. One of the bulbs is filled with the solution intended for the irrigation. The air is expressed from the other bulb, and the stop cock is closed. The two bulbs are then adjusted upon the apparatus. Holding the glans with the left hand, the stop cock of the aspirating bulb is opened. The aspiration begins and lasts from ten to fifteen minutes. The stop cock of the aspirating bulb is then closed, that of the opposite bulb is opened and the canal is irrigated.

In order to obtain a more powerful aspiration and at the same time to regulate its force, the author has substituted a syphon pump provided with a monometer. Instead of using the bulbs, the branches of the sound can be connected with a syringe. The author reports having treated by the method of aspiration, 12 cases of chronic urethritis, during a period of four weeks. He found that all the patients bore the treatment very well and that aspiration never gave rise to bleeding. In the aspirated liquid, he was always able to find numerous pus cells and sometimes true pus shreds. In cases in which the lining of the urethra had become changed to a horny state, a large number of the horny epithelia were found in the aspirated fluid. In some cases, the dilating influence of the aspirations was clearly demonstrated. The condition of the patients before the treatment was begun, showed that a great variety of other methods of treatment had been used without success. After the use of aspiration, marked improvement occurred. The effect of this method of treatment is twofold: First, it performs a sort of curettage of the urethra, and also aspirates the secretions of the glands by a method which

seems superior to massage. Second, it produces hyperemia acting in the shape of a dry cup and thus has the same effect as Bier's method. The author is continuing his observations and promises to report further progress with his method.

5. Calculous Anuria in a Single Kidney Treated by Means of Urethral Catheterism.—André reports a case, the character of which is described in the title. The patient was 42 years of age, and presented himself at the hospital because he had been unable to urinate for 48 hours. Six years previously he had an attack of renal colic on the left side, which was repeated after two months. During the second attack, he passed a number of small yellowish stones. He had not suffered at all for six years. A third attack of renal colic occurred just before admission. Complete anuria had been present in this patient for 48 hours. The left kidney was painful and evidently the anuria was due to the blocking of the left ureter.

The left ureter was accordingly catheterized, a 7 F catheter entering and passing up to the pelvis. Immediately a stream of urine began to flow, showing that this fluid had been retained in the pelvis in a state of tension. At first, 70 grams flowed out of the catheter at one time; then the flow continued drop by drop. The catheter was allowed to remain in place for 48 hours. During the first 24 hours, 1800 grams of urine were voided. During the next 24 hours, 2600 grams were passed and after that the patient secreted urine continuously. During the following days, large quantities were secreted. Examination of the region of the right ureter failed to show its presence, and although every effort was made to find a second opening, it could not be discovered. The patient recovered completely and never passed any stones. X-ray pictures were negative, but this may not mean much, as the stone may have been very small.

ANNALES DES MALADIES VÉNÉRIENNES

Vol. VI, No. 1, January, 1911

1. Is Early Malignant Syphilis Really Syphilis? By Dr. Carle, of Lyons.

1. Is Early Malignant Syphilis Really Syphilis?—Carle discusses this question, which was first asked by Queyrat

in 1908. It raises an interesting problem. There is scarcely a specialist who does not see several times a year, cases which are called precocious malignant syphilis, and which are characterized by a remarkable rapidity, intensity, and tenacity of the lesions. In spite of very careful treatment, these lesions do not improve, and the question frequently arises whether we are really dealing with syphilis in such cases. The author proceeds to report a case of what he thought was precocious malignant syphilis, in which after a year's comparatively unsuccessful treatment, the Wassermann reaction was found to be negative. The patient resumed his usual mode of life and did not present any symptoms whatever after that. In this case, and in similar cases, the question may be asked, whether precocious malignant syphilis has the same origin and the same character as normal syphilis; whether the symptoms of this special type differ from the normal type, and if so, to what extent; and finally, whether or not the same treatment is applicable to the malignant form. The author concludes from a study of this subject, that precocious malignant syphilis is true syphilis, because in authenticated cases, the spirocheta was found. In general, it might be said that the malignant form reduces itself to one or two attacks of ulcerated lesions accompanied sometimes by a more or less impaired general condition. The absence of the classical symptoms of the secondary period, as well as of the later complications, is characteristic of these cases, even in instances in which the disease had never been treated specificially.

The treatment in these malignant cases does not have the rapid effect which we are accustomed to see in cases of the normal type; in fact, the treatment does not seem to have any appreciable effects upon the malignant lesions and it is even possible that mercury in these cases is dangerous. In such instances, we should try the arsenical preparations, although the best results up to date have been obtained with potassium iodide in large doses. At the same time, it is necessary to combine a medication which would be both tonic and sedative. All local treatment should be avoided, except the necessary dressings and washes, which should be as anodyne as possible.

RIVISTA UROLOGICA

Vol. I, No. 9, November 15, 1910

1. A Case of Double Ureter. By Quirino Sergi.
2. Consideration on a Case of Rupture of the Urethra. By E. Cibrario.

1. A Case of Double Ureter.—Quirino Sergi reports a case of double ureter on one side. This anomaly is not very rare, and has been known since the publication of Bartholin's "Anatomy" in 1655. The question is, to what is this anomaly due? Embriology teaches us that the ureter does not descend from the kidney towards the bladder, but that it ascends from the bladder upward. Thus, in cases of incomplete double ureter we find that there are two distinct canals at the lower end which merge into one further upward. The ureter is but a prolongation of the cloacal extremity of the diverticulum of the kidney.

The specimen obtained postmortem and reported upon by the present author, showed a double ureter which was discovered accidentally during a careful dissection of the abdominal organs. The right kidney was normal, while the left was large, and irregular in outline. The renal sulcus was large and gave issue to two pelves, each terminating in a separate ureter. Each pelvis drained a number of calices. The organ seemed to be composed of two distinct kidneys, superimposed and fused together. The lower kidney was turned slightly towards the left upon its long axis, as well as upon its horizontal axis. The upper kidney, however, seemed to be fairly normal in position. The anomaly described, therefore, represented a complete double ureter on the left side. The trigone showed an irregular arrangement, owing to the presence of three ureteral mouths, and to the scarcity of the inter-ureteral muscle fibres. Upon microscopical examination of the two urethral mouths on the left side, a sheath was discovered which surrounded the extremities of both ureters, thus confirming the theory of Versari upon the origin of the intra-and extra-mural fascia described by this author.

2. A Case of Double Rupture of the Urethra.—Enrico Cibrario, reports an interesting case of rupture of the bulbous and prostatic urethra. The patient was a young man of 19, a plasterer, who sustained a fall from a scaffold, his body falling forward. On examination immediately afterward, a lacerated wound was found upon the internal surface of the thigh on the

left side, near the root of the limb. This wound was carefully dressed and sutured. A small quantity of blood issued from the meatus at this time. The patient refused to go to the hospital, believing that his injury was not severe enough. Towards evening he felt an intense desire to urinate, and a physician who was called tried in vain to catheterize him. A moderate swelling formed in the perineum. When seen 24 hours after the accident he was able to urinate, and had fever, with a frequent and small pulse and a coated tongue. The swelling in the perineum had greatly increased, ocupying the entire scrotum and extending laterally towards the thighs. The skin which covered this swelling had become bluish black. There was only one thing to do; namely, to cut into the perineum at once and perform external urethrotomy, for the purpose of emptying the bladder and counteracting the septic process.

Accordingly, a Syme's guide being introduced down to the bulb which had become ruptured, an incision was made extending from the scrotum along the median line to within 1 cm. from the anal orifice. The dissection was carried through the very much infiltrated tissues to a depth of about 4 to 5 cm. until a cavity with necrotic walls was reached, containing a small quantity of foul smelling liquid mixed with blood clots. This, then, was the location of the rupture in the bulbous portion. A careful cleansing of the parts was carried out, a stream of hot water being directed against the necrotic tissue, thus removing the clots and debris. It was found that the upper wall of the urethra had entirely disappeared, and that there was a complete rupture of the canal. Attempts were therefore made to find the central end of the urethra, and when this was accomplished, a sound was introduced into the bladder. The central end of the urethra was attached to the skin by means of two silk sutures and drainage was established through the perineum. The patient improved apparently for a few hours, but contrary to expectations he did not urinate through the perineal drain. The bladder was enormously distended, the fever rose, and the patient became restless. The bladder was then drained by means of a hypogastric puncture and the patient was taken to the hospital. Under chloroform, a sound was introduced through the urethra and through the upper segment of the canal, which had been fixed to the skin, but after passing upward for a short distance, the instrument was arrested. The presence of a second rupture was then thought of, and rectal

exploration was practised. The membranous urethra was uninjured, but in the prostatic portion, the finger felt a large swelling of the size of a small orange, which seemed to contain fluid. The conclusion was, that there was a second rupture, situated in the prostatic urethra. Two ways now presented themselves for the relief of this condition. The first was the classical method, namely, that of retrograde catheterization through a suprapubic incision, and the second, through a perineal incision, as recommended by Riche.

The first of these methods, while simple of execution would probably have been insufficient in this case to establish the continuity of the canal. The perineal method was therefore preferred as giving better drainage, the only difficulty being the extreme delicacy of working in the prostatic region, when the tissues were in a state of such marked infiltration.

A transverse incision was made as customary for perineal prostatectomy, and after dividing the recto-urethral muscle the space between the rectum and the urethra was reached. After separating these organs, a cavity of considerable size was reached in the upper wall of which the finger discovered an aperture in the beak of the prostate. After the clots and fluid contents of the cavity, had been removed by irrigation, an unsuccessful attempt was made to enter the bladder with a sound. The operator then made a longitudinal incision along the posterior wall of the prostatic urethra. Through this incision a drainage catheter was introduced through the bladder, and allowed to remain in place. Strips of gauze were packed around the catheter, and a smaller drainage tube was introduced, alongside the larger for the purpose of draining whatever urine might escape between the catheter and the urethra. The drainage catheter was attached to the skin by means of a few stitches. The patient made a good recovery. The gauze was removed on the fourth day and the drainage tube on the fifth. On the eighth day, sounds were passed, and this was repeated every day, gradually increasing the size of the sound. The patient was discharged on the eighteenth day. A year after the operation, the patient was in good condition, and his urethra admitted a good sized sound. The author emphasizes the value of removing the drainage tube after a period not exceeding six or seven days. If allowed to remain longer, the drainage tube favors the formation of traumatic strictures.

THE AMERICAN JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII MAY, 1911 NO. 5

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

VESICAL STONE AND ITS MANAGEMENT WITH SPECIAL CONSIDERATION OF LITHOLAPAXY [1]

By F. KREISSL, Chicago.

IN accepting the honor of addressing your distinguished society I was fully aware that I could not appear before you with a subject which has been worn threadbare in the course of years, nor was I in a position to deliver a new and startling message. I therefore, selected a topic, which, while not new seemed to me to deserve much more attention than it has received from our profession in America, namely, "Vesical calculosis and its management with special reference to Litholapaxy."

By a circular letter sometime ago sent to a large number of surgeons especially to those engaged in Genito-urinary work I have endeavored to obtain a definite answer to the following questions:

I. Is your operation of choice for vesical stone, Lithotomy or Litholapaxy?

II. If any, what is the mortality after your operations for vesical stone?

III. If any, what is the percentage of recurrence?

IV. In how many cases was marked cystitis present at the time of operation?

V. Did the cystitis always receive attention after the operation?

VI. What, in your experience, is the percentage of stones of renal origin that caused vesical calculosis?

[1] Read by invitation at the meeting of the St. Louis Medical Society March 4th.

VII. If so disposed, can you give me the number of operations for vesical stone performed by you?

The replies were mostly incomplete and unsatisfactory which is regretable since there is no consensus of opinion yet on most of these points and since exact clinical work and harmonious co-operation of those engaged in this branch of surgery would help a great deal to throw much light on very important questions such as: The Etiology of Vesical Calculi, the indications for the different operative methods for their removal and the prevention of recurrence of the same.

But many surgeons seem to be satisfied to record the diagnosis and the operation and sometimes the size and weight of the stone if it happens to be unusually large and heavy.

It is not the purpose of my address to annoy you at length with a more or less dry lecture on vesical stone and its treatment. I merely submit to your consideration a few points which appear to me of sufficient importance since they are not generally appreciated.

It is therefore hardly necessary to mention that a large proportion of vesical stones are of renal origin although the proportion may not be so large as is commonly believed. While I have been unable to receive a satisfactory reply to this question from other surgeons, I have in the large number of my own cases always tried to ascertain this point by inquiring of my patients if symptoms of lumbar pain or renal colic had preceded those of the vesical disorder at any time. In my own cases the percentage of vesical stone of apparent renal origin is very small, expressed in figures not over fifteen percent.

The majority of my patients exhibited evidence of infection of the lower urinary tract—urethra and bladder—or at least of the latter, some also of the upper urinary tract. Many of them had gonorrhoea in former years, had been treated with bougies and metal sounds and stated that at times these instrumentations were followed by more or less bleeding. Frequently I found a still active prostatitis and oftentimes urethral strictures.

In examining concrements which had been removed by Lithotomy I have several times discovered blood as the nucleus of a stone. From this I would conclude that careless and forcible instrumentation will eventually lead to injuries and repeated

bleeding of the prostatic urethra and bladder, which under favorable conditions might lay the foundation for a vesical stone. Such favorable conditions are furnished by inflammation, cystitis, urine retention a trabeculated bladder, a diverticulum or a cystocele in woman.[1]

Under similar conditions, vaseline used as a lubricant might form the nucleus of a stone and for this reason it has been pretty generally abandoned for the above purpose.

In former years when medicated bougies containing beeswax as an excipient, were freely used in the female urethra I had several times occasion to remove vesical concretions, the nucleus of which consisted of a fragment of the urethral bougie. With the introduction of the soluble gelatine-bougie this sort of vesical calculi has become quite rare.

In one of my cases the stone had formed around a lump of paraffin which was previously employed in a periurethral injection for incontinence. Apparently a part of the paraffin escaped through a puncture into the bladder. Since this method is still practiced without any guide except the index finger introduced into the vagina I would suggest that a cystoscopic inspection of the bladder should follow such applications.

Another source of vesical calculus are silk-thread loops immigrating into the bladderwall after operations on the abdominal and pelvic viscera. But at this date they are more of historical interest since catgut or tendon has replaced non-absorbable material as ligature and suture material.

The small proportion of women afflicted with vesical stone —about five per cent.—is rather surprising especially in the light of the generally accepted theories of lithogenesis which should hold good for both sexes. I believe this small percentage may be partly explained by the shortness and dilatability of the female urethra which permits the spontaneous expulsion of stones of a size too large to pass through the male canal. But I also believe it to be due to the fact that women are yet much less than men subjected to urethral and vesical instrumentation, which as I previously suggested is etiologically responsible for a certain number of vesical stones.

[1] But this might be an incident, since most of my patients were of advanced age and presented urinary lesions which apparently were directly or indirectly responsible for the formation of vesical stones.

Very strange is the endemic existence of vesical stone in certain localities and still stranger and confusing are the reasons sometimes quoted for this phenomenon. The climate, the condition of the soil and the water have been utilized for an explanation, but undisputable proof has not been furnished for any of them.

In one instance, at least, the theory of the influence of climate and the conditions of the drinking water has received a setback. I refer to the prevalence of vesical calculus in Egypt, which was demonstrated beyond doubt by Bilharz to be due to distoma hematobium, the latter causing a more or less severe cystitis and itself forming the nucleus of the stone.

It seems to me that in other districts perhaps faulty metabolism might be the cause of the prevalence of urinary calculus may be due to certain habits or the preference for certain food products rather than the climate or the water supply. In all probability the Bacterium coli contributes its share to the formation of vesical calculus in the same proportion as it is guilty of many other offences in and outside the urogenital tract.

Vesical stone in infancy and childhood is perhaps largely due to uric acid infarct of the kidney. This condition at least is of particular frequent occurrence in districts in which vesical calculosis is an endemic disease. However, this theory would *only* explain the formation of uric acid stones, while no doubt, purely phosphatic concrements owe their origin to vesical irritation and infection. Perhaps the pyelitis of infants which occasionally induces so-called enúresis plays an important part in this respect.

Heredity also seems to have some influence inasmuch as uric acid diathesis and cystinúria with subsequent vesical calculosis can be observed in several generations of the same family.

The symptoms of vesical stone are sometimes typical and unmistakable at others not sufficiently pronounced to suspect the disorder particularly so in women.

There is usually a phase of toleration which extends from a few weeks to several years. Ultimately, the bladder reacts with hematuria, pain, polakiúria, interruption of the stream of urine, retention or incontinence and finally a very painful trying cystitis.

I do not need to go into details on these symptoms, except

to mention that most of them are by far not so pronounced in women because of the different shape and position of the female bladder. So for instance, do we *not* observe the interruption of the stream of urine, which in the male bladder is produced by the rolling of the stone over the vesical outlet acting there like a valve. On account of the spacious lateral pouches of the female bladder stones are always located away from the vesical sphincter. For the same reason vesical stones in the female bladder are not so apt to change their position as in the male and therefore pain and hematuria is less often observed and less pronounced than in the male sex.

Indeed frequently, the discomfort is referred to the genital organs and women are treated gynaecologically or rather gynaeco-illogically until a subsequent cystitis directs attention to the real nature of the trouble.

Another symptom the *incontinence* if occurring in children —and vesical stone is much more frequent in children than in adult women—is oftentimes mistaken for enúresis and treated as such, of course without result except perhaps that we wrongfully attribute the failure to the difficulty of managing enúresis. While the blocking of the vesical outlet by a stone is partly responsible for urine retention it is not the only cause of it. If cystitis has set in the pain is most marked when the bladder becomes empty and soon the latter learns to cease contracting before complete evacuation occurs. This can be readily proven by urging the patient to urinate while lying on his back. In this position the stone rolls away from the vesical outlet, there is no blocking of the free escape of the urine and yet immediately after urination, residual urine will escape through a catheter introduced into the bladder.

If not removed in due time, extensive ulceration of the bladder wall takes place leading in extreme cases to perforation mostly into the rectum, or the vagina, rarer in the prevesical space. Another and serious complication is the extension of the infection into the renal pelvis and the kidney proper, which renders subsequent surgical interference for the removal of the stone, a rather dangerous procedure.

The diagnosis of vesical stone from the symptoms enumerated is not always easily made; since hematuria, terminal tenesmus and sudden interruption of urination are observed in other disorders of the urinary tract. Particularly in the presence of a cloudy urine such symptoms might readily be attributed to

a cystitis of other origin than of calculosis and the stone either as the cause or the result of the cystitis is not thought of. Very characteristic for stone, however, is the pain radiating into the glands in the male and the rectum which is most pronounced when the patient is on his feet or being shaken up when riding in a vehicle, while he or she is comparatively comfortable when resting in the recumbent position. But even this symptom is absent in patients whose bladder has lost its sensitiveness on account of some spinal disease for instance, in tabes and poliomyelitis.

Thus, it is seen that we have to resort to local inspection of the bladder in order to get a clear idea of the conditions existing therein. In the precystoscopic time we had to rely upon the deceptive rectal or vaginal palpation of the bladder and the examination with metal sounds. This was not always satisfactory since excessive fat on the abdomen or the small size of a stone would not permit it to be felt and calculi escaped detection by the sound either because they were located in a diverticulum or wedged in between a large lobe of the prostate and the bladder wall or because the bladder being extremely sensitive would contract pouchlike around the stone so that the metal searcher could not come in contact with the latter.

With the advent of the cystoscope the diagnosis of vesical stone has been simplified and errors are almost impossible, failures rare. It should therefore be employed wherever circumstances, the condition and the age of the patient, permit to do so. Only unusual enlargement of the prostate, excessive hemorrhage from the bladder a urethral stricture of a very small caliber or the extreme youth of the patient interfere with this method. In these cases we possess in the shadowgraph a valuable aid to establish the presence or absence of vesical stone.

However, it must be remembered that with the latter method errors are unavoidable which are not without consequence when indications for therapeutic procedures have to be considered. I have reference to the incrustations of vesical ulcerations and of tumors which in the X-ray picture cannot be differentiated from veritable stones. Even with the cystoscope the deception is sometimes complete when a tumor with a slender pedicle becomes covered with a phosphatic shell. Many years ago I encountered such a growth and incidentally touching the same with the beak of the cystoscope fractured the thin phosphatic shell, pieces of which separated from the tumor exposing its red

surface. Since then it is my practice whenever possible, to move the stone from its bed with the beak of the cystoscope, which could not be done if it *was* an incrustated growth. Owing to this practice, I also diagnosed the rare case of a so-called hour glass shaped diverticle-stone, one-half of which was enclosed in the diverticulum, the other half protruding into the bladder and its narrow centerpart or neck being closely surrounded by the vesical opening of the diverticulum. In a case published in the JOURNAL OF UROLOGY last year I saw a stone apparently lying free in the retroprostatic pouch behind a very large gland. It could not be reached with the beak of the cystoscope on account of the large size of the middle lobe. Upon opening the bladder in the subsequent suprapubic prostatectomy this stone was found to be emanating from the narrow neck of a very large diverticulum from which I removed sixteen more stones of like size. An X-ray picture would have shown the condition before the operation and these pictures should be taken in all unclear cases of vesical distress in which only diverticula are found, because stones are oftentimes located inside of them without being visible through the cystoscope. The X-rays will also demonstrate stones which are wedged in behind and covered by enlarged prostate lobes, and therefore cannot be palpated with a metal sound or seen through a cystoscope.

Treatment:—The presence of stone in the bladder ascertained, its early removal becomes necessary. This can only be accomplished by surgical means. The problem of dissolving a concrement by injections of solvent drugs or by internal medication has remained a problem up to the present time and doubtless will so continue. Where such results have been observed the so-called solvents did not act on real stones, but on gravel (mineral deposits of minute size). Since all solvents are administered with large quantities of water the good results obtained in this way should be credited to the water and not to the drug.

We have been taught that in the choice of the method of removing vesical stones, the bladder, the stone and the general conditon of the patient are to be considered. You may add to it "the experience of the surgeon *in* and his preference *for*, a certain method." But the latter should not count because there is no one method for every case and while it might be true that all roads lead to Rome, there are shorter and longer ones and there are smooth and rough roads.

We possess two established methods for the removal of vesical stones:

The former, as the name indicates, aims at the crushing of the stone and the removal of all the fragments by aspiration in one sitting. It is performed with instruments which are introduced into the bladder through the urethra.

It is not the purpose of this address to give a description of the instruments required or the technique of the operation, but it may be said that the surgeon, who performs litholapaxy, is supposed to possess a well developed tactile sense and great dexterity in intravesical manipulations. Maybe this is one of the reasons, if not the only one, why a majority of surgeons are, so to say, *addicted* to Lithotomy and opposed to Litholapaxy.

The operation is indicated in free stones of small and medium size, of not more than five centimeters diameter. This, however, is said with reservation, as even somewhat larger concrements, chiefly consisting of phosphatic material, can be readily crushed, while very hard stones of less than five centimeters will resist even the toughest Lithotrite. I personally take into account in these cases rather the condition of the bladder, it's sensitiveness and distensibility.

Litholapaxy can also be performed in certain fixed stones, that is, in stones which have formed around ligature-loops imbedded in the bladder wall provided one be reasonably sure of this condition and the possibility of an incrustated tumor can be excluded.

The operation is not indicated when stones are wedged in between prostate and bladder wall or lodged in a diverticulum. The *multiplicity* of stones is for me not a strict contraindication for Litholapaxy. To my mind it is not the number of stones, but the total diameter of all of them taken together that should determine the method of operating. If the total size of all these stones should exceed the limits mentioned above Lithotomy should be performed for the identical reason for which the latter would be indicated for a single stone of the same size.

If, however, the total diameter lies below this limit these stones represent to me the same as the fragments of one large stone dropped to the floor of the bladder during the crushing operation. These have to be seized and crushed into the smallest possible pieces and made ready for the aspiration, and the same process will reduce multiple concrements. Thus you might perform Litholapaxy in a bladder containing perhaps a half a dozen

stones of an average diameter of one ctr., while in another case of but two stones of three and four ctr. diameter respectively you will be compelled to do a Lithotomy.

Litholapaxy is also not indicated in an ulcerated bladder when the ulcerations have passed beyond the mucosa, and reduced the tensile strength of the muscular coat.

Enlargement of the prostate gland if not excessive does not contraindicate the operation. The difficulty of passing metal instruments over the obstructing parts in these cases is readily overcome by leaving a retention catheter in the bladder for a day or two preceding the operation. This also prevents excessive hemorrhage subsequent to the urethral trauma of the operation. Difficulty, however, may be experienced in the evacuation of the fragments by the depth of the retroprostatic pouch.

In very large prostatic obstructions Litholapaxy is not indicated, because of the difficulty of seizing the stone and the fragments, which necessitates prolonged manipulations and undue traumatisms to the gland. Inasmuch as there is always more or less infection present in these cases prostatic abscess is the usual result, and passi paru, Lithotomy has to be considered the milder procedure. But aside of this consideration very little is to be gained by Litholapaxy in such a case, since the large prostate and the subsequent urine retention are at least partly if not altogether responsible for the formation of the stone, and nothing but the removal of the gland will give a fair prospect of preventing the recurrence of the vesical trouble. On the other hand one should remember that an enlarged prostate does not always cause retention and that where both conditions, large gland and vesical stone are found together, the latter might be the sole source of the trouble.

Litholapaxy should not be performed in a diverticulated bladder, not so much on account of the danger of rupturing its walls, but chiefly because fragments and stone dust are likely to drop into the diverticulum, from where their removal is not only difficult but most likely impossible. The inevitable result then would be the early formation of diverticle stones, which will put the patient in a condition just as bad if not worse than he was before the operation.

Litholapaxy in the female bladder is very *difficult* for anatomical reasons, such as lack of support for the lithotrite as it is rendered by the prostatic urethra, the greater distensibility of the posterior wall and the irregularities in contour.

Smaller concrements may be easily extracted through the dilated urethra.

Litholapaxy under general anaesthetic is contraindicated in all cases in which any other major operation would not be permissible. However, some of these patients can be safely and painlessly operated under local cocain or spinal anesthesia. I have repeatedly performed Litholapaxy under similar conditions by cocainizing the urethra and bladder and injecting into the rectum one ounce of water containing thirty grains of antipyrin and one-fourth grain of morphine. Of course, this mode of anesthetizing will only be applicable in a bladder which is very tolerant and not inflamed or ulcerated.

A cystoscopic examination should immediately follow the operation in order to determine if fragments have been left behind. There is no excuse for not doing this, because if properly and skillfully performed there is hardly any bleeding observed which could interfere with a clear view of the bladder cavity. There is sometimes a little more bleeding if the bladder be ulcerated, but it is not so profuse that it could not be checked by irrigations with hot boric solution to which a few drops of adrenalin may be added. Neglect of this rule will oftentimes be followed by forming of new stones around the fragments as a nucleus and the operation loses its chief characteristic and purpose, *the removal of the stone in one sitting.* Instead of relieving the patient he is then left in a possibly worse condition because, where he previously carried a rather smooth concrement, his bladder is now injured by one or more sharp-edged fragments.

The practice of leaving a retention catheter in the bladder after Litholapaxy should be discouraged. It is unnecessary and irritating, and in an infected bladder the vesical part of the catheter readily becomes coated with phosphatic deposits and infectious débris which increases the symptoms of cystitis instead of reducing them and renders the ultimate removal of the instrument very painful and bloody.

It is true frequently complete retention follows the operation for a day or two which is due to the distension of the weakened bladder wall unavoidable in Litholapaxy. But whether the bladder be infected or not it suffices to empty the same at regular intervals. Litholapaxy as an office operation has to be condemned. It is impossible to render an office as aseptic as an operating room should be, and accidents making it necessary to

discontinue the operation and finish by suprapubic cystotomy might occur.

Postoperative attention to the bladder is also one of the requirements, lest recurrence should appear soon afterwards. If we bear in mind that the majority of vesical stones are the product of or complicated by cystitis it is at once apparent that unless the bladder be restored to normal condition recurrence of stone will be inevitable. In some cases a short treatment will suffice, while in others the etiology of the vesical infection requires prolonged or even perpetual attention. Such is particularly the case when we have to deal with chronic pyelitis and pyelonephritis prostatic obstruction or paralysis of the bladder as the source of the cystitis.

Prophylactically we may here employ such remedies which are recommended as solvents. No doubt the drinking of copious quantities of water with or without the addition of mineral drugs will dilute a concentrated urine, will keep certain urinary salts in solution and mechanically flush the urinary tract. Urotropin, a specific for coli infection, unquestionably is of great value in cases of vesical stone of renal origin in which the bacillus is the sole cause of the trouble. Regulations of the diet and elimination has its place where faulty metabolism is an etiological factor.

Soon after the inspection cystoscope was modified so that it could be utilized for the purpose of catheterizing the ureters the idea suggested itself to extend its field of usefulness into surgery, and this led to the construction of the operation cystop, the best type of which carries the name of one of the leaders in Genito-urinary work, Bransford Lewis, of your city. While it is very valuable for such a purpose as the removal of ligature loops, the cauterization of tumors, and the curetting of ulcers of limited extent, I consider it not capable of accomplishing more than the breaking up of very small concretions. But for this purpose I employ a much milder procedure, the aspiration of stones which are not too large to pass through the eye of an evacuation catheter of size thirty-one French scale.

The mortality after litholapaxy in the hands of skillful surgeons is about one and one-half to three per cent. In the preantiseptic time, and before the ingenious American surgeon Bigelow evolved the principle of litholapaxy against lithotripsic in several sittings, the mortality was as high as thirty per cent.

Lithotomy should be reserved for all those free vesical calculi which are not removable by Litholapaxy. The perineal

route for this purpose is rarely taken nowadays except in those cases in which perineal prostatectomy is performed at the same time.

Suprapubic Lithotomy being anatomically and surgically correct is generally preferable when a cutting operation is decided upon. The preoperative preparation of the bladder is the same as for Litholapaxy. I would suggest to distend the bladder with air instead of water, which insures to a certain degree a cleaner wound and saves time, which is consumed in drying the field of operation and the vesical cavity when water be employed.

For large stone, a transverse incision through skin, fatty tissue and fascia, is preferable to the vertical one. The recti can be retracted without being cut, and the bladder is also transversely incised. In this way much space is gained, time saved, and a hernia prevented.

The stone being extracted, the bladder should be closed by a double row of catgut sutures wherever possible. This can always be done unless extensive ulcerations should require special attention. The old idea that every infected bladder has to remain open because the suture line becoming infected would not hold, has lost its standing, since we have learned to lay the first row of sutures exclusively into the muscular coat in such a way as to approximate broad surfaces of the same by retracting the serosa and preventing the mucosa from being caught between the muscle fibres. If the sutures are placed in this manner there is no chance for urine leakage, and no occasion for the employment of a retention catheter, the detruso being able to functionate normally. Eventually, as in Litholapaxy, catheterization and irrigations at suitable intervals might be advisable.

Suprapubic cystotomy can and has also been performed under spinal anaesthesia when certain conditions did not permit a general anaesthetic. In women *colpocystotomy* is usually practiced not only because the gynaecologist attends the majority of cases of vesical stone in the female sex, but also for cosmetic reasons which should be taken into account, particularly in girls and young women. A decided disproportion between the stone and the vagina as found in young girls and old women might compel the suprapubic route.

The mortality after Lithotomy in the preantiseptic time reached over twenty-four percent, at present the figures given by different surgeons vary between seven and fifteen percent.

The percentage of recurrence after operation for vesical

stone does not depend on the method selected. Recurrence will be observed whenever renal caculi pass down into the bladder, when the vesical trouble which caused the stone is not properly attended to or for certain reasons reappears.

Considering that patients after Litholapaxy sometimes leave the hospital on the day of the operation frequently within the next twenty-four or forty-eight hours and rarely later, and then on account of their general debility, furthermore that patients on whom Lithotomy was performed are confined in the hospital from ten days to many weeks, and comparing the above figures of mortality after either operation I do not need to say more, why Litholapaxy should be the operation of choice for vesical calculosis.

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Contributed by the Author to The American Journal of Urology.

CHRONIC GONORRHEAL PROSTATITIS

AN ENUMERATION OF A FEW OF ITS UNUSUAL SYMPTOMS—TREATMENT—AND A REPORT OF 75 CASES TREATED IN DISPENSARY AND PRIVATE PRACTICE.[1]

By Robert Burns Anderson, M.D.,

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WHEN a young man with a gonorrheal past has a history of marked sexual disturbance, painful urination, especially at the end of the act, a feeling of heaviness and fullness in the perineum, a stubborn urethral discharge, or a recurrent urethritis or epididymitis, it requires no special knowledge or skill on the part of the medical adviser to see that trouble exists somewhere in the urogenital tract, and that a thorough examination of his patient's excretory system is demanded whether his patient presents few or many of these symptoms. But many cases of chronic gonorrheal prostatitis present few of the symptoms of gleet. They have in the dim past a gonorrheal history, but that was long ago. Now they suffer with pains in the back, loins, thighs, pubic region, testicles: or they are invalided with persistent frontal headaches, mental depression, irritable temper, marked neurasthenia and hypochon-

[1] Read before the "Hartford County Medical Society," Hartford, Conn.,

dria, sexual impotence and mental states bordering on insanity. The physician with wrinkled brow thinks of lumbago, sciatica, renal colic, vesical calculi or some grave nervous disease or mental condition, but the cause of at least a few of these people is a chronic prostatitis the origin of which goes back to the long forgotten gonorrhea. A thorough examination will often prove the truth of this statement. To this end if the urine is not clear, the bladder is filled with sterile water and the patient instructed to micturate. This process is repeated until the fluid passed is clear. The prostate is then massaged and the secretion thus obtained examined for pus cells and gonococci. If on the first examination only pus cells, a few red blood cells and pus cocci are found, another examination is made after an irritant has been applied to the posterior urethra, for where pus cells are found a pathological process exists, and if a sufficient reaction is produced in the diseased gland, gonococci will be found in the exudate. Any prostate thus examined the secretion from which contains pus cells and gram free, intracellular diplococci, whether disease of the seminal vesicles can or cannot be determined, is in the terms of this report a chronic gonorrheal prostatitis.

What do we mean by the term "cured"? As far as this report is concerned a chronic gonorrheal prostatitis is discharged cured when the symptoms improve and the amount of pus is seen to diminish and entirely disappear in the urine; when the referred pains cease and the processes of micturition and defecation are normal; when the urine and the discharge from the prostate obtained by massage contains no pus cells and no gonococci on successive examinations; the patient is then discharged and instructed to return at the end of two months for re-examination. The absence of gonococci at any particular examination does not mean that they may not be found at a later examination. Successive examinations showing no gonococci and very few pus cells are necessary to assure the patient that he is cured of his disease.

PRINCIPLES OF TREATMENT.

First:—To remove from the diseased gland the products of an inflammatory, round-celled infiltration and stimulate the normal cells of the organ to inhibit the growth of the invading parasites by the production in the diseased part of a local artificial congestion.

Second:—To prevent the production of an acute local inflammation.

Third:—To give fixed periods of rest that an organ long irritated and congested may regain its normal tone.

Gonorrheal inflammations are characterized by round-celled infiltrations, and when this process becomes chronic the diseased organ has a diminished blood supply and suffers from partial lymph stasis. The removal of these inflammatory products from the diseased organ and the stimulation of the inherent properties of the cells to inhibit the growth of the invading parasites constitutes the basic principle of treatment. "Hence chronic gonorrheal prostatitis is cured by the utilization of the same natural processes as act in the case of any infection which, because of anatomic or pathologic conditions, is not accessible to the direct action of a germicide. These natural properties are the inherent properties of the living cells." When the natural resistance is strong enough to inhibit the growth of gonococci in the ducts, acini, glandular or periglandular tissues, a chronic gonorrheal prostatitis is cured. If this natural resistance were strong enough to stop the growth of gonococci at the moment of their entrance into the urethra, an acute or chronic gonorrheal prostatitis would not develop. In this way can we best explain the immunity in some and the infection in others when exposed to the same source of contagion. There are no drugs known at the present time, tolerant to the urethra, which possess the power of penetrating the mucous membrane and the glands and ducts communicating therewith to a sufficient degree to destroy all gonococci in a chronic gonorrheal prostatitis. The great majority of these cases are cured by the operation of a rational local therapy all parts of which aim at the production of a local congestion in the diseased parts, thus promoting the absorbent and bactericidal properties of the blood manifested by an increase in the amount of blood serum to the part and a migration of leucocytes to the diseased area. Whether the treatment be irrigation, instillation, dilatation, massage, or the topical application through the posterior endoscope of germicidal irritants to the verumontanum and prostatic ducts, the aim is the production of a localized artificial congestion of the diseased part which makes possible the activity of the natural defenses of the body against the continued activity of infectious organisms.

True, this production of a localized congestion in the presence of pus and gonorrheal micro-organisms results at times in the production of an acute inflammation instead of a local congestion; and for a while the patient seems worse. But the principle of treatment is not at fault. It is the failure of the physi-

cian to recognize the pathological condition of the diseased gland and apply the proper amount of stimulation to the chronically inflamed organ.

REPORT OF 75 CASES—TREATMENT AND ANALYSIS OF RESULTS.

The cases have been classified for convenience as follows: Those cases of chronic gonorrheal prostatitis which on rectal palpation show (1) no change in the size, contour or consistence of the prostate; (2) marked changes in size, contour and consistence of the prostate, the gland always larger than normal either as a whole or in parts; and, (3) marked changes in size, contour, and consistence, the gland always smaller than normal.

Before considering the first group, certain instructions are impressed upon all gonorrheal prostatics. He is warned of the dangers of alcoholism and the performance of the sexual act. Men suffering from syphilis, rheumatism, gout, amemia and malnutrition receive appropriate treatment. Local conditions in the region of the prostate and allied gonorrheal complications like hemorrhoids, fissure in ano, fistula in ano, anterior gonorrheal patches, cystitis, periurethral abscess, stricture epididymitis receive immediate attention, and their treatment and cure well under way before the prostatic treatment is begun.

CLASS I:—NINE CASES.

Cases of chronic gonorrheal prostatitis showing no change in size, contour, or consistence by rectal palpation and characterized clinically by a slight urethral discharge which clears up quickly after a few treatments of nitrate of silver irrigations to reappear again a few days after treatment. A superficial catarrh of the posterior urethra, prostatic ducts and a few glands about the verumontanum. The acini filled with desquamated epithelium and leucocytes.

Complaint on Presentation for Treatment:—Morning drop, 3; venereal ulcers (three chancroids and one chancre), 4; frequent micturition, 1; and one who came in with his friend and finding shreds in his own urine requested treatment.

Number of previous attacks of gonorrhea or acute exacerbations of a chronic gonorrhea:—Once, 6; twice, 2; three times, 1.

Time of Treatment:—Less than five weeks, 2; less than eight weeks, 4; less than three months, 3.

Manner of Treatment:—Irrigation of the anterior and posterior urethra with sterile water, weak solutions of protargol 1/10 to 1/4%, followed by instillation of nitrate of silver to the

prostatic urethra, varying in strength from 1/4 to 4%. Massage, dilatation and endoscopic application were not used.

Results of Treatment:—All were discharged cured. One appeared three months after the date of discharge and was found on examination not cured. This case after six weeks' treatment was cured as proven by an examination six months later. Five others of the nine reported later and were found cured.

Complications during treatment, none. Complications on presentation for treatment: buboes and chancroids, 2; chancre, 1; anterior gonorrheal patches, 4.

A few axioms in this class of cases:

1. "Make haste slowly." Do not convert a superficial catarrh into a periglandular infiltrate.

2. Be careful about discharging these patients as cured. A few deep seated infected glands may light up the whole process again.

CLASS II:—47 CASES.

Cases of chronic gonorrheal prostatitis which show on rectal palpation marked changes in the gland. The prostate is larger than normal, either the whole gland or parts of it; surface uneven, smooth areas alternating with nodular projections and small depressions; consistence not uniform, some places hard, others soft and boggy, and still others give the sensation of a loss of tissue. Inflammation has extended to and through the walls of the ducts and acini; a glandular and a periglandular infiltrate is poured out; the prostatic ducts are swollen and distended and the small cavities filled with a milky, even, purulent fluid consisting of desquamated squamous epithelium, pus cells, granular matter, pus and gonorrheal micro-organisms. The walls of the ducts show cloudy swelling and are permeated by leucocytes and epitheloid cells which invade the periglandular tissue. In some places complete destruction of glandular tissue has taken place, in others cyst formation is going on. The connective tissue bands between the acini are more abundant than normal and feel like scar tissue. As destruction of the glandular substance progresses, cavities are formed separated from one another by scar tissue. Thus in one and the same prostate may be found in one part a beginning catarrhal inflammation, in another part cyst formation, and in still another part a round celled serous infiltration.

Complaint on presentation for treatment:—Persistent urethral discharge, 9; recurrent swollen testicle (epididymitis), 3;

difficult urination (pain at end of the act), 9; pains in testicles, thighs and back, 2; buboes and chancroids, 5; painful and frequent urination, 4; hemorrhoids, 1; loss of flesh and strength, and headaches (neurasthenics), 3; painful and stiff joints, 3; morning drop, 2; sexual impotence, 2; syphilis, 4.

Time that has elapsed since an acute gonorrhea or an acute exacerbation of an old gonorrhea:—

Months	2	3½	4	5	6	7	8	9	11	6 years,	5 years.
Number	7	12	6	5	3	2	4	1	2	4 years,	1 year.

Time of Treatment:—Including periods of rest.

Months	2	3	4	5	6	7	8	9	11	12	14	18
Number	5	5	8	3	6	5	2	4	3	4	1	1

Manner of Treatment:—All these cases have received irrigations of boric acid, sterile water, oxycyanid of mercury, protargol, nitrate of silver, and zinc sulphate and instillations of nitrate of silver varying in strength from ½ to 6%. Eight have received application of nitrate of silver or tincture of iodin to the verumontanum and prostatic ducts through the posterior endoscope. All have received prostatic massage.

Massage must be purposeful, the strokes made from the base towards the apex and from the lateral lobes toward the isthmus. The older the case generally speaking the more pressure can be used. The reaction following the use of the posterior endoscope was generally stormy. However, six of these cases would probably not have been cured had not the instrument been used.

Results of Treatment:—Forty-five of these cases have been discharged cured. Nineteen since treatment are the fathers of healthy children. Thirty-seven have returned for examination from four to eight months since the date of discharge and all were found were free of the gonococci. Two I have been unable to cure. One was treated eighteen months with periods of six weeks' rests. The other after fourteen months treatment disappeared and was not heard from for six months when he appeared for examination. He was not cured although his prostate was in better condition than the date of his last treatment.

The reaction to some treatments was indeed angry. Seven have developed during treatment acute epididymitis, two acute retention and eleven urethral fever. But on the other hand, many of the cases were savage.

Complications found on initial examination:—Stricture, 10; cystitis, 7; seminal vesiculitis (palpable seminal vesicles), 4;

gonorrheal arthritis, 3; epididymitis, 2; hemorrhoids, 1; chronic gonorrheal prostatitis following an acute prostatitis, 5; buboes, single, 5; double, 1; severe constipation, 13; pediculosis, 1.

A few axioms in the treatment of this class of cases:

"Be not weary in well doing, for ye shall reap if ye faint not."

Clean the prostatic urethra and glandular ducts by massage and irrigations and use pressure enough during massage and a strong enough instillation to produce an appreciable reaction and then let the patient rest.

Periods of rest are as necessary to successful treatment as periods of irritation.

CLASS III.

Cases of chronic gonorrheal prostatitis which show by rectal palpation marked change in the size and consistence of the gland.

The pathological process has advanced further in these cases than in Case II. The prostate is smaller than normal, surface uneven, and consistence not uniform; large, hard sclerotic areas alternating with pit-like depressions. The chronic prostatic fibrosis; areas of complete glandular destruction followed by scar formation alternating with areas of glandular and periglandular infiltration.

Complaints for which patients sought relief:—Indefinite pains in the back and loins (marked neurasthenia), 3; frequent and burning micturition on examination found to be due to residual urine with no apparent cause, 2; fistula in ano, 1; pains in back and thighs, 2; cloudy and turbid urine, 12. Note that few of these complaints refer directly to the uro-genital tract.

Time since last acute gonorrhea or an acute exacerbation of a chronic:

Time,	4	3	1
No.	More than 4 yrs.	5 or 6 yrs.	6 years with external urethrotomy for stricture.

And one said he "had always had it."

Time of treatment including periods of rest:

Number	3	2	1	2	1
Months	7	8½ to 9	10	12	24

Manner of Treatment:—Five were treated by irrigations, instillations, massage, and dilatation. Four were treated with all these and application of nitrate of silver and tincture of iodin to

the prostatic urethra and verumontanum. Treatment in these cases is tedious and the patients hard to handle. More intense irritation is needed to produce a reaction than in all other cases. Dilatation to be effective is done by the dilator, as the conical sound is too small to produce results.

Massage in the hard prostate is difficult. In general, find a soft place and massage. Others will appear as the treatment proceeds. Firm continued pressure of the gland against the pubic bone will often convert a hard irregular lobe into one having soft areas throughout it. The direct application of strong solutions of silver nitrate and tincture of iodin to the posterior urethra is of decided benefit in these most chronic cases. Small prostatic cysts are broken up and the germicide acts as a cautery to the posterior urethra and gland.

RESULTS.

Eight of the nine cases have been discharged cured. Two are the fathers of healthy children. Three have returned for examination as instructed and found cured. One is still under treatment after 2 years. Of the remaining ten cases none were discharged cured. Five left after the first treatment, two after a diagnosis had been made, two after three weeks and one after two months. The most of them belong to that band of gonorrheal pilgrims wandering from place to place seeking relief.

Such is the result of five years experience with chronic gonorrheal prostatitis. Ten or 13.3% left before treatment was completed; 3 or 4% are failures; 62 or 82.7% are cured; 21 or 28% are the fathers of healthy children. It is no record calling for self-approbation. But when we consider that chronic gonorrheal prostatitis is a condition of serious import to human economy, that it is the most frequent complication or rather extension of gonorrheal urethritis, that it has long been recognized as a frequent cause of stubbornly resisting urethral infections and inexplicable reinfections; that it has long been known as the most common cause of marital infections communicated a considerable time after the original gonorrhea; that it is a condition presenting no symptoms at all or on the other hand a multitude of symptoms; that it is difficult to prevent and hard to cure—when we consider all this, are not these cases worthy of the physician's most serious considerations and untiring zeal?

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Review of Current Urologic Literature

ANNALES DES MALADIES VÉNÉRIENNES

Vol. VI, No. 2, February, 1911

1. Hectine in the Treatment of Syphilis. By F. P. Guiard.
2. Some Rare Cases of Dental Dystrophies. By Serge Bogrow.

1. Hectine in the Treatment of Syphilis.—F. P. Guiard contributes a comprehensive review of the mode of action and therapeutic value of hectine (sodium benzosulphone-paraaminophenylarsinate) in the treatment of syphilis. He devotes special attention to the local inflammatory or painful reaction which is produced by this remedy. The article is accompanied by a detailed study of a number of cases, illustrating the action of hectine. As is well known, hectine is an organic arsenic compound, discovered by Mouneyrat, about two years ago. This product is claimed to be much less toxic than atoxyl and arsacetine, and is said to be well borne by the tissues, without any serious disturbances. The author's personal experiences with hectine lead him to conclude as follows:

(*a*) *The Physiologic and Toxic Effects of the Remedy.* Hypodermic injections of hectine, even in daily doses of 0.2 gram., can be repeated as often as 30 times in succession, without producing the slightest untoward action upon the general system. On the contrary in this dosage, 30 injections of hectine seem to have a favorable influence upon the economy, to produce favorable nutritive changes and to contribute to the patient's strength. In 3 of the patients, an increase in weight of a noteworthy character was noted.

(*b*) *Effects Upon Eyesight.*—Some of the other organic arsenic compounds, have, as we know, given rise to some severe complications, on the part of the eye, including in some instances, complete blindness. Slight and transient disturbances of vision have indeed been noticed with hectine, but in the author's experience, the eyesight was not affected in any way, in any of the cases treated with this remedy.

(*c*) *Local Reactions.*—These varied considerably, according

to the location of the injection. There was almost no reaction, or at least a pain which could easily be borne when the remedy was injected intramuscularly into the buttocks. On the other hand, the local disturbances were much more severe when the remedy was injected into the genitals, as in cases of chancre. At first there is more or less severe burning, followed by an intense neuralgic pain, which lasts for a number of hours. A local irritation is also noted in the cellular tissue, which is followed by localized indurations, variable in size. Sometimes the skin over these indurations turns red, but it rarely ulcerates and usually the hard nodules are absorbed within a few days.

The local use of hectine, without the use of internal treatment is in itself sufficient to abort syphilis. This has been the experience of the present author. He considers this property of hectine as the most important of all its virtues. The only criterion for a completed cure which he acknowledges, is the total absence of any visible lesions. He does not regard the presence or absence of the Wassermann reaction as of any distinct value in this connection.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Vol. XXVIII, I, No. 3, February 1, 1911

1. The Operative Treatment of Stones in the Ureters. By Dr. Fabbricante.
2. A Unique Case of Congenital Malformation in the Urethra Detected by the Urethroscope. By. J. Chadzynski.
3. Knotted Bougies in the Bladder and the Urethra. By O. Pasteau.
4. Supernumerary Kidney Diagnosed in *Vivo*. By A. Isaya.

1. Treatment of Stones in the Ureter.—Fabbricante says that the surgery of the ureter has developed only within the past twenty years, although as early as 1856, Gigon advised the opening of the ureter, the removal of a stone and the establishment of a fistula by sewing the end of the ureter to the skin. This idea, however, did not meet with favor. The author reports a case of stone in the ureter in a girl aged 17, upon whom he operated in October, 1908. An incision was made, beginning about 2 fingers' breadths above the iliac crest, a little behind the axillary

line, and curving towards a point situated a little above the anterior superior iliac spine, travelling then parallel to the ligament of Poupart, and ending near the rectus muscle. The muscles and fascia were divided down to the peritoneum, and the latter was detached as far as the median line. The ureter was easily found and was followed down as far as the bladder. Attempts were made to milk the stone into the bladder, but this proved impossible. It was possible, however, to force the stone upward to some distance. An incision was made over the ureter at the point where the stone was situated, and a calculus, of the size of a plum-pit was easily extracted. The ureter was then explored with a probe up to the pelvis and down to the bladder, without encountering any obstacle. The canal was therefore sutured in such a manner as to transform the longitudinal incision into a transverse. The patient made a good recovery.

Reviewing the literature of the subject, the author finds but two cases in which calculi have been removed from the ureter only. There are a great many more cases in which, in addition to ureteral calculi, stones are present in the renal pelvis. Stones in the ureter alone, are comparatively rare, and often give rise to no symptoms of any account. Whenever we encounter a renal colic it is necessary to examine, not only the kidney, but also the ureter, throughout its entire extent. The best method of diagnosis, in searching for stone in the ureter, is undoubtedly radiography, but clinical symptoms should not be neglected. A stone which has passed beyond the pelvis is usually arrested at one of three points of constriction which are normally present in the ureter. The first of these is located about one cm. beneath the pelvis, at what is known as the neck of the ureter. The second point is located at the level of the iliac crest, while the third is situated at the point where the ureter penetrates into the bladder. Besides these three points, which are favorite resting places for the stone, the latter may also be arrested at the point in the ureter where it originally developed. This applies, of course, to stones which are primarily ureteral. The most preferable method for the extraction of ureteral stone is the extra-peritoneal. The best incision is that which gives the greatest facility of access over the entire course of the ureter, namely, the incision described above. In specially favorable cases, however, an attempt may be made to

remove the stone through the vagina. If the stone has been discovered in the ureter, this canal need not be separated from the peritoneum, but should be opened by a small incision, and the stone should be extracted without enlarging the incision, if possible. The ureter should be carefully sutured and then the abdominal wall closed layer by layer. A small drain should be left in place at first.

2. An Unusual Case of Congenital Malformation of the Urethra Discovered with the Endoscope.—Chadzynski reports an unusual malformation which he happened to detect through the endoscope, in a case of chronic urethritis and prostatitis. The malformation was not detected until the third examination of this patient with the endoscope, when a tube of large calibre was used. The first impression was that there was a marked fold of the mucous membrane in the visual field, but when the tube was moved to one side, a ridge, two or three millimeters in thickness was discovered, which on further examination, proved to be a band of tissue inserted above and below, but arching over a portion of the urethral mucous membrane. The patient did not feel any inconvenience as a result of the presence of this anomaly, nor did it interfere with the passage of sounds or dilators. The recess underneath it was not infected, and there was no inflammatory zone around it, nor any secretion in the folds alongside the band. A platinum wire was passed beneath the band, so as to make sure that it was free from adhesions, save at its two extremities. The author consulted a number of his colleagues who have had much experience with the endoscope, but they all declared that they had never encountered a similar anomaly in their work. A search of the literature was also unproductive of any evidence, that such anomalies have been recorded, save a quotation in a thesis published in 1905, by Foisy. This author mentions the fact that, as early as 1856. Jarjavay, described the formation of bands or folds in the urethra, and mentions the fact that he had met with a case in which there was a diverticulum situated immediately in front of the prostatic portion and limited below by a valve, thus presenting a pocket which was open towards the bulb. The present author has noted three cases in which the valve and pocket described by Jarjavay, were present in the prostatic portion.

It is possible that some of the cases of persistent chronic urethritis are due to the presence of such pockets, in which the gonococcus find a convenient hiding place. In the present instance, as has been said, there was apparently no infection in the pocket under the cord, but the patient insisted on having the cord removed, after he had heard that this anomaly was discovered. Accordingly, the upper attachment of the band was severed by means of a curved galvanocautery tip, which was introduced under the band. The lower attachment, was severed by means of a snare. The patient was operated on March 12, and examined again on the 22nd. At the site of the upper attachment, there was a minute white elevation, the lower attachment being hidden in a fold of the mucous membrane. The cautery tip could be introduced to a distance of over a centimeter, into the fold, representing the pocket under the band which had been removed.

3. Knotted Bougies in the Urethra or the Bladder.—Pasteau speaks of an accident which may occur in connection with the introduction of filiform bougies. In a case, which he reports, the bougie became knotted in the urethra. A man of 30 years of age, with multiple strictures, came to the hospital to have his urethra dilated. After several attempts, a filiform was introduced into the stricture, but when the time came for removing the bougie, the latter was found to be held back at the level of the perineum. The bougie could not be pulled forward nor pushed backward. By palpating the urethra, a small irregular nodule was felt along the bougie in the perineum. A more careful palpation disclosed the fact that the bougie had become knotted. Urination was impossible, and it was evident that the bougie would have to be removed at once. Two methods suggested themselves. Internal urethrotomy, which could be performed if it were possible to introduce a new filiform guide alongside the knotted bougie. Over this filiform guide, a urethrotome could be introduced and the obstruction severed. The other method, which was indicated if the first proved impracticable, was external urethrotomy. After several attempts, a filiform guide was introduced and internal urethrotomy was performed, allowing the removal of the knotted bougie. An indwelling catheter was then introduced, and the patient made an uneventful recovery.

Observations of this kind are rare. The author was able to find but one similar case reported, in which the bougie was knotted in the urethra. Several cases, however, had been reported, in which a filiform was knotted in the bladder, and the present author gives brief summaries of three such cases.

The manner in which these bougies become knotted has been a subject of discussion. Some believe, with Poulet, that the knotting occurs as the result of a contraction of the bladder walls. Others, like Desnos, believe that the knotting is the result of a too rapid evacuation of the bladder, whereby the flow of urine plays against the bougie and gives rise to the formation of a more or less complicated knot. Others, like Lebreton, blame the accident upon the fact that the bladder is too small or contracted, so that the bougie is bent upon itself within its cavity, but does not find sufficient room to bend without knotting. In such cases, the precaution should be taken to distend the bladder, after the bougie has entered it. Others still, like Poncet, believe that the formation of the knot is simply due to a twisting of the bougie at the moment of its introduction. While this explanation may be admissible for knots formed within the bladder, it does not seem to apply to those formed in the urethra, unless there be some dilatation of this canal, in which the bougie may twist and bend, and thus form a knot.

The author has tried to find out how such an accident could happen in the urethra. For this purpose he has examined the ends of filiform bougies, which had been introduced in some difficult cases of stricture, and in this manner he has been able quite readily to prove how such knots were formed.

Assuming the presence of a very narrow stricture, the bougie encounters the narrowing, and if some efforts are made to introduce it, it may bend upon itself. If there is no anterior stricture, or if the anterior stricture is easily entered, the end of the bougie will simply come out at the meatus. If on the contrary, there is a stricture behind the first, the bougie is again arrested and again bends upon itself, but in the opposite direction. As an example, the author cites the case of a man, aged 49, and shows the manner in which the filiform bent in this case in the accompanying diagram. (Figs. 1 and 2.)

It must be remembered that, if in this case, a bougie had been

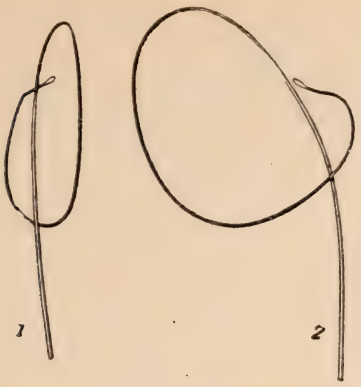

Fig. 1 and 2.

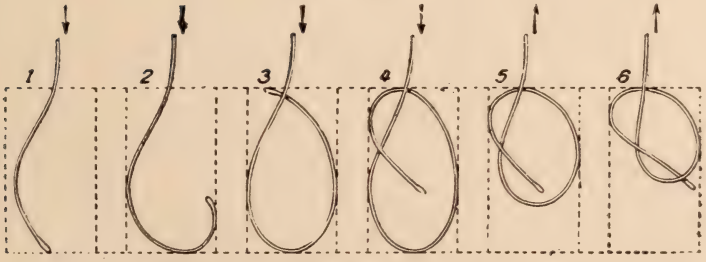

Fig. 3

used, the end of which was twisted in the form of a spiral, one would have a condition which favors the formation of a knot, as shown in Fig. 3. The knot would be pulled tight between the two strictures by any effort to remove the bougie from the urethra. The conditions which are necessary for the formation of a knot in a filiform bougie in the urethra are, two strictures,— one in front of the other, the knot always being formed between the two. If the first stricture is not very tight, the knot does not interfere with the removal of the bougie; if the stricture is tighter the removal of the knotted bougie becomes impossible. If gentleness be employed in the exploration of the urethra, this accident will be exceptionally met with. It is well, however, to remember the following principle: In cases of stricture, after a filiform bougie has been felt to impinge against an obstruction, if there is any reason to suppose that the bougie has become folded upon itself, it is better to remove it completely before trying to pass the obstruction, so that the risk of causing the formation of a knot in a bougie may be avoided. If we have a case before us, in which

a knot has already formed in a filiform bougie in the urethra, our conduct should be as follows:

(*A.*) If urination can take place alongside the bougie, the latter may be simply allowed to remain in place. Its sojourn in the canal may soften the obstruction, enlarge the opening, and enable us to remove the instrument within a day or two.

(*B.*) If urination is impossible, with the bougie in place, we must resort to urethrotomy. If we can pass a guide, alongside the bougie down to the bladder, and over this guide a urethrotome, internal urethrotomy should be performed. It is well to be sure after this operation, that the knotted bougie has been extracted in its entirety, and that no segments of it have remained in the canal, after having been severed by the blade of the instrument. If internal urethrotomy cannot be performed, external urethrotomy is indicated. The knot is then easily detected and cut off.

4. Supernumerary Kidney Discovered During Life.—Isaya, reports a case in which a third kidney was discovered during the patient's life. The presence of a third kidney is the least frequent of all congenital anomalies of this organ. In most cases reported, the third kidney was discovered at autopsy, and there are but few instances on record, five in addition to the present one, in which the third kidney was discovered during life. In the present case, the patient was a woman aged 27, who since the age of 6, had been complaining of pain in the right loin, corresponding to the region of the kidney and radiating downward towards the pubis. This pain recurred in attacks at intervals of about two years, and was accompanied always by bilious vomiting. There were never any disturbances of urination, nor any jaundice during the attacks. Seven months before admission, the patient had been examined by a physician who discovered an abdominal tumor, situated on the left side in the hypogastric region, and easily movable without pain. The tumor had not grown larger, but the patient complained of a sense of weight and of pain in the abdomen, especially after meals and after exertion. She was also troubled with constipation.

Upon examination, a tumor was found about three fingers' breadths to the right of the navel, of the size of a large egg, hard, elastic in consistence, irregular in shape and not displaced by the movements of respiration, but movable in every direction.

The tumor, however, was but slightly movable upward, and by energetic maneuvering was displaced towards the right side under the arch of the ribs. The intestines, when dilated, were found to lie in front of the tumor. On bimanual palpation on the right side, it was noted that the kidney on that side was slightly displaced downward, but it was not enlarged, nor painful. The probable diagnosis of a benign mesenteric tumor was made. A laparotomy was performed and a third kidney situated on the right side of the spinal column was found. This organ was of the size of an egg, shaped like a bean, and had its own vessel and ureter, which after an independent course of about five centimeters ended in the right ureter. The supplementary kidney was normal in appearance and the patient's pains were probably due in large part to a prolapse of the transverse colon. Therefore, the third kidney was left alone, and the colon was replaced in its normal position. The left kidney did not show anything abnormal. On examining the patient some days later through the cystoscope, two apparently normal ureteral orifices were found.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Vol. XXVIII, I, No. 4, February 2, 1911

1. The Phenolsulphonephthalein Test for Renal Function. By L. G. Rowntree and J. T. Geraghty (to be continued).
2. Modern Instruments for Suprapubic Cystotomy. By F. Cathelin.

2. Modern Instruments for Suprapubic Cystotomy.—Cathelin presents a number of improved instruments for the operation of suprapubic cystotomy. This procedure is now used less than formerly, but still it is important to reduce its technique to the most convenient form. As a matter of fact, the suprapubic operation of opening the bladder can be performed with almost no instruments. Yet, it is useful to have special tools for this purpose, because they enable the surgeon to operate conveniently, even in cases with very small and very extensively diseased bladders. For this purpose the author has devised six instruments, which with the six other tools that are necessary for any opera-

tion, constitute the entire armamentarium necessary for this procedure.

The six ordinary instruments primarily needed are, a rather large scalpel, a mouse tooth forceps, a pair of straight scissors of good size, a bent Reverdin needle, and two rather long Kocher's forceps.

The special instruments are six in number, but only four of them are indispensable for suprapubic cystotomy. These are:

(1). *A tunnelled hollow metallic catheter with stop-cock.* This instrument has a Beniqué curve, with a tunnel upon its convexity, and two large eyelets near the beak. The stop-cock is placed near the proximal end. The advantages of this instrument is that it enables us to wash out the bladder, or to fill it with water or air without the necessity of having an assistant, holding an ordinary catheter in the meatus, so as to allow us to inject air, for example. The curve is purposely made so as to allow easy entrance in cases of enlarged prostate. This is not a matter of indifference, because in many cases, the operation is performed in old men. The beak is useful when a guide is wanted by the surgeon before entering a small thickened bladder, which will not distend and which is difficult to distinguish from the neighboring tissues. The tunnel has been provided for cases of external urethrotomy, the groove being intended to receive the point of the knife as it cuts into the urethra.

(2). *A modified self-retaining retractor, with small bent blades.*—This retractor is only a modification of that commonly employed. The latter has the disadvantage that on account of its large blades, it cannot easily penetrate through a small incision. Personally, the author strongly advocates very small incisions. The blades of the retractor are therefore half the size of those ordinarily employed. The incision used by the author extends only three or four centimeters above the symphysis. Furthermore, the author has had small hooks placed upon the spreading arms of the self-retaining retractor, with the aid of which the sutures which hold the bladder edges open can be fastened.

(3). *Bladder Forceps.*—Instead of the old suspensory sutures which are so inconvenient, the author employs a narrow bladed forceps, 22 centimeters in length, and provided with one serrated blade and one smooth blade. This forceps has great

advantages, over suspensory sutures, which damage the walls of the bladder. Thanks to its length, the forceps can be handled the moment the incision into the bladder has been made, and it does not interfere with the field of operation. The forceps does not cause any traumatism, nor does it injure the operator's fingers, while these are engaged within the bladder. The forceps therefore, is superior to those of Péan and of Kocher, which caused tearing of the walls, and to the mouse-tooth forceps, which may injure the operator's fingers.

(4). *Retractor, with small straight and long blades.* This retractor is composed of two ordinary spreading arms, working upon a ratchet, and with finger-grips, but its blades are straight, narrow, and their ends are bent at right angles, like those of a Farabeuf retractor. They may be called automatic Farabeuf retractors, and their advantage is, that they separate not the walls of the bladder, but the two lips of the opening, which always tend to adhere to each other.

(5). *Vesical depressor.*—This instrument is designed to be attached by its fixed portion to the retractor with small bent valves. It consists of two portions, a handle, and a blade which plays in a hinge wherein its position can be adjusted with the aid of a ratchet wheel. The advantage of this depressor over the fixed retractor, is that it can be adjusted in such a manner as to be out of the way, and to allow the operator to inspect the posterior aspect of the bladder.

(6). *Prostatic forceps.*—These are designed for the removal of the prostate after enucleation. The forceps consists of a very long shank, facilitating their use in very fat patients. The blades are rectangular fenestra, serrated and with smooth slightly bent edges at the distal end. These forceps work very satisfactorily.

The six instruments above described, which have been devised by the author, have given very good results in his operative work. He advises surgeons who have to perform suprapubic cystotomy in many cases to adopt them. Their apparent complexity is compensated by the great security of technique which they make possible.

FOLIA UROLOGICA

Volume V, No. 8, February, 1911

1. Contributions to Freyer's Method of Prostatectomy. By Paul Steiner.
2. Contributions to the Histology of Hypertrophy of the Prostate. By D. Veszpremi.
3. Instruments for the Treatment of the Posterior Urethra. By F. Dommer.

1. Contributions to Freyer's Method of Prostatectomy. Steiner contributes a very comprehensive review of his work with Freyer's method of prostatectomy. He has performed this operation in 43 cases, the ages of the patients varying from 52 to 78 years. Steiner believes that the operation is not indicated in the first stage of prostatic hypertrophy, save in the cases showing some evidence of malignancy. When a radical operation has been decided upon, we must remember that the removal of the prostate must be so managed that the obstruction will be permanently done away with. Of the two methods, the suprapubic is to be preferred in suitable cases. In reviewing the history of the operation, the author credits Fuller (1895) and Freyer (1900) as the first to perform total removal of the prostate by the suprapubic route; but he properly states that Freyer has contributed much to the elaboration and popularization of the operation.

The patients should be carefully prepared. In the first place, they should be thoroughly examined as to the condition of their heart, lungs, digestion and kidneys. In patients with advanced years, one frequently meets disease of the arteries or the heart muscle. If the condition of the circulation is one that can be improved, the proper stimulants should be given, such as digitalis and camphor. The condition of the kidneys and of bladder requires special attention and the functional conditon of the kidney should be tested, if possible, although this is not easy, owing to the difficulty attending the passage of ureteral catheters. It is best to improve the condition of the bladder, and to reduce the residual urine as much as possible before operation, by employing careful irrigations, and systematic catheter life. Often the patients will improve remarkably under these measures.

In cases in which the patient is evidently septic, and remains so even after the local measures outlined above, a preliminary suprapubic incision should be employed. The operation, there-

fore, will be carried out in two stages in such patients. Frequently, after the first incision, careful drainage will remove the septic condition and will greatly diminish the shock of the second operation. The latter should be undertaken when the patient's general condition improves, when his urine grows clearer, and when the function of the kidneys becomes more normal. Usually the interval between the first and the second stages will be from four to eight weeks. Internally, such patients also should be given urinary antiseptics.

Regarding the technique of the operation, the author favors lumbar anesthesia with tropococaine. He records no unpleasant incidents, even in cases of men over 65. Only in two cases did he have occasion to supplement this method with ether inhalations, and then merely with a few whiffs of ether. The position of the patient favored by the author is that of a moderate degree of Trendelenburg's posture.

The field of operation is surrounded with carefully adjusted cloths, a screen being drawn in front of the patient's face, and another cross the body over the symphysis. The latter serves to isolate the field of operation from the assistant who manipulates the rectal part of the operation. A solution of mercury oxycyanide 1:2000 is used to wash out the bladder. Care is taken that no fluid remains in the bladder. The latter is not filled with air until after the abdominal muscles have been divided, as this allows the operator to regulate the degree of distension, under the guidance of the eye.

The bladder is opened in the usual manner, and the sides of the opening are fastened with the aid of two silk sutures held by an assistant with clamps. Much care is taken not to injure the prevesical peritoneal fold, and the opening in the bladder is surrounded by strips of sterile or iodoform gauze. The bladder is opened, either by a longitudinal or a transverse incision. The cut is made rather small and high up towards the apex of the organ. Any urine that may have accumulated is carefully removed from the cavity by means of sponges. After putting the retractors in place the prostate is enucleated according to Freyer's method. The chief point is the finding of the proper stratum for this enucleation. If the finger gets into the right layer, there is no trouble, and we avoid removing the prostate piecemeal. If possible, the entire gland with the prostatic urethra is removed. It is advisable not to tear the membranous urethra, but to cut it off with scissors. After the removal of the gland, the hemor-

rhage can be arrested by compressing the prostatic lodge. If the hemorrhage is severe, massage of the cavity of the prostate may be tried. This is done by making counter-pressure between one finger in the rectum and a finger in the other hand in the prostatic cavity, massaging the parts between for about five minutes. Irrigation with very hot boric acid solution is also a good method, although it may carry infection from the bladder into the tissues immediately around the prostate. Another way is to pack the cavity with gauze, saturated in a solution of adrenalin, the end of the gauze being carried out externally through the wound. Still another method which is not to be recommended, however, is the use of an iodoform and antipyrin tampon (according to Mikulicz) in the bladder. The trouble with this method is that the drugs mentioned are not well borne by some of the patients whose kidneys have been impaired. The best method is simply to tampon both prostatic cavity and bladder with sterile gauze strips. During the packing of the prostatic cavity, an assistant should make counter-pressure through the rectum, and control the compression. The packing may be removed after three or four days.

As regards drainage, the best method involves the use of Freyer's tube with two lateral windows, but we should take care that the tube should not reach down to the prostatic cavity, otherwise there will be interference with healing and pain. The drain should not touch the posterior wall of the bladder, otherwise there will be tenesmus. A properly adjusted drain should reach only two or three cm. into the bladder. The chief point in the success of the method is the adjustment of this drainage-tube. The latter should not be stitched to the muscles or skin, nor to the bladder, but should be allowed to rest in the wound, which may be reduced in size to the proper diameter. The author does not use any permanent catheters after the operation, because the Freyer tube gives good drainage, while the permanent catheter often produces inflammation and suppuration in the prostatic cavity. He never uses perineal drainage in these operations. As regards the closure of the wound, Steiner believes that it is best to allow it to heal without any sutures, and packs iodoform strips so as to drain the cavity of Retzius. The wound is covered with gauze and cotton and binders are applied. The saturated gauze is removed daily. In order to prevent eczema around the wound he is in the habit of applying an ointment of xeroform. A useful adjunct to the tube is an outlet made of hard rubber and bent at right angles which carries the urine into the receptacle placed between the patient's legs.

The chief elements in the after-treatment which Steiner emphasizes are that the patient be allowed to get up as soon as possible, that the gauze over the wound be changed frequently, that the wound itself be protected and that external cleanliness is of extreme importance. Irrigations through the tube are not necessary, provided the tube be kept free from clots with the aid of a dressing forceps. The tube is removed on the fifth day, together with the drainage strips, and a smaller tube is introduced which is removed after two weeks. Gradually the abdominal wound closes and usually has healed entirely on the 18th to the 30th day. The healing may be hastened by an indwelling catheter in the urethra, but the author does not favor this. After the wound has healed or almost closed the patient gladly takes prolonged lukewarm baths. Some patients can sit up, even on the day after the operation, and as soon as possible they are allowed to walk.

Incontinence of urine is a rare complication in these cases and is due to the tearing of the membranous urethra. Incontinence may be only temporary. Fistulae of the bladder are seen chiefly in cases in which the wall of the bladder has been sutured to the abdominal muscles. In none of the author's cases was there a fistula of this kind, and he attributes this to his practice of avoiding these sutures.

In speaking of the influence of prostatectomy upon the sexual function, the author emphasizes the fact that in the suprapubic method the ejaculatory ducts and their surroundings are left intact. The advantage of Young's perineal method is that he saves these parts, even after removing the prostate through the perineum. It is upon the preservation of the floor of the prostatic urethra and its anatomical features that the preservation of the sexual function depends. In a number of cases elderly patients have been sexually improved by the operation. In summarizing the results of the cases in which he performed the Freyer operation, the author gives the following figures: Eleven patients were operated upon in the stage of complete chronic retention with aseptic bladder; ten of these recovered. Nine patients were operated upon in the stage of chronic complete retention with infected bladder, and of these six recovered. Four patients were operated upon in the stage of chronic incomplete retention, without distension of the bladder and without infection, and all four recovered. Fifteen patients were operated upon in the stage of chronic incomplete retention without dilatation of the bladder, and with infection. Of these ten recovered. Four patients were

operated upon in the stage of chronic incomplete retention with a distended bladder, and three of these were cured. In all the recovered cases, the cure was complete and permanent.

2. Contribution to the Histology of Prostatic Hypertrophy.—D. Veszpremi examined the prostates removed by Steiner whose report appears in the preceding article. As the result of the histological study of these prostates, the author concludes that the hypertrophied gland does not assume any characteristics which might be seriously considered as representing a true tumor such as an adenoma. Nor does the microscopical picture prove the presence of an inflammatory process. In the few cases in which the histological examination showed signs of an advanced chronic inflammation, the prostate showed lesions which were characteristic of a sclerosis rather than of a true prostatic hypertrophy.

3. Instruments for the Treatment of the Posterior Urethra.—Dommer describes a set of instruments which he has adopted for use with the Wossidlo urethroscope for the posterior urethra. In describing their instruments both Wossidlo and Goldschmidt intended their appliances especially for the examination of the posterior urethra. Both authors succeeded, each in his own way, in securing this end. The author familiarized himself thoroughly with the method of examination and the appearances of the parts visible with these instruments, and it occurred to him that it would be desirable to have an electrode which could be employed for the local treatment of the colliculus. This electrode is adjustable to the Wossidlo instrument projecting from the window of the latter in such a position that it impinges upon the seminal hillock when the latter is in the window. Another appliance devised by Dommer is a small curette which enables one to treat the same portion of the urethra locally. A small urethrotome was also devised by the author for use with the Wossidlo instrument. The latter is made somewhat larger than the original instrument, so as to facilitate the manipulations through its tube. All these local measures can be applied through the Wossidlo instrument, directly under the control of the eye, much in the same manner as the appliances devised years ago by Kollmann.

The author recommends the use of the electrode and the curette. The knife is not so frequently required in the posterior urethra, as strictures in this part of the canal are usually suf-

ficiently soft to allow of distension by sounds or dilators. The curette is useful in the removal of soft infiltrations and ulcerated processes.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Volume XXIX, Sec. 1, No. 5, March 1, 1911

1. Polycystic Kidneys. By Professor Pousson.
2. An Instrument for the Exact Application of the Separator in Women. By D. Taddei.
3. Experimental and Clinical Study of the Function of the Kidneys with Phenolsulphonephthaleine. By L. G. Rowntree and John T. Geraghty. (*Concluded.*)

1. Polycystic Kidneys.—Pousson reports a case of multiple cysts of the kidneys. The patient was a woman aged 34, who in July, 1909, felt a sudden pain in the region of the left kidney. At first the pain was violent and later subsided somewhat, but continued for two months, being especially severe when the patient stood up. She remained in bed most of the time, had severe gastric disturbances and continued headaches. The woman herself noticed that there was an increase in the size of the left kidney and her physician, upon examination made a diagnosis of hydronephrosis. There was albumin in the urine. After two months she gradually began to get up and wore a belt which helped her a good deal. In April, 1910, without cause she was suddenly seized with a new painful attack on the left side, accompanied by vomiting, headache and sometimes violent cramps in the ankle. Since then she has had constant but less severe lumbar pains, while the headaches and cramps also continued.

On examination, we found her to be a woman with marked emaciation. On the right side a kidney increased in size was felt which was smooth, movable, not acutely painful, and could not be replaced in the lumbar fossa. On the left side, the kidney was equally well felt, but much larger, filling the entire lumbar fossa in which it was fixed, and presenting a nodular surface. This kidney was very painful to the touch.

There was no disturbance of urination, save that it was somewhat more frequent at night. The urine was dark and clear, with diminished quantity, and contained some albumin. There was an increase in the size of the kidneys on both sides, espe-

cially on the left. The diagnosis of multiple cysts of the kidney was made provisionally.

Some thirty years ago, it was thought quite impossible to make a diagnosis of this disease, which was usually discovered at autopsy. To-day, we have some methods at our command which assist in the diagnosis. For example, the comparative study of the functional condition of the kidneys, and the radiographic study of kidney shadows. In the five cases of cystic kidney diagnosed during life by various authors up to 1896, the symptoms, while not perfectly characteristic, were very suggestive. Since then Ferron, in 1908, has added a number of similar cases to the collection now existing in literature. The similarity of the symptoms of these kidneys with those of chronic nephritis is striking in many cases. These patients often exhibit marked general weakness, pallor, dryness of the skin various peculiar skin sensations, loss of appetite, nausea, vomiting, headache, and disturbances of vision and hearing. There are also attacks of shortness of breath and oppression, muscular cramps, especially of the ankle, etc.

The symptoms cited represent a more or less marked uremic intoxication, but in addition there are symptoms which are referable to mechanical interference with the circulation. These consist of an increase of arterial pressure which results as in Bright's disease; in a hypertrophy of the left ventricle, and sometimes in dilation of the right ventricle.

The urinary disturbances which always must be looked for in these patients, even when they seem to be absent, complete the clinical picture and make it particularly similar to that of Bright's disease, especially of interstitial nephritis. We frequently find in these cases increased frequency of urination and an increased amount of excretion, just as we do in interstitial nephritis. In fact, it might be said that the cases reported in literature do not allow any distinction between multiple cysts of the kidney and chronic nephritis. Were it not for two symptoms, which are met with in the former affection, namely the pain in the lumbar region and the increase in the size of the kidney, it would be difficult to distinguish these two maladies. Cases of chronic nephritis with local pain are exceptional. In polycystic kidney, the tumor is usually bilateral, but more marked on one side than on the other, and presents an uneven surface. The nodular character of the tumor may be detected upon palpation or with the X-rays. The bilateral character of the tumor and the

pain is important in diagnosis, especially in differentiating from stone.

One feature in polycystic kidney prevents us from detecting these cases early, namely the very slow and insidious growths of the cysts. In some cases the condition has been detected after death from other causes, and no symptoms whatever have been noticed during life which could be interpreted as belonging to polycystic kidney.

The question of treatment in these cases is very important. Medical treatment is usually of no value when there are symptoms of uremia, or violent pains, or when death is threatened. The question of operation will then naturally arise. Until lately, there has been a general opposition to surgical interference in cases of polycystic kidney, because of the fact that the condition almost always affects both organs, and because also of the false conception of the origin of the cyst-formation. Various theories have been held regarding this peculiar disease, but according to the present author's opinion, the cysts are due to an inflammatory process, although there must be some truth in the theory of a new growth formation or degeneration. Surgery, therefore, also seems powerless in checking the disease, yet it might be employed to relieve complications and to combat symptoms which are sufficiently severe to threaten the existence of the patient. The indications for operation in such cases are the compression of neighboring organs by the tumor, severe pains, hematurias uremia, and interference with urinary secretions or suppuration of the cysts.

In the case reported in the present communication, the operation of nephrotomy was performed chiefly for the relief of pain, and for the diminution in the urinary secretion. Not only has this woman borne the operation well, but her pains disappeared, the quantity of urine was increased, the headache and the cramps in the ankle vanished.

2. An Instrument for the Accurate Application of the Separator in Women.—Taddei describes an attachment to the separator of Luys which makes it possible to apply that instrument with greater accuracy in women. He has used this appliance for five years, and has had very good success with it. The apparatus is made by Gentile at Paris.

It is a well-known fact that the apparatus of Luys is the best separator for the bladder which has hitherto been devised, yet it has one defect when used in women, namely that it easily slides

about in the urethra, which is large in diameter. In men, on the contrary the instrument is much more accurately maintained in place, thanks to the narrowness and rigidity of the urethra. It is difficult to apply the apparatus accurately in women, especially in older women with relaxed pelvic tissues. In such cases, it is difficult to make the curved part of the instrument hug the wall of the bladder closely, unless we make counter pressure with a finger in the vagina.

In consequence, the author conceived the idea of having an attachment constructed which could be introduced into the vagina, and would enable one to approximate the wall of the bladder and the anterior wall of the vagina, thus giving the curved part of the instrument something to rest upon. The new attachment consists of a clamp which can be fixed to the outer end of the separator and of a hinged lever which can be introduced into the vagina and set at an angle with the separator with the aid of a thumb screw. The vaginal portion of the apparatus consists of a stem of solid metal and a curved concave portion which corresponds to the curve of the separator. After the separator has been adjusted, with the clamp of the attachment in place, the vaginal blade is set, so that the vaginal curve holds the wall of the bladder in the vagina against the curve of the spectator. The method of applying the instrument is simple. After the usual preparations, the entire apparatus is sterilized, and after the bladder has been washed and found to emit absolutely clear fluid, the curve of the separator is introduced into the bladder. After the separator membrane has been raised, the valve in the vagina is adjusted. It is first passed into the vagina by an assistant with the curve directed upward, and is then pushed against the separator as it lies in the bladder. To make sure that the instrument is in place, a slight pull is made upon the handle and should show that the tissues are grasped securely so that the instrument cannot slide.

The modified instrument is particularly applicable to cases of cystocele, but is also useful in multiparae, in fact in any woman. The same instrument slightly modified can be used in men, with the attachment introduced into the rectum. The instrument is simple and not costly. Unless the operation of separating the urine be performed under the most rigid rules of technique the results are always uncertain.

3. The Phthaleine Test in the Functional Diagnosis of the Kidneys.—Rowntree and Geraghty give the following

technique for the application of the phthaleine test:—Twenty minutes before the examination, the patient is given from 600 to 800 cc. of water for the purpose of promoting urinary secretion. The ureters are then catheterized. As it is essential to collect the entire urine secreted by each kidney during a definite period, we have adopted in our work a special catheter. This catheter is preferably a No. 6 or No. 7F Albarran catheter, with an end shaped like the mouth-piece of a flute. Catheters which have no beveled end-opening, but merely side openings, do not give absolutely trustworthy results. In women, one may employ Kelly's method of cystoscopy, and larger catheters which completely obstruct the ureter may be used. These catheters, however, cannot be used in the male.

The catheter should be pushed into the ureter for a distance of about 10 cm. The cystoscope should then be removed and a thread should be attached to the catheter in the right ureter, so that one can always recognize it. Next a small rubber catheter should be introduced into the bladder, and the latter should be completely emptied so that one can afterwards detect the slightest leakage of urine alongside the urethral catheters. A specimen of urine must then be taken from each side in order to make the usual urinary examination. In many cases, the authors also took samples at this point for the purpose of looking for the quantity of creatinin.

In their earlier cases the authors injected subcutaneously thirty milligrams of phthaleine, but in the more recent cases they used only six milligrams. The time of the injection and that of the first appearance of the drug in the urine are noted. After that time the urine is allowed to collect for an hour. Its quantity and its specific gravity are noted. One cc. is taken for the purpose of determining the urea. Finally the quantity of phthaleine eliminated is determined.

Upon the basis of their study of 42 cases of renal infection the authors draw the following conclusions regarding the value of the phenolsulphonephthaleine test:

1. The functional tests of the kidney, when carried out in conjunction with a careful clinical study of the case, furnish without any doubt information of great value upon the condition of the kidney.

2. The phthaleine test, as practiced by the authors, presents many advantages over the tests which have been proposed by others until the present date.

3. Phthaleine itself is better adapted for the functional

diagnosis of the kidneys than any other substance which has hitherto been employed for the same purpose. The reason for this lies in the prompt appearance of the drug in the urine and its rapid and complete elimination by the kidneys.

4. The method of estimating the quantity of the test substance excreted is simple and very accurate.

5. The permeability of the kidney for this substance is diminished in chronic nephritis, and the decrease is more marked in the interstitial variety.

6. The test has proved of great value in showing the true state of the kidneys of patients presenting urinary obstruction of prostatic origin. In such cases the test is of greater value than the study of the quantity of urine excreted, the amount of total solids, of urea, and of the total nitrogen. The test allows the surgeon to choose a time for operation when the kidneys are in a satisfactory functional condition.

7. The improvement noted in the cases of prostatic obstruction by the use of preparatory treatment is demonstrated remarkably by the phthaleine test, which also indicates the most favorable time for operating.

8. In lesions of the kidney, the absolute quantity of labor furnished by each kidney, and also the relative proportion and work done by the two kidneys can be determined when the urines are examined separately.

SEVENTH INTERNATIONAL CONGRESS OF DERMATOLOGY AND SYPHILOLOGY, ROME, 18-23 SEPTEMBER, 1911.

In May, the final Program of the Congress will be published, giving all necessary informations, the order of business, and the scientific articles of each session.

In order to complete the Program those who contemplate attending the meeting and read a paper, are requested to send the title of the same to the Secretary General, before the last day of April, together with a brief abstract typewritten, to be placed on the program.

In reference to the special reductions of price, on the Italian Railways, the members of the Congress will find a special ticket for sale in all the Italian R. R. depots and Agencies at the price of l. 10.50=$2.10. Together with this special card a booklet will be sold with eight tickets, each one entitling the bearer to a trip at reduced rates from 40 to 60 per cent., according to the length of the voyage. The booklet will be recognized for 45 days, and the coupons will be accepted on all trains.

In reference to Hotel accommodation the Committee of arrangement has accepted the offers of Cook Agency (Esedra di Termini, Roma) and of Chiari and Sommariva Piazza Venezia, Rome, who will assign the members to the different Hotels, and give the addresses of the best Restaurants in every Italian City.

The members are requested to write to either one of those agents and state the class of accommodation they desire.

A. Ravogli,
Secretary for the U. S. A.

THE AMERICAN JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII JUNE, 1911 NO. 6

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

SUMMARY OF RESULTS REPORTED FROM THE USE OF VACCINES AND THE SERA OF GONOCOCCI AND OTHER PYOGENIC ORGANISMS IN UROLOGY.[1]

By R. F. O'NEIL, M.D., Boston, Mass.

THIS summary of results is based upon the consideration of ninety-five general and special articles on vaccine therapy which have appeared in the literature of the last few years, upon personal communications and personal experience, articles reviewed varied from careful and exhaustive studies of the subject to the report of a case, or a series of cases, more or less accurately followed.

First, as to the question of a stock or an autogenous vaccine: In gonorrhoeal infection in general most reports are that a stock vaccine made from a good strain is as serviceable as an autogenous one. In joint infections the autogenous is to be preferred and used if possible. In other infections antogenous vaccines are to be used.

To have any general application of this treatment in gonorrhoea, a stock vaccine would have to be employed, for the double reason that the preparation of an autogenous vaccine requires time and skill and in a chronic case it may be very difficult to procure sufficient material to make a good one.

The limitations of the doses of the ordinary organism have been pretty well worked out, so that now the regulation of the amount and frequency of the dosage by the estimation of the opsonic index seems to be unnecessary, quite as good results

[1] Read before the American Association of Genito-Urinary Surgeons, at the Eighth Congress of American Physicians and Surgeons, 1910.

being obtained when these are regulated by the clinical symptoms and reaction.

Effects of Gonococcus Vaccine in Urethral Gonorrhoea. The almost universal opinion is that vaccine treatment in acute and chronic urethral gonorrhoea, whether a stock or autogenous vaccine has been used, has proved to be of no value. That urethral discharge is uninfluenced by vaccines has been noted by those treating cases of arthritis. For example, Hartwell says, "No effect was noticed on urethral discharge, even in cases when local treatment was withheld."

A few men have thought that their cases seemed to do better when vaccine treatment was used as an adjunct, particularly in the declining stage. These cases mostly received active local treatment, and these impressions do not agree with the larger series of cases.

Antigonococcus Serum in Urethral Gonorrhoea. Precisely the same statements apply to antigonococcus serum in urethritis.

Gonococcus Vaccine and Antigonococcus Serum in Local Gonorrhoeal Complications. Apparently favorable results in epididymitis are reported by a few observers. They are not many cases, and in most the ordinary methods of treatment were employed as well. It is, therefore, difficult to say what rôle the vaccines play in a condition which varies clinically to such an extent as does this. Keyes believes that he has succeeded in a certain number of cases in aborting the disease when he has been able to minister the vaccine very early in the course.

In gonorrhoeal prostatitis and vesiculitis there is very little to show that vaccines are of any benefit, except as has been stated, that some men think their cases of chronic urethritis do better when the vaccine treatment is added. Garton, in the *U. S. Naval Bulletin*, 1908-09, reports a case of prostatitis of two years' standing in which a cure was obtained in five weeks by the use of a stock vaccine.

Vaccine therapy is, on the whole, of very doubtful value in local complications.

Serum. Better results are reported from the use of antigonococcus serum. In epididymitis, in Dr. Swinburne's hands, the serum has been satisfactory, particularly in relieving pain.

In twenty-seven cases of epididymitis the majority were relieved of pain in forty-eight hours and almost all went on to complete recovery. He also thought improvement was to be seen in one case of acute prostatitis and a case of vesiculitis.

Rosenthal reports four cases of epididymitis, with one cure and improvement in two cases; also four cases of prostatitis, with improvement in two.

Autogenous and Stock Vaccines in Gonorrhoeal Septicemia. In speaking of vaccine treatment in general, Thomas and others say: "Never undertake the treatment by immunization in acute diffused infection associated with septicemia, sapremia or marked toxemia," for in these conditions the body is developing its own immunity.

The following cases are of interest in this connection: Eyre and Stewart report in the *Lancet*, July, 1909, a case of gonorrhoeal septicemia where the gonococci disappeared from the blood under the use of an autogenous vaccine; the patient was doing well when death occurred from an infection with the pneumococcus.

Dieulafoy reports in *La Presse Medicale*, in May, 1909, two cases of gonorrhoeal septicemia, where the organisms were cultured from the blood; the first case following a urethral infection, the second a polyarticular joint infection. These cases were treated with a stock vaccine with apparently good results, that is, the temperature and symptoms subsided, although the gonococci were present in the blood for some time. In each of these cases typhoid fever developed before the patient left the hospital and ran the regular course, ending in recovery; the typhoid appearing after the apparent clinical cure of the gonorrhoeal sepsis. He believes the vaccines raised the patient's immunity. These are the only reports I have been able to find and are not a sufficient number upon which to base any definite conclusions. I have found no reports of the use of antigonococcus serum in such conditions.

The Effect of Gonococcus Vaccines and Antigonococcus Serum on Joints. In a general summary of the results of gonococcus vaccine therapy, Ebright makes the following statement: "The only lesions that respond with sufficient uniformity to put

the treatment on a secure plane are the joint lesions." It is to be combined with other forms of treatment and may be regarded as an advance in therapeutics. The relief of symptoms, particularly pain, is often prompt.

Hartwell, in a careful study of fifty-one cases, draws the following conclusions: An autogenous vaccine is to be used, if obtainable. Gonorrhoeal vaccines are valuable agents in all stages of arthritis, except when anchylosis or other marked joint changes have taken place. It is to be remembered that these lesions show a varying clinical course. In nine acute cases with suppuration, six recovered with no other surgical measures but aspiration. Vaccines do not produce immunity, as shown by successive polyarticular infections.

There are many cases reported where apparently excellent results have followed the use of the serum. Herbst considers it of great value in toxemic joints, with the following restrictions: The original focus should be cleared up before or at the same time the serum is used. The serum should be used in sufficient quantity, 24 to 30 c. c. A correct diagnosis must be made, remembering that a non-gonorrhoeal rheumatic articular condition may exist with a gonorrhoeal process.

In a personal communication, Dr. C. F. Painter of Boston expressed the following view: He has found the vaccines to be more efficacious in the early cases, and the serum in the later ones; but because of the very varying clinical course of gonorrhoeal arthritis, looked upon both as adjuncts to the treatment ordinarily employed.

Clinical Diagnostic Reaction. A point of considerable interest is the value of the clinical gonococcal vaccine reaction in diagnosis. Irons found that no reaction took place in eight non-gonorrhoeal patients, even after the administration of large doses (500,000,000), and that some suspected cases all showed reaction and a focus of gonorrhoeal infection somewhere.

Others have noted the reaction following the administration of vaccines not only in joints, but in other lesions, and have regarded it as a means of determining cure. If this is at all constant, it would prove of distinct value, at any rate it should be further investigated.

Vaccines in Other Infections of the Urinary Tract. This brings us to the consideration of the infections of the urinary tract with other organisms, and the effects of vaccines on bacteriuria, and pyuria resulting from pyelo-nephritis, pyelitis and cystitis.

Infections with the Colon Bacillus. The most important organism in this connection is the colon bacillus. Before speaking of the employment of vaccines it must be remembered that the acute urinary infections tend toward recovery under internal medication. It is a well-recognized fact that in cases which do not recover there is some obstruction or abnormality in the urinary tract interfering with complete drainage. Also, that these chronic cases are very stubborn, run a varied clinical course and are particularly liable to acute exacerbations. In regard to the results of vaccine treatment in these conditions it would seem, at present, as if a large enough number of cases had been followed for a sufficient length of time to justify the following conclusions:

In acute and subacute pyelitis good results are reported with the remission of temperature and relief of symptoms, which is entirely in accord with the ordinary clinical course of the disease treated by the usual means.

In chronic pyelitis and pyelo-nephritis they have proved unavailing. They do not prevent exacerbations, nor do they affect the amount of pus or of bacteria present in the urine; the sudden fall of temperature and improvement in symptoms seen in the exacerbations being due to the reëstablishment of the temporarily shut off drainage rather than to the action of the vaccines, and are seen in cases when vaccines are not used.

In bacteriuria, even after long administration, they fail to clear the urine of bacilli. In some of the *milder bladder infections* they have seemed to have given symptomatic relief, lessening pain and frequency of micturition. In the more *severe cases of cystitis*, with changes in the bladder wall, they have had no effect.

The reported results of anticolon serum are as yet too meager from which to draw any conclusions.

Staphylococcus Infections. Bacteriuria, due to the sta-

phylococcus, has proved just as rebellious as that due to the colon bacillus.

There are a few cases reported of post-gonorrhoeal prostatitis (Rooker and Robinson), in which the continuation of symptoms has been due to the staphylococcus, where apparently good results have followed the use of a stock vaccine.

Other Organisms. A case of pneumobacillus pyelitis is reported (Mills) which was treated with an autogenous vaccine regulated by the opsonic index. This case appeared to be a self-draining pyelitis which recovered. The urine contained bacteria for some time, but they eventually disappeared.

A case of interest is one of pneumococcus urinary infection which occurred at the Massachusetts General Hospital on the service of Dr. F. C. Shattuck, who kindly gave permission to quote it. An autogenous vaccine was made but not used, as prompt recovery took place under the use of urotropin.

One case of ulcerative cystitis is reported (Rosenow), due to a pseudo-diphtheria bacillus treated with an autogenous vaccine with seeming improvement. There was, however, in this case drainage by a vesico-vaginal fistula.

A case of cystitis (Clarke), due to Gaetner's bacillus, treated with an autogenous vaccine, recovered in ten days. The short duration of this case makes it of little value.

A few cases of proteus infection of the bladder were treated with negative results.

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Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

SALVARSAN IN SYPHILIS*

By CHAS. S. STERN, A.B., M.D.

SYPHILIS has been known over 400 years, and for the same length of time Mercury has been used and recognized as an excellent and efficient remedy against it. But although in hundreds of thousands of cases the Etiology, Symptoms, Prognosis, and so on, have been thoroughly studied; until lately many important questions still remained unsettled, so that both physician and patient were often left in doubt at critical moments. How often have we wished to begin Mercurial treatment at once, but had to wait on account of the dubious character of the infection! For it was a ticklish question to settle whether the patient really had Syphilis or a harmless lesion, which required no treatment, and one often waited weeks and months for secondaries and so lost the best time for using remedies; for it is self-evident that the sooner treatment is begun, the quicker and more certain will it be effective.

*Read before the "Hartford County Medical Society," Hartford, Conn., April 4, 1911.

Syphilology has progressed more in the last seven years than in hundreds of years before. In the first place, 1903, Metschnikoff and Roux in Paris discovered that Syphilis could be transmitted to animals, and by this means it became possible to study exactly and clearly many questions which theretofore were impossible to follow out. For intsance, what parts of the body were most prone to be attacked, where the poison concentrated itself, if the animal was really cured after a certain remedy was used, and whether, after an apparent cure, a so-called immunity was established. (On the latter point, as a matter of fact, it is now settled that if a patient is cured of Syphilis he is not immune, but can again acquire the disease if exposed.)

Then (1905) came the great discovery by Schaudinn and Hoffman of the Spirochete Pallida, the microscopic parasite which he proved to be the cause of Syphilis. This discovery enables us to make an early positive diagnosis in cases where it was formerly impossible, and in this way we can start treatment earlier.

Then came the great discovery of Wassermann, 1907, by which a diagnosis of Syphilis, especially latent forms, can be ascertained by examination of the blood. This is important in its bearings on cases which have undergone treatment, and which otherwise could not positively be declared cured; important as well for the purpose of continuing treatment, of knowing the existence of Syphilis, and so forfending later dangerous lesions, and yet again in deciding whether a patient is cured and able to marry.

Lastly, in 1910, came a great step forward, in treatment —the invention by Prof. Paul Ehrlich, of Salvarsan. The effectiveness of this new remedy to cure Syphilis has been so firmly established within a short time, and the consequences thereof are of such world-wide significance, that this may well be counted one of the most important events since the turn of the 20th century.

Dioxydiamidoarsenobenzol!—by its inventor Ehrlich,

named "Salvarsan," has now been used for the treatment of syphilitic patients about fifteen months, only the last four of which has it been available by the profession at large. The importance of my discussion concerning its value, therefore, is necessarily restricted, because of the short time elapsed during which all these observations have been made. Undoubted benefit has followed its use in by far the largest number of cases; but many reports give dubious or uncertain results, some claim negative effects, while still others attribute actual harm from giving "Salvarsan." A study of the various writers is unsatisfactory, even if we eliminate the numerous superficial reports, which, crowding the recent plethoric literature on this subject, are rather haphazard in their statements. For elements of error, in diagnosis, in application of the 606, and in the personal equation of observers themselves, leave numerous definite facts, for which we are seeking and waiting, still unsettled. However, we do know what Prof. Ehrlich established regarding the remedy before it came into general use. In his laboratory, at Frankfort on the Main, where I had the opportunity of spending a little time, he first conducted a long series of experiments, till he absolutely proved that the new substance cured *animals* of Syphilis. He then, under certain restrictions, distributed the remedy among some 500 reliable and well-known Professors, principally in Germany, but also in other countries, and from their reports he was satisfied that it produced the cure of Syphilis in humans as well. While at the same time was demonstrated that with proper care it could be used without danger. But before permitting its general use it was tested out in some 30,000 cases, and he then gave it over to the manufacturers for distribution to the profession at large, and expressed his opinion concerning it, somewhat as follows:

"It is established with certainty that the preparation is the mightiest specific against Syphilis. . . . Especially in cases where former remedies have been unsatisfactory, or where such could not be used longer. It is well known how wonderful and magical the cures have been in just those severe syphilitic headaches and throat troubles that have resisted the usual remedies.

Even though there is a question concerning eventual bad effects of the preparation on the eye and ear, this has not been established. Concerning harm to the optic nerve, it was established in September already that not a single case of blindness occurred in 8,000 cases; and by December, out of 25,000, only a single case of atrophy of the optic nerve was reported, and this one case had been treated previously with other arsenic preparations. And Ehrlich states that in all previous experience with arsenic cures, he found the eye especially sensitive when other arsenic preparations were used later. (On the other hand, from 250 to 500 cases of blindness occurred after the use of Atoxyl.)

He speaks of five cases of death following injection of 606, occurring in patients suffering with heart disease, bad arteries, or severe kidney or brain affections; but he objects to these cases being counted as deaths due to the preparation, as he had distinctly stated that it should not be used in patients having such complications. Nor should cases which showed poor results where the preparation was badly introduced be counted against it; for most of these were due to wrong manipulations in compounding the 606, or too small a dose being administered, or the manner of injecting it being such that only partial effects could take place. Most of the recurrences of symptoms were due to insufficient dose.

The majority of cases can be cured, and the cure established by Wassermann's test, and absence of further syphilitic manifestations. Should these reappear, however, Mercury can still be used in addition to the Salvarsan, and the latter also repeated.

As a rule in the primary and early secondary stages (i. e., 2, 6, 8, months after infection, when symptoms are usually very difficult to control,) the intra-venous injection should be used and repeated if necessary. But cases with heart disease, and tertiary, malignant, and hereditary Syphilis should not have the intravenous. Ehrlich is certain that Salvarsan if used as he directs, can effect a complete sterilization—that is *CURE*."

Prof. Neisser of Breslau, the discoverer of the Diplococcus of Gonorrhea, speaks in glowing terms of Ehrlich and his new

remedy, while sounding a warning note regarding its limitations. He says there is no question of magic or witchcraft about it. But, on the other hand, this much is certain: That the new preparation will cure Syphilis more quickly, more surely, and more comfortably than any other remedy used heretofore—though at the same time, Mercurial treatment must still hold a worthy and honorable position in the future, as it has in the past.

Salvarsan works quicker and destroys the Spirochetes more effectively than Mercury. One injection of *606* will often do more than a long Mercurial course, though it should not be supposed that one injection will complete a cure. Then again, by the use of this remedy the lesions of the skin, lips, mouth, etc., are rapidly dispersed, and as just these lesions are the ones which especially disseminate syphilis by direct contact, a great source of spreading the infection is thus closed off. This is very important in respect to lessening the number of cases acquired from such sources.

Neisser further states unequivocally that there is no danger from the remedy—that up to this time there have been few remedies so powerful and efficient which were at the same time as safe to use. And he also says that there have been no cases of blindness which should be placed at its doors, or for which it can be held responsible.

It is now six months since its use was begun in this country, and though we have heard of many cases from various quarters, there is not as great enthusiasm apparent here as attended its first successes abroad. The general trend of opinion may be culled from the conclusions arrived at by different observers, such as the following:

Dr. Corbus of Chicago concludes:

"1. We have in the Ehrlich remedy, a powerful agent against Syphilis.

2. A single injection has in favorable cases approximately the same result as four or five months' treatment with Mercury and Iodin.

3. It may show a brilliant effect in cases in which Mercury and Iodin have failed.

4. Salvarsan has advanced the treatment of Syphilis in a decided manner, but on account of its strong arsenic content, repeated doses may have a disastrous effect on the human organism.

5. Every physician should master the technic before attempting to use it. Only in this way will the drug be safely guarded from many pitfalls."

Dr. Engman of St. Louis says: "To be perfectly fair we have seen equally as rapid disappearance of skin manifestations from the use of injections and mercury (as from Salvarsan);

Reasoning from analogy and our knowledge of chemical therapy, a certain per cent. of cases will also, no doubt, prove rebellious to Ehrlich's remedy; but no matter how many may prove rebellious, it has a remarkable effect on the cutaneous manifestations of Syphilis."

Dr. McKenna of Chicago concludes:

1. The medical profession should use every effort possible to eradicate the idea that appears to have become prevalent in the minds of the laity, and, indeed, of many of the profession, that a single dose of Salvarsan will permanently cure Syphilis.

2. Salvarsan should be administered under the best scientific conditions possible, which means that no patients should be treated until they have been in a hospital four days and careful records made of their physical condition. Only patients in a healthy condition, aside from the spyhilitic taint, should receive this form of treatment. Any attempt to treat patients when these precautions have not been taken, or any unscientific use of the preparation, should be strongly opposed by the profession, as these attempts are sure to result disastrously to the patient, and also to detract from the merits of the remedy.

3. Salvarsan is the treatment of election in the condition of Syphilis enumerated in this paper, but under all circumstances should be followed by Mercury or the Iodins, or both.

4. Administration by the intramuscular or suprafascial route should first be instituted, as it is the safest method, and in the event of the patient not becoming Wassermann-negative, it is then time enough to employ the more dangerous intravenous method."

Dr. Wolbarst of New York, says: "Briefly, we may conclude that the remedy gives evidence of being able to combat successfully conditions that remain unaffected by mercury and iodines for months and years; that while it is wonderfully effective, it must be used cautiously; certain persons show a susceptibility towards the drug, with the result that alarming symptoms may arise; these alarming symptoms disappear as soon as elimination is augmented; at no time do the patients give evidence of being 'sick,' even when the temperature runs above 105 F. The high temperature is due to the reaction of metabolism, caused by the absorption of the arsenic. Lastly, we have added to our therapeutics, through the immortal genius of Ehrlich, the most powerful weapon in the fight against Syphilis that civilization has ever known."

And yet we cannot entirely depend upon these first conclusions, inasmuch as different technics were used. Wasserman's & Noguchi's control reactions, and tests for spirochetes were frequently omitted, and other treatments were often used synchronously; and then again we must not close our eyes to a considerable error, arising through faulty technic, incorrect dosage, and lack of continued observation of patients over a sufficiently long period. There seems some discrepancy between the effects of Salvarsan here and in Europe, which may be accounted for in part by a difference in severity of the disease per se, and also the difference in environment. The cases I saw at the hospitals in Berlin last September were mostly of a severer type than we are accustomed to meet here, and yet there were very few exceptions to the complete cure of syphilitic manifestations within one to four weeks after the injection of "Salvarsan." The various methods of injecting "Salvarsan" which I saw, have been fully described elsewhere. At present the most favored technics are the intravenous and intramuscular. But this phase of the subject need not be entered into here.

There can be no doubt of the value of Salvarsan as a cure for Syphilis in most of its stages, but it must be used with due care and a thorough knowledge of its methods of introduction, of its effects on the organism (Herxheimer Effects, etc.), and of its dangers.

Personally I am enthusiastic as to its value, but submit that more time is necessary before anyone can absolutely conclude as to end results following treatment with Salvarsan.

I would rather wait until a sufficient number of the cases treated shall *have remained cured* over a period of at least three years. Meanwhile let us use the remedy and be deeply grateful to its inventor, Professor Paul Ehrlich, for the wonders it is now accomplishing.

Review of Current Urologic Literature

ANNALES DES MALADIES VÉNÉRIENNES

Volume VII., No. 3, March, 1911

Ehrlichs "606" in Intramuscular Injections in the Treatment of Syphilis. By Alfred Lévy-Ging and Louis Duroeux.

Intramuscular Injections of "606."—Lévy-Bing and Duroeux contribute an extended memoir to the literature of "606." Their report includes a study of 38 cases, covering a variety of syphilitic conditions. Their study is one of great detail and contains many valuable suggestions, so that it merits somewhat extended notice. The paper opens with a few remarks concerning the tremendous enthusiasm which was manifested by some physicians in France when the remedy was first introduced. The present report covers an experience of six months, during which patients had been followed very carefully. The purpose of the study was to follow up a small number of cases for a long time, from day to day, rather than to take a large number of patients and work less systematically. Every patient was examined thoroughly and in following up the cases the urines were tested for arsenic. At first the authors employed intramuscular injections of watery solutions of salvarsan, according to the methods of Alt and of Blaschko, but they found that these methods were unsatisfactory on account of the local complications and the difficult technique. Oily solutions were then tried, and were used in the remaining cases. The authors strongly favor this method of administration. Salvarsan was given by them in a medium very much like that used for the suspension of mercury known

as gray oil. One part of sterile anhydrous wool fat and nine parts of sterile oil constituted this excipient. The method of procedure consisted of placing the dose of salvarsan in a small sterile mortar. Over this about two cc. of the oily medium were poured, and the mixture was effected with the aid of the pestle. When the emulsion was perfect, it was drawn into a sterile syringe. The pestle and mortar were rinsed twice or thrice with a very small amount of the medium (about 1 cc.), and the resulting liquid was each time drawn into the syringe. In the meanwhile, the needle was plunged into the muscle and watched, to see whether any blood came up. The oily fluid was then injected in the usual manner. With this method the product was deposited in the tissues without undergoing any chemical changes. The therapeutic action of these injections was not appreciably slower than that of the watery solutions.

The only trouble with this technique was that the needle became quickly obstructed, and the rest of the suspension could not be injected. To avoid this, the authors had a special syringe constructed. This was built of metal and glass, holding 10 cc., the piston working through a head-piece wherein it could be arrested with the aid of a screw-thread. The piston itself was made of rubber. The needle was of considerable diameter, with a conical head, smoothly finished so that there were no projections wherein the particles of "606" could catch.

Various parts of the body were used for the injection. At first, the space between the scapula and the spine was chosen. This is a bad place and should never be used. Next the injections were given into the buttocks, and finally into the region which the authors first described, namely, at a point equally distant from the anterior superior spine and the uppermost end of the inter-gluteal fold, the needle being directed downward and inward. For disinfecting the skin, tincture of iodine, or Hoffman's solution (Hoffman's Anodyne?) were used. There was no necessity for the use of collodion or adhesive plaster after the injection. Slight massage suffices. In general, the doses were high, at least 0.5; more frequently 0.6 or 0.7, in women, and 0.7 or 0.8 in men. The dose of 0.4 is regarded as insufficient by the author, although in tertiary lesions smaller doses were found necessary than in primary or secondary cases. A careful study of the cases observed led the authors to the following conclusions: Salvarsan is a very active remedy and of great value in treat-

ment of some manifestations of syphilis, but cannot be said to constitute the sole remedy for this disease. It should be used with the greatest prudence in pregnant women, for its vaso-dilator action is very intense and in almost all their patients the authors noticed that the menstrual periods occurred prematurely, were very abundant, and often amounted to real hemorrhages.

"To sum up, we find that intramuscular injections of salvarsan have not given us on the whole, much superior results as compared to those which we are in the habit of seeing after injections of soluble mercury salts, when employed in sufficient doses. We recognize, however, that salvarsan is an excellent healing remedy (epidermizing) in the treatment of syphilis, and that it has the following indications:

1. Primary lesion, either ulcerating or phagedenic, in which prompt action is necessary in order to secure rapid healing;

2. Ulcerating secondary or tertiary lesion of an extensive character, upon the skin or mucous membranes, in which it is necessary to arrest rapidly the process of necrosis;

3. Lesions which arrest the action of mercury;

4. Cases in which for some reason (stomatitis, enteritis, idiosyncrasy, etc.), the patient does not bear mercury treatment, or bears it badly.

5. In the interval between two treatments with mercury, during the obligatory period of rest, salvarsan may be used as an adjuvant to mercury and as a reconstructive.

Finally, in our opinion, the use of salvarsan should not exclude mercury, but both should be combined in combating as successfully as possible the manifestations of syphilis."

RIVISTA UROLOGICA

Volume I., No. 10, December 15, 1910

1. A Critical Study of the Various Methods of Dealing with the Pedicle of the Kidney. By F. Cathelin.
2. On the So-Called Essential Hematurias. By C. Santini. (To be Continued.)
3. Two Cases of Uncommon Types of Inguinal Hernia with Prostatic Lesions in the Same Patients. By D. Giordano.
4. The Surgical Treatment of Nephritis. By B. Cimino.

1. A Critical Study of the Various Methods of Dealing

WITH THE PEDICLE OF THE KIDNEY.—F. Cathelin remarks that the treatment of the pedicle of the kidney is the most important point in the removal of that organ. Often the success of the operation depends upon this feature. It is not astonishing, therefore, that a great deal of study has been devoted to the methods of dealing with a renal stump. The methods which may be applied for this purpose are six in number.

1. *Ligature in mass.* This means the tying of the entire pedicle, as is customary in dealing with other pedicles in surgery. The pedicle is first grasped with a curved clamp, which may be reinforced with one or more additional clamps, the application of a ligature, and is followed by the excision of the kidney. This technique is very imperfect, because every element of the stump is included in a single ligature, not even excluding the ureter. The latter may be large, thickened, dilated, and its presence may interfere with the healing. The pedicle thus treated is large and difficult to handle. No matter how secure the ligature may seem, it may be displaced by the movements of the stump, and thus a severe secondary hemorrhage might occur. A very important objection against this method is also the fact that in the ligature are inclosed nerve fibres, which afterwards give rise to severe pain. The method of ligating the mass therefore is a poor one, and should be abandoned. It is, of course, utterly unsuited in those cases in which there is an involvment of the upper part of the ureter in a diseased process, such as tuberculosis, etc.

2. *Ligature of the vessels alone in mass* (excluding the ureter). This method differs from the previous one, in that the ureter is first isolated and the vessels are tied with a ligature. A clamp is always passed beneath the kidney and is more secure in this method because it has less tissue to compress. This method is undoubtedly better than the first, but still imperfect, because the stump is large and the ligature cannot be absolutely secured.

3. *A Mixed Ligature.* A distinct advantage in the methods of dealing with the stump is represented by this procedure which has been well studied by Pasteau. It consists in applying a ligature before the attempt is made to sever the kidney. The first thing done is the application of a clamp, and then above and below this clamp, ligatures are carefully applied and tied. The incision is then made between the ligatures. The trouble with this procedure, however, is that the kidney, being in place during the tying of the ligatures, interferes materially with this process.

4. *The Separate Ligation of each Structure.* This is the ideal method of dealing with a stump, which the author has proposed some years ago, and is the true anatomical method, resembling as it does, the manner of tying the ovarian stump. It consists in drawing the kidney forward as far as possible, displacing it from its niche and wrapping it with a gauze compress. Next, the various elements of the stump are separated with the fingers and held with the aid of another gauze pad. Each of the vessels is then taken up with an artery clamp and is tied separately, often without the patient losing a single drop of blood. The best material for the ligature is cat-gut, provided a good quality of No. 4 gut be used. After the vessels have been tied separately and the kidney has been removed a general ligature is applied half a centimeter beneath all the others, and is tied with a double sailor's knot. Finally, in spite of the great security of this method, a third general ligature is applied one centimeter beneath the second, No. 4 catgut being used. In this manner one secures a very safe ligation of the stump. In over 100 cases thus treated, no accidents of any kind were noted.

5. *Subcapsular Ligature.* This method is recommended especially by Albarran in secondary subcapsular nephrectomies. It consists in, first enucleating the kidney, then isolating the pedicle by blunt dissection, and tying the pedicle beneath the capsule. It is a delicate and difficult method, and is dangerous, so that it should be rejected in favor of some method involving the use of a permanent clamp.

6. *Forcipressure.* This method is very old and has been used for the renal as well as for other pedicles. The cases which require the application of a permanent clamp are those in which the ligature cannot be employed for various reasons. Among these are the cases with thick infiltrated pedicles surrounded by adhesions, such as are found in certain infected and tuberculous kidneys. There are also cases with very short pedicles, in which the kidney cannot be moved sufficiently to allow of convenient ligation. In cases in which the nephrectomy has been performed by stripping the capsule, the clamp is also the best method of treatment. Finally, in some cases, in which the twelfth rib is abnormally long and the space under it narrow, and in which the pedicle is situated high up, usually require a clamp. The advantages of a permanent clamp are evident. Their use shortens the operation, and makes it less dangerous, and moreover they are very safe and avoid the danger of secondary hemorrhage.

Certain precautions should be observed, however, in applying the forceps, without which it is impossible to be sure that the stump has been securely clamped. The clamp, whether straight or curved, should have elastic blades and should be clamped as tightly as possible. The patient should then remain lying upon his side with a cushion under his back. The clamp should not be removed for at least 72 hours, and when they are removed, this should be done very gradually, disengaging the pedicle piecemeal, at intervals of five minutes. First the blades should be slightly opened, then opened a little more, and finally the clamp should be slowly removed. The results of the use of clamps have been very good. In nine cases in which this method was used in the author's hospital, the clamps worked very satisfactorily.

In closing the author remarks that Tansini cannot claim legitimately to have introduced this method, inasmuch as it has been known in France for a great many years, having been practised many times by Pean. Nor does the author agree with Tansini that the application of the permanent ligature is useful in practically every case of nephrectomy. In the present author's opinion the clamp should be used when the ligature cannot be conveniently and securely applied.

4. The Surgical Treatment of Nephritis.—Cimino, in a short communication, remarks that at present the surgical treatment of Bright's disease is employed exceptionally. In fact, surgery is invoked in Bright's disease only when medical treatment has failed. In some instances the surgical treatment is followed by excellent results, and it is well for the physician to know in what classes of cases some hope may be entertained for efficient results with surgery. Originally the operation was performed accidentally. Later, when it was found that some improvement followed after stripping the capsule, the procedure was employed deliberately. The best results seem to be obtainable in cases of chronic nephritis accompanied by neuralgic pain. In these cases the compression of the capsule seems to have a great deal to do with the pain. When the capsule is stripped off, the pain disappears, and so does the hematuria which may be present. The operation of stripping the capsule, however, cannot be expected to cure nephritis, yet some of the consequences of the disease may be averted. In some cases the disease seems to be temporarily arrested in its progress and from a sub-acute type, a very slow form may be evolved. In any case, the opera-

tion is palliative and not radical in its effects. The procedure may also be applied in cases of heart disease complicated with renal disease, as Cathelin has shown in a recent lecture in which he pointed out that the operation improved the condition of the heart and blood vessels, caused a disappearance of edema and dyspnea, and increased the secretion of urine.

FOLIA UROLOGICA

Volume V, No. 9, March, 1911

1. Anatomical Investigations Concerning Prostatic Hypertrophy: The Process of Repair After the Removal of the Prostate. By J. Tandler and O. Zuckerkandl.

2. Urethral Fever. By Joseph Englisch.

1. Prostatic Hypertrophy. Tandler and Zuckerkandl point out that prostatic hypertrophy is always an enlargement of the anatomical middle lobe. This lobe is independent anatomically from the rest of the organ and develops as a separate structure. By prostatectomy is not meant the total removal of the prostate but the shelling out of a mass imbedded in the prostate, belonging to the middle lobe, and connected inseparably with the prostatic portion of the urethra. The anatomical capsule is formed by a compression of the peripheral parts of the prostate. The removed pieces of prostates are always the same parts of the organ from an anatomical viewpoint. In no case is the whole prostate removed. The method of choice for removing an enlarged prostate is through the bladder.

The above is a summary of this important research, but some of the salient points thereof deserve special comment. The object of the investigation was evidently to determine what part of the prostate was really removed in prostatectomy, and what was the process of repair after the operation. In spite of the great quantity of work done at present upon the prostate these questions are by no means solved. In removing the prostate through the bladder, the operator, after dividing the mucous membrane, introduces his finger and seeks a plane which enables him to enucleate an enlargement or growth from its surroundings. This tumor is attached at the bottom of the wound to the urethra and upon severing the latter it becomes possible to remove the tumor. Immediately afterwards, the remaining parts shrink, leaving a small gap in the mucous membrane of the bladder close

to the normal urethral opening. The mass of tissue removed, which consists of prostatic substance through which a portion of the urethra runs, is generally designated as a totally extirpated prostate, the remaining walls are termed the capsule and the entire process is designated as prostatectomy. The point emphasized by the author is, that during this operation it is impossible to follow definite anatomical landmarks, nor to be sure that we know the exact relation of the removed mass to the anatomical structures, in the region in question. Freyer's original idea was to remove the prostate completely; in other words to shell it out outside of its anatomical capsule. This was an erroneous conception. Another error which Freyer made in his original work was that the urethra remained intact in his operation. This latter notion was declared as untenable by various writers who followed Freyer. Thus Freudenberg in 1909 announced that he had studied the capsule at autopsy after prostatectomy and found it to consist of compressed prostatic tissue. On this ground Freudenberg declared Freyer's operation to represent a subtotal prostatectomy. In spite of this, the statements still made in recent textbooks, as for example, in Albarran's work on operative surgery, to the effect that the shelling out takes place between the prostatic substance and the prostatic space which is lined by aponeurotic tissue, provided the enlargement is adenomatous.

The clinical observation of operative results does not show the character of the healing process after prostatectomy. It is therefore necessary to study the whole subject anatomically. Contemplating the normal prostate, the author finds that its anatomical capsule is merely a condensation of its glandular substance. The prostate is very closely adherent to the surrounding tissue, with the exception of a portion in the posterior aspect, lying close to the rectum. The division of the prostate into three lobes, two lateral and one middle lobe, is justified not only by an examination of the structure of the organ but also by the development of the prostate. The middle lobe develops in the center by a projection of grandular tissue originating from the region of the colliculus. The prostatic capsule, in the anatomical sense, is composed by the approximation of the various pelvic fascia. With the exception of the posterior surface, this capsule cannot be peeled off, save by artificial dissection. In no instance can the prostate be shelled out of its anatomical capsule in the manner in which surgeons enucleate the enlarged organ from the surgical

capsule which is nothing but a condensation of the prostatic tissue at the outer portions of the organ.

The investigation conducted by the authors consisted in an analysis of 42 cases. An attempt was made to select typical hypertrophied prostates. The first point which struck the investigators was the evident fact that there is no such thing as a total enlargement of the prostate. In the most marked cases of hypertrophy there were portions of the prostate which could be called atrophic. In none of the cases was the posterior lobe hypertrophied, while in no case was the middle lobe free from enlargement. The material investigated proved the fallacy of the common notion that the hypertrophy usually involved the posterior semicircle of the prostate, and that the anatomical middle lobe was the seat of origin of the enlargement in but a fraction of the cases. According to the present authors prostatic hypertrophy involves exclusively that portion of the gland which is limited longitudinally above by the internal orifice and below by the mouth of the ejaculatory duct. That portion of the prostate lying behind the duct is never hypertrophied but rather atrophied as a result of pressure.

Furthermore, the enlargement affects primarily only those structures which are in contact with the neck of the bladder and which lie above the colliculus. This includes the median lobe and the other parts of the prostate which are above the colliculus. It is impossible to say why the hypertrophy is thus localized. While this is the general trend of the process, there are a great many variations.

An examination of the specimens of prostatic tissue removed at prostatectomies shows that only a portion of the prostate is removed. The enucleation takes place within the prostate itself, and on examining the remaining structures in both living and dead subjects it appears that in no case has a pelvic space lined with fascia been opened by the act of enucleation. The enucleation therefore is an intraprostatic procedure. The reason why the vesical operations are better than the perineal is because the hypertrophy takes place almost exclusively in that portion of the prostate which is next to the bladder. The vesical method, therefore, is anatomically the method of choice. On the other hand, surgically, a method which enables one to work strictly under the guidance of the eye is to be preferred. The operation in the dark, therefore, represented by the vesical method is surgically inferior.

2. Urethral Fever. Englisch contributes a very complete study of urethral fever, beginning with the earliest history of our knowledge of this interesting condition. This communication is to be concluded in a subsequent number. A critical examination of the literature, including a study of typical reported histories leads the author to conclude that the infectious origin of urethral fever cannot be denied. The injury in these cases may be slight but is always present. There still remains a good deal of doubt however, as to the exact relation of infection to urethral fever. Thus in some cases, there may have been injuries and infections previously to the development of the fever, in which no bacteriological examinations had been made. There is a possibility, therefore, that bacteria had already been present in the blood of the patient and that the subsequent introduction of additional bacteria, combined with those already present, caused the onset of the fever. In some cases in which no urethral injury was recorded, there had been no examinations for the presence of bacteria in the blood. Such examinations should have taken place before the urethral manipulation. There is still a possibility that changes may take place in the walls of blood vessels as the result of abnormal conditions of the nervous system. The blood vessels thus become favorably disposed to the entrance of bacteria.

The author lays down the conditions which in his opinion are essential before one can draw conclusions from bacteriological examinations regarding the origin of urethral fever. Such examinations should be made, in the first place, in patients who have never had any instruments passed into the urethra, especially no forcible dilatation. Examinations should furthermore be made in persons in whom dilatation of the urethra had been practised and were followed by urinary retention. In such cases we have the proper condition for the entrance of bacteria. Thirdly, bacteriological studies should be made in persons who have had no other infection such as typhoid fever in which the urinary organs may have been invaded. In order to get proper evidence the urine, the blood, and other secretions should be examined bacteriologically before every urethral manipulation. The examination of the blood should be repeated after the urethral interference, whether or not a febrile reaction follows.

The blood should also be examined postmortem. All these conditions are difficult to follow out, but it is only in this way that we can gain a proper knowledge of the real character of urethral fever.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Volume XXIX, I, No. 7, April, 1911

1. Surgical Methods of Determining the Condition of the Kidneys, When Urethral Catheterism and Separation Fail. By Dr. Rochet.
2. Treatment of Gonorrheal Urethritis. By Dr. Motz.
3. Stricture of the Urethra in the Perineal Region. By Henri Piéd.
4. The Internal Secretion of the Prostate. By N. Serrallach and Martin Pares. (Barcelona.)

1. Surgical Methods of Determining the Condition of the Kidneys. Rochet points out that in some cases urethral catheterism and separation both fail. The bladder may bleed so readily that the ureter cannot be found, or the ureter may be hidden by pus, stones, etc. The results of separation may be unreliable. The question arises, what shall we do in these conditions. If there is no apparent enlargement of the kidney on one side, nor any pain felt more acutely on one side, if there is an absence of any reliable signs which would lead to the localization of the trouble, the case in such an event becomes very difficult. If, however, there are some symptoms which localize the trouble on one side, some surgeons suggest that an exploratory incision be made upon the opposite side. This will show the presence or absence of a second kidney, but will not show the functional value of this kidney. Another method of obtaining information regarding the condition of the kidneys when ordinary means have failed is the catheterization of the ureters through the bladder, after opening the latter suprapubically. This method was recommended by Albarran some years ago, and since then by others, including the present author. Rochet has employed this method in a number of cases, either deliberately or in the course of suprapubic operations for bladder lesions, in which it was necessary to know the condition of the kidneys. The results are excellent. The urethral catheters may be left in place for fifteen or thirty minutes, if the kidneys are secreting properly. In other cases, the catheters may be left in place for 24 hours. The advantages of the method are that we are able to obtain very complete information regarding the secretion of each kidney. Furthermore, when there is a chronic cystitis the suprapubic incision is a good preliminary

measure. The catheterization of the ureters through an open bladder is sometimes quite difficult, even when the incision is of considerable size. There is also a disadvantage in this method because if we decide to operate upon the kidney afterwards, the patient will have to be subjected to two different operations.

A second method has been suggested by Jaboulay. It consists in ligating the ureter after having exposed and opened the kidney. The object of the ligature is to exclude the urine secreted by this kidney from the rest of the urinary apparatus. The urine from the kidney in question, therefore, can be collected through the nephrostomy wound, while the urine from the bladder will come from the opposite kidney. In this manner we can get an accurate idea of the functional value of both kidneys. If the opposite kidney, however, is found to be functionally inferior, we are obliged to keep a fistula permanently in the incised kidney. This is always an inconvenient procedure.

In order to avoid all the various inconveniences connected with the procedures mentioned, the author recommends the following method: The kidney which is believed to be diseased or to be the more diseased of the two is not opened, but its ureter alone is opened in order to obtain the desired information. The ureter is exposed on the side in question and a small opening is made in it at a distance of six or seven centimeters below the kidney. A small catheter is introduced through this opening, pointing upward into the pelvis in order to collect the urine from the kidney. Into the lower end of the opening a ureteral catheter of large size is introduced, in order to occlude the ureter and prevent any urine from passing below the opening made in that canal. A period of fifteen or thirty minutes is allowed to elapse and the urine from the incised ureter obtained through the catheter is examined. The urine from the opposite kidney is obtained from the bladder. In this manner we can decide whetther a nephrectomy is necessary. The author has applied this method in two cases.

In the first case, there was renal tuberculosis, with a very painful and contracted bladder preventing all examination. The kidney on the other side seemed to be in fair condition. A nephrotomy was first performed and a fistula was allowed to remain. Three months later, the opposite kidney was found to functionate perfectly and the diseased kidney was removed. The patient made a good recovery. In the other case there was also renal tuberculosis with a contracted bladder which could not be

explored. The ureter was opened on one side and the urine from the opposite kidney was so suspicious that it was not considered safe to remove the kidney, the ureter of which had been opened. The opening in the ureter was sutured, the patient's condition was not aggravated apparently, but he died four months later with advanced changes in both kidneys.

The method of opening one ureter for exploratory purposes therefore seems useful only for cases in which other means of information fail. A disadvantage of this method, however, is the necessity of knowng beforehand which of the two kidneys are more markedly affected.

2. The Treatment of Gonorrheal Urethritis. Motz contributes a review of this subject based upon lectures delivered at the International Hospital in Paris. He begins by emphasizing the necessity of careful treatment in this affection, especially in view of the serious complications that may follow. Among the complications, perhaps the most frequent are orchitis and prostatitis. With the older methods of treatment there were 15 to 18 percent. of cases complicated with orchitis and from 35 to 60 percent of cases complicated with prostatitis. Moreover from personal investigation, the author has found 30 percent. with vesiculitis. The fact that these complications may be the cause of debility, sterility and impotence is alone sufficient to show the need of attention to the treatment of the infection with special reference to the prevention of complications. Neurasthenia is also one of the consequences of gonorrheal urethritis, while of late, the disease has been considered as one of the causes of enlarged prostate. The negligence which has been manifested in the treatment of this infection is indeed unpardonable. It is astonishing that some of the old superannuated methods are still used in the treatment of this disease when we have at our command energetic and trustworthy methods for arresting the infection and preventing the various complications. The principle which should guide us in the treatment of gonorrheal infections as in the treatment of any other infected wound should be disinfection, immediate and systematic. The disinfection of a urethra invaded with the gonococci will vary according to the duration of the disease and its complications.

It will be useless to go into all the details of the attempts which have been made in trying to abort the disease at its early stage. The fact that abortive treatment may be attempted with

some hope of success, provided the infection is not too advanced is no longer to be disputed. The author believes that the disease in the great majority of cases remains anterior for the first five or six days, although there are cases in which the infection spreads posteriorly during the first few days. In order to be suitable for the abortive method, the following conditions are required. The duration of the infection should not be longer than six days. There should be no acute external inflammatory symptoms. The secretion should not be abundant and the sensitiveness of the canal should be about normal. The second glass should be perfectly clear and the patient should not have been exposed to reinfection since his infection. The patient should be told that he may have to come twice a day for several days.

On the first day, after the usual preliminary antiseptic cleansing, an injection is given into the anterior urethra of from three to four c.c. of a two percent. silver nitrate solution, which should be kept in the canal for two minutes. About twelve hours later, the anterior urethra should be washed with a solution of one to one thousand potassium permanganate. On the second, third and fourth days, in the morning, the anterior urethra should be washed with a solution of 1:1000 permanganate, while in the evening, ten c.c. of a one-half percent. solution of cocaine should be injected and the anterior as well as the posterior urethra should be washed with a solution of from 1:2000 to 1:3000 potassium permanganate.

On the fifth day, and the following days, the patient should receive daily, irrigations of the same strength of potassium permanganate. If on the fifth day, gonococci are still present, it is well to continue for a few days longer with two irrigations daily. If the canal be somewhat irritated, the strength of the solution should be diminished.

Daily irrigation should be continued until the complete disappearance of the secretion, and until the first portion of urine becomes clear.

An interesting point to be noted in the course of this treatment is the occurrence of a false retention of urine. The patient complains that he cannot void his bladder, but in reality, he is only afraid to do so, on account of the sensitiveness of the urethra. In such cases, a few drops of cocaine solution should be injected into the fossa navicularis.

Slight bleeding of the urethra may be noticed at the end of the first week, but this disappears in a few days under the continued treatment. In one case the bleeding was sufficiently severe to call for the injection of a ten percent. solution of antipyrine. These hemorrhages are noticed particularly when strong solutions (1:1000) of potassium permanganate are employed. It is important to know whether the blood comes from the urethra or the bladder. When cystitis develops in these cases, the patient suffers some pain at the end of urination and passes cloudy urine, the last portion of which is somewhat tinged with blood. When these symptoms are present it is best to give the ordinary irrigation and to follow it with an instillaton of a few drops of two percent. silver nitrate into the posterior urethra and the neck of the bladder. No other complications are seen with this method of abortive treatment. An average of two or three weeks is necessary for this treatment, but if the infection is virulent it may require longer. In 62 percent. of cases, treated by the author, the duration of the treatment was fifteen days, while in 85 percent. of cases, 21 days were necessary. Aside from the shortening of the treatment, the principal advantage of the abortive method is the avoidance of complications.

In addition to the above outlined treatment, the author has also used a mixed treatment with irrigations of potassium permanganate employed as outlined above, together with injections of protargol. In two to five percent. solution, which is allowed to remain in the canal for from two to three minutes. The results of this mixed treatment are fairly satisfactory.

In the treatment of *acute urethritis* three methods are used: The internal treatment, the local disinfection of the anterior urethra, and finally, the disinfection of both urethras. The latter is the procedure favored by the author at present. This is his method in these cases: When a patient presents himself in the acute stage, too late to receive abortive treatment, he is first examined for the presence of paraurethral ducts and the two-glass test is applied. A few cubic centimeters of a one-half solution of cocaine are injected. The anterior urethra is washed at low pressure with a solution of 1:3000 mercury oxycyanide, and then the bladder is filled with the same solution. With the bladder thus filled, the prostate and vesicles are palpated and the contents of the bladder voided. If the accessory glands are not involved, the patient is given directions as to hygiene and diet, and irrigations

are begun involving both anterior and posterior urethra. These are given once a day. The solutions used are of mercury oxycyanide, one part in two or three thousand. They are continued until the discharge becomes very slight and are replaced then by similar irrigations of permanganate, of the same strength. From time to time, during this treatment the prostate and vesicles are examined.

If the posterior urethra is infected, the patient is given urotropin internally and the bladder is irrigated twice daily with the same solution of mercury oxycyanide until the second glass becomes clear. Then the irrigations are given once a day. If the prostate and vesicles are involved, urotropin is given internally and two irrigations are given daily for four or five days. The prostate and the vesicles are massaged every other day and the patient is told to take very hot rectal irrigations. In this type of cases, the clearing up of the second glass will take more time. Instead of mercury oxycyanide, solutions of various silver salts may be employed. If the first glass fails to clear promptly, an injection of two percent. protargol may be given anteriorly, and retained for half an hour. The irrigations should be continued until the urine becomes clear and the morning drop disappears.

If the discharge reappears and gonococci are present after two long series of irrigations, we may be sure that we have a rebellious case with glandular involvment. If the patient cannot come twice a day he may be allowed to use injections of protargol, two or three percent., retained for fifteen minutes twice daily, while an irrigation is given once a day. This method exposes the patient to a greater frequency of complications.

In *subacute cases*, there are divergent opinions as regards treatment. The old method is the use of balsamics towards the end of the third week and with these the use of astringent injections. A newer method is that of Neisser and his school consisting of injection of organic silver preparations. In this connection the author strenuously objects to the policy of allowing an acute infection of the posterior urethra to go without local treatment. To allow such a condition to go on is to expose the patient to serious complications. The modern method of treatment in subacute cases has been worked out by Janet. The best results of Janet's method of irrigation have, in fact, been observed in the subacute stage of the disease. Janet advises irrigations of the entire canal with solutions gradually increasing in strength from

1:4000 upward. This treatment should be continued until the urine clears up and the discharge becomes very slight. The irrigations are then interrupted and if the secretions become more abundant and shows gonococci the treatment is again begun and continued in the same manner. If after a series of injections gonococci are still present the case should be regarded as tending towards chronicity and should be treated as a chronic case.

The treatment of the *chronic cases* consists in the first place, in determining if possible, the cause of the persistence of the infection. The treatment will therefore vary according to the condition found. The first thing to do is disinfect the surface of the mucosa and to obtain clear urine. This can be done with a few irrigations after which a quantity of solution is left in the bladder. At first the region of the bulb is palpated and the patient is asked to void some of the solution. Then the seminal vesicles and the prostate are palpated and expressed and the patient allowed to void some more solution. The condition of the glands examined will appear upon microscopical examination.

The patient is asked to return on another day and the anterior urethra is examined. It is here that we find in most cases the cause of the persistent discharges. The entire urethra is thoroughly washed, the calibre of the canal is determined and the anterior portion is palpated over a sound. We find often the presence of infiltrations which should be massaged over the sound. The patient is then asked to urinate and the presence of expressed matter from the glands is determined. A few days later the patient is urethroscoped and the locality of the lesions is accurately determined.

If one or more paraurethral canals are detected they should be opened and disinfected if they are not deep; if however, they are very deep, it is best to disinfect them by injecting into them solutions of protargol, permanganate, etc.

Cases in which gonococci have been found in the vesicles, the prostate or the posterior urethra, must be treated by irrigations and massage of the entire tract. Cases with lesions in the anterior urethra should be treated by irrigations followed by dilatation. Injections of antiseptic solutions, such as two to five per-cent. protargol, may also be used in the form of prolonged applications, i. e. after the solution is injected, the meatus is closed with a layer of cotton which is firmly tied into place.

ANNALES DES MALADIES VÉNÉRIENNES

Vol. VI, No. 4, April, 1911

1. Syphilis and Sporotrichosis. By Drs. Gougerot and Dubosc.
2. Acquired Syphilis in a Subject with Heredo-Syphils. By. Dr. Goizet.

1. Syphilis and Sporotrichosis. Gougerot and Dubosc report a case of sporotrichosis in which there were lesions greatly resembling gummatous syphilis involving the subcutaneous tissue, the muscles and the bone. There was also a spontaneous fracture of the radius.

The resemblance between syphilis and sporotrichosis was recognized early in the history of the latter disease. A number of cases have been recorded in which sporotrichosis so closely resembled syphilis that the lesions in the skin and the bones were practically identical with well known syphilitic processes. In the present case, a new example is shown of gummatous deposits in the skin and beneath it; in the muscles and bones, and an involvment of the radius which ended in a fracture of that bone. The diagnosis of syphilis was made at first. The presence of muscular gummas and of the fracture of the radius were elements in this diagnosis. Treatment was begun with injections of mercury benzoate and for a few days some improvement seemed to occur. Later a thorough examination together with cultures upon gelose —glucose and peptone demonstrated the presence of sporotrichosis. It was fortunate that this diagnosis was made, because the patient rapidly improved under treatment with iodine and iodides.

The authors emphasize the importance of certain clinical signs which allow one to make a differential diagnosis at the first examination, in cases such as this. The number of the lesions was considerable there being seven evident foci. Of these six were deeply situated. It is quite exceptional to find syphilitic gummas so numerous. Gummatous syphilis gives rise to multiple lesions only in cases in which it affects the skin itself, in the shape of ulcerating foci. The gummas in sporotrichosis are different from those of syphilis. In the former infection the muscular gumma of the arm had completely softened without producing any inflammatory symptoms which are so constantly found in syphilitic gummas when they liquefy. The contents of the softening gumma was like that of a cold abscess, the shape of the cavity being cup-

like. Syphilitic gummas contain a soft mass which cannot be removed by puncture and yields but a few drops of serous fluid. In the case in question, however, puncture elicited several cubic centimeters of yellow slightly cloudy fluid and completely emptied the abscess. The bacteriological diagnosis is simple and graphic. Cultures are prepared as follows: A quantity of pus from the gumma is taken with a sterile syringe, and one-half to one c.c. of pus are planted upon each tube of culture medium (see above). The tubes are left at ordinary temperature in a warm room for a day or two, and a glance at the tubes is sufficient, for the appearance of the colonies is characteristic. Another method is the serum diagnosis of Widal and Adami, the latter method having the advantage of giving an immediate answer to the question of diagnosis and the being available when the lesions are not on the surface or when culture is impossible.

2. Acquired Syphilis in a Subject with Hereditary Syphilis, who Presented at Birth the Signs of Secondary Hereditary Syphilis. Goizet reports the case of a man thirty-eight years of age, who at birth had presented the signs of pemphigus, according to the records of the author's father. At the age of 14, the patient had a reappearance of syphilitic ulceration and these lesions disappeared under treatment. At about the same time, he showed the beginning of a spinal curvature which, however, did not develop to a marked degree. In 1902, the patient enlisted in the army, but could not do any active service. For five months he was at a hospital for nervous disturbances including insomnia, headaches and contractures. At the hospital, he contracted scarlet fever and was finally discharged from service. In 1905, he suffered considerably from a varicocele and in the same year, he was attacked by an eczema occupying the entire upper portion of his chest and arms. A new attack of eczema occurred in 1906. Until August, 1908, the patient suffered from neuralgia and from a nervous depression which interfered with his occupation. In August, 1908, he developed a cervical adenitis on both sides, which was very persistent and very marked. He applied for treatment at a hospital where the diagnosis of a primary lesion of the left tonsil was made. Six weeks later a very pale and very transient rose rash appeared. Treatment was begun with a course of ten injections of gray oil. During 1909, treatment by injection was continued, and the symptoms were comparatively subdued, except that the pain due to the varicocele

persisted. During the month of December, the patient was sent to a watering place for neurasthenia and anemia, and was operated upon for varicocele. After the operation a double hydrocele appeared, more marked upon the right side. This was punctured four times on the left side, and operated upon on the right side. During this period injections and inunctions of mercury were continued.

In August, 1910, there was an induration of the right testicle. The patient was ordered internal treatment with iodine and ten injections of enesol. He then was sent to another health resort where he received twenty injections of mercury benzoate.

In November, 1910, he developed a very painful and marked swelling of the tonsils and was seen by the author for the first time. There was a deep ulcer upon the left tonsil and a very marked condition of neurasthenia. Treatment was then begun with hectine in daily doses of 0.10, followed by ten days of rest after each ten injections. The results of the treatment consisted in a general improvement without any apparent check upon the process in the tonsils. The ulcer had increased in size and a second ulcer had appeared upon the left tonsil and its inferior pillar. After the first ten injections of hectine the patient developed a generalized hemorrhagic purpura, accompanied by an abundant hematuria. After a second series of injections of hectine, localized purpura developed upon the face and arms, accompanied by nosebleed and spitting of blood. These symptoms lasted only a short time. Two days after the last injection of hectine, the ulceration in the throat began to diminish in size. In spite of this, the patient wanted to try an injection of salvarsan, but upon consultation with Professor Gaucher, it was deemed best not to use this drug in view of the untoward symptoms which had occurred with hectine. Twenty injections of mercury benzoate were given, accompanied by local applications of a solution of iodine. After ten injections great improvement was noted, and after twenty injections there remained only a small ulceration upon the right tonsil, together with some pain radiating into the corresponding ear.

Tonsillitis and Genito-Urinary Disorders.—G. L. Hunter, Baltimore (*J. A. M. A.* April 1), after referring to the recent enumeration of ailments ascribed in certain cases of tonsillar disease by Rosenheim (Bull. Johns Hopkins

Hosp., November, 1908, xix), says that those treating diseases of the urinary organs in women are familiar with the so-called rheumatic urethritis. There are many cases in which gonorrhea can be ruled out to a practical certainty and some in which we are at a loss to ascribe the symptoms to anything but a rheumatic cause. His experience with these patients is that they respond more readily to local treatment than do these with chronic gonorrhea, and as a rule they relapse within a few years or months. His impression also is that in these cases we find the inflammation more frequently in the posterior third of the urethra rather than in the anterior third, where it is more frequent in gonorrhea. Several illustrative cases are reported and discussed. He finds the evidence of their connection with tonsillar disorders sufficient to warrant a more careful study of chronic urethral cases for, if we can relieve them by tonsillectomy, as he has done in several of his reported cases, we will make an important advance in therapeutics. The possible connection between tonsillitis and ureteritis has been brought to his attention only recently, and he reports two cases of this type, in one of which the tonsils had been removed. A suggestive feature in one of these is that the patient had a sore throat and hoarseness following each attempt to catheterize the ureter. He believes that this new theory of tonsillar infection or toxins producing ureteral strictures may be found to explain some otherwise obscure cases. While not himself familiar with male genito-urinary work, he is informed that many cases of posterior urethral inflammation cannot be traced to gonorrheal infection. Dr. Geraghty of Johns Hopkins Hospital tells him that he has seen cases of acute prostatitis with abscess formation occur during or immediately after tonsillitis, and he thinks that it is not improbable that some cases of chronic urethritis may have a like origin.

Foreign Body Calculus.—A case of urinary calculus formed on a pin and weighing 5.5 grams, in a girl 5 years of age, is reported by I. S. Hirsch, New York (*J. A. M. A.*, October, 22, 1910). The symptoms, which had continued for about 7 months, were those of enuresis, for which the child had been treated, but a rectal examination, which had not been made before, showed the probable cause, and this was confirmed by use of the sound and X-ray. The stone was removed by suprapubic cystotomy and recovery was uneventful.

Hirsch discusses the nature of the calculi and the probable method of the introduction of the foreign body in this case. Considering all the facts, he thinks, the pin must have been maliciously introduced into the child's bladder, as the possible penetration from the intestines after swallowing seemed to be excluded by the history of the case. Chemical analysis showed the calculus to be formed of calcium and magnesium phosphates and calcium oxylate. The cystitis which existed was accompanied by a slightly acid urine and the encrustation consisted of the substances found in such urine.

BOOK REVIEWS

GONORRHEA IN THE MALE. A Practical Guide to its Treatment. By Abr. L. Wolbarst, M.D., Consulting Genito-Urinary Surgeon, Central Islip State Hospital; Visiting Genito-Urinary Surgeon, People's Hospital, West Side German Dispensary and Beth Israel Hospital Dispensary; Professor of Genito-Urinary Diseases, New York School of Clinical Medicine, etc. 12mo, pp. 175. New York International Journal of Surgery Company. 1911.

In this convenient little volume Dr. Wolbarst has collected a series of articles on gonorrhoea in the male which have appeared some months ago in the *International Journal of Surgery*.. The book is intended primarily for general practitioners, as a guide to diagnosis and treatment, and is based largely upon the author's personal experience. A special plea is made for accuracy in diagnosis and for conservatism in treatment.

Dr. Wolbarst's book is a thoroughly up-to-date summary of the subject of gonorrhoea, and may be strongly recommended as a practical, handy guide for practitioners.

THE AMERICAN
JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII JULY, 1911 NO. 7

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

A RATIONAL AND EFFICIENT METHOD OF TREATING ACUTE GONORRHOEAL URETHRITIS

By F. KREISSL, M. D., Chicago.

IN the treatment of acute gonorrhoeal urethritis one should bear in mind the following points:

1st. That it is necessary to ascertain the condition as gonorrhoeal urethritis.

2nd. That the gonococcus cannot be killed with an ax nor burned out by fire, or suffocated by balsams.

3rd. That the gonococcus having once settled below the epithelial strata it cannot be reached by any drug, be it administered by mouth, urethra or rectum.

4th. That nature will rid the system of pathogenic organisms, especially if it be assisted in a moderate and sensible manner.

It should be hardly necessary to say that not every urethral discharge which follows a cohabitation within a few days is necessarily of gonorrheal origin, or if so, that it is not necessarily due to a recent inoculation. Hence the importance of using the microscope in *every* case of urethral discharge, and of employing all other diagnostic means if the anamnesis should point to a previous infection.

It may happen then that a discharge noticeable within forty-eight hours after cohabitation will be found to be due to a chronic prostatitis, vericulitis, a urethral stricture, or a follicular catarrh, which condition becoming aggravated under provocation and stimulation, is manifesting itself by the urethral secretion. This may or may not be augmented by the presence of the gonococcus.

As soon as the Gonococcus Neisser was recognized as the cause of gonorrhoeal urethritis, its destruction in the shortest possible time and by the most vigorous treatment became the chief object of our therapeutic measures; and when the specific

action of the silver preparations on the gonococcus became appreciated, they were employed in the strongest possible, not to say impossible, concentrations.

Several years ago I heard a colleague recommend in a meeting the introduction into the urethra of a solid silver nitrate pencil. I ventured to ask the gentleman if he would like to have the treatment he was prescribing for his patients, but the answer is still outstanding.

The idea of using strong germicides for this trouble suggested itself from the results of the laboratory experiments, but we should bear in mind that the living tissue is not a dead culture medium and that drugs, which are of sufficient strength, to kill all the *cocci* at once will certainly destroy all the living tissues harboring the same and perhaps even more. Such methods are on the order of the old Chinese cure of corns—by chopping off the toe—a procedure, which considering the importance of the organ involved in gonorrheal urethritis,—will never become popular.

We have therefore to be satisfied, in being able to reduce the virulence of the germ, to check as far as possible its multiplication, to prevent it from invading the posterior urethra and to avoid complications. And this must be accomplished without undue traumatism—mechanical or chemical—to the inflamed area.

Therefore, the principal, upon which a rational method of treating acute gonorrhoeal urethritis will stand, must aim to destroy and eliminate the gonococcus which appears on the *surface*, leaving the extinction of the rest to the action of the tissues into which our germicides in their *permissible* strength are unable to penetrate. In the early and very acute stage the gonococci abound and multiply rapidly. Consequently the efforts to combat this condition must be made very frequently, but they have to be made under consideration of the then highly inflamed and vulnerable tissues. Therefore *frequent* injections are indicated with a very mild germicide and without extreme expansion of the urethral wall. As soon as the inflammation subsides, the character of the discharge changes, and the virulence of the gonococcus is lessened, we find the leucocytosis—nature's attempt to carry the germ to the surface—decreased. Very natural then, the frequency of applications can be reduced—more for the comfort of the patient than for any other reason—and the solution employed made somewhat stronger.

Proportionately to the reduction of the number of injections

the solution should be retained longer. This concession I make not because I believe that the longer duration of the contact of the drug with the diseased area has a deeper reaching effect, but I believe that under the prolonged pressure of the column of fluid the contents of the infected follicles are forced into the urethra and the fluid into the follicle. It is the same idea that prompted the combination of dilating and irrigating the urethra in *chronic* urethritis.

The frequent injections in the very acute stage of the disease do not represent much more than a flushing of the urethra with the addition of the germicide. I am convinced that both the flushing and the drug are sharing alike in the ultimate result, which can readily be proven. If a patient in this stage would use nothing but frequent injections with hot water, the subjective symptoms improve, the character of the discharge changes from purulent to almost watery, and the quantity becomes considerably less. Similar conditions may be observed under the internal administration of diuretics *with* or without the addition of balsams. The latter have no decided specific action on the gonococcus but they increase the diuresis by stimulating the renal activity.

However, it should be admitted that the number of cocci is considerably reduced by the use of balsams in conjunction with the administration of water, either through injections or by mouth.

But whether frequent flushing of the urethra by diuretics or by injection of water is employed, the results will be unsatisfactory. The acute inflammation will subside, but the gonococcus, as a rule, remains, constantly menacing the posterior urethra and threatening complications. A speedy extinction of the germ can only be expected by the judicious employment of the silver preparations, foremost among which I place protargol and nitrate of silver. Several years ago I attempted to test the relative efficiency of argyrol, protargol and silvernitrate on gonococcus cultures, under consideration of strength of the solutions employed and length of exposure to the same. The cultures were made from the secretion of patients then under treatment for acute gonorrheal urethritis. I selected for the experiment solutions of different strength such as were commonly prescribed for urethral injections and exposed the cultures to each concentration of the three drugs for from one to thirty minutes. The experimental study, which was conducted with the kind assistance of Dr. Ralph Webster, furnished information similar to that ob-

tained by almost the identical investigation carried on by Schaefer about fourteen years ago and published in a paper which I presented before this society. These experiments were made with drugs which we considered as germicides at that time and employed in the treatment of gonorrhoeal urethritis.

Experimental study of argyrol and protargol with gonococci cases No. 9379, No. 9378, No. 9529:

Tests of gonococcicidal strength of argyrol and protargol. Owing to the susceptibility of the recently isolated gonococcus to death from ordinary laboratory manipulations, no tests were made until the organism was accustomed to a saprohytic existence and would live for days at roon temperature, to reach this condition necessitated the making of new growths many days in succession.

This being accomplished the procedure was practically the same in Nos. 9378, 9379, 9529.

Only ascitic and blood agar slants were used. A culture tube containing a vigorous growth of the gonococcus was filled to above the slants with sterile water, when with a sterile pipette the colonies were mixed thoroughly with the sterile water and a transfer made to blood agar as a viability test. A solution of the substance being testes was then added to the mixture of gonococci and sterile water to the desired strength and transfers made at stated intervals. After 48 hours incubation at 37 degrees C. the transfers showed the following results:

	Exposure	1 min.	2 min.	4 min.	10 min.	20 min.	30 min.
Argyrol	10%	xxxx	xxxx	xxx	xx	x	x
Argyrol	20%	xx	xx	xx	x	x	x
Protargol	⅛%	xxxx	xxx	xx	xx	xx	xx
	¼%	xxxx	xxx	xx	xx	xx	xx
	½%	xxxx	xxx	xx	xx	xx	xx
	1%	xxxx	xxx	xx	x	x	x
	2%	xxx	xx	xx	x	x	x
	4%	xx	xx	x	x	x	x
	5%	x	x	x	x	x	x

The xxx marks crudely represent the comparative number of colonies shown. The result may be stated briefly: partial destruction of viability is shown by all solutions, but is complete in no strength used. The inhibition of growth is in direct proportion with the strength of solution and length of exposure. While our findings differ from most of the reports published, we attribute it to the amount of material carried over to the testing culture, for incubation. In our work from one to five drops were

transferred, while the custom is to transfer but a few loppsful. Had this latter plan been followed we have no doubt, from the small numbers remaining viable, in many instances, there would have been apparently complete gonococcicidal effect. The same procedure was made with silver nitrate solution and the results were

	1 min.	2 min.	4 min.	10 min.	20 min.	30 min.
1-2000	xxxx	xxxx	xxxx	xxx	xxx	xxx
1-1000	xxxx	xxxx	xxxx	xxx	xxx	xxx
1-750	xxx	xxx	xxx	xxx	xxx	xx
1-600	xxx	xxx	xx	xx	xx	xx
1-200	o	o	o	o	o	o
1-100	o	o	o	o	o	o
1-50	o	o	o	o	o	o
1-20	o	o	o	o	o	o

Looking at the cross marks of the copy of this report you will observe that the ultimate results of strong, medium or weak concentrations of argyrol and protargol are the same. None of them destroys the gonococcus completely. You will further observe that there is no perceptible difference in the effect of any of the lower concentrations of either drug. A marked difference appears as we come to higher concentrations. But these differences are only pronounced in the first minute of the contact of the drug with the culture.

Hardly any effect is observed from the silver nitrate solutions used in concentrations which are commonly employed for gonorrhoeal urethritis. Here also the length of exposure to the drug does not seem to have any influence whatsoever. Most positive however, is the effect of very strong concentrations.

These experiments bear out the contentions which I have made so often, that drugs which seem to possess *gonococcicidal* properties exhibit the same in vitro most pronounced only in concentrations which are not permissible in practice on account of being too irritating or even destructive to the tissues they come in contact with.

This point is particularly emphasized by the immediate cessation of symptoms following one application of a very strong silver solution in those cases of chronic gonorrhea in which the germs have retired into a morgagni crypt, a paraurethral duct, or hiding in a granulating patch. Here no *extensive* inflammation can be set off by a vigorous cauterization which will destroy all the gonococci, together with a small area of adjoining tissue.

But in this experimental study we also find a strange contrast between the apparent indifference of the culture gonococcus to the milder concentrations of the silver preparations, *and* of the susceptibility of the gonococcus to the same solution on the living tissue. I have never been able to offer an explanation for this discrepancy which would not be open to objection. Perhaps the cultured gonococcus has more resisting power because of the absence of antibodies as they are formed in the living tissues. This theory might then explain why, under the employment of strong and irritating drugs in the acute stage, the process is getting worse and prolonged.

Whatever the underlying cause may be, experience teaches that for the successful management of acute gonorrheal urethritis the strength of the silver solutions employed must be in an inverted ratio to the degree of inflammation. And experience has shown that protargol serves this purpose best, both in its immediate effect and its ultimate results.

The patient receives a one-eighth of one percent solution of protargol, equal to about four grains in six ounces of distilled water. Of this solution he has to inject from two to three drams, depending on the capacity of the urethra. The solution has to be retained for one minute, and this injection is repeated every hour during the day and every three hours during the night. The latter point, for which I take the priority, is of the utmost importance for a speedy cure, and neglect of this rule is responsible for complications and undue prolongation of the disease.

The patient should urinate before each injection so as to mechanically remove the secretion from the urethral wall. Sexual excitement and physical exertion must be avoided. Regarding diet, my instructions to the patient are not as stringent as is customary. Of course highly seasoned foods and alcoholic beverages should be prohibited in the very acute stage of the disease. But a small quantity of claret diluted with water should be permitted patients who are in the habit of taking stimulants and if taken in moderate amount it is perfectly harmeless.

The patient is advised to report in the forenoon of the fourth day. He should not urinate nor use an injection for at least four hours preceding his visit to the office. The discharge will then be found to be very scanty, thin, of grayish color, and microscopically very few leucocytes and still fewer gonococci will be seen. The patient receives then a one-fouth of one percent solu-

tion of protargol to be injected every two hours to be retained for one minute and to be used only once in the middle of the night. He is to return on the fouth day, prepared in the same manner as previously. As a rule we find then very little grayish secretion, hardly enough to be spread on a slide, and microscopically we see very few or no pus cells, a good deal of mucous shreds and a number of epithelial cells. Usually no gonococci are found, or just a few extracellular. The decrease of the number of leucocytes and the appearance of epithelial cells indicates than the gonococcus has lost its virulence and that repair of the damaged tissues has commenced.

In the *total absence* of pus cells and leucocytes the patient is instructed to inject once every four hours, which gives him about five injections a day. The night injection is discontinued.

If leucocytes and a few gonococci be still present in the discharge, the patient should retain the *first and last day* injection for three minutes and continue using the one in the middle of the night. He is to report after four days without having injected for twelve hours. Usually then the discharge which has to be forced out of the orifice on account of its scantiness, contains some epithelium and mucous, the urine voided is perfectly clear or carries a few floating shreds.

The number of injections is then reduced to four during the day, these to be retained for three minutes upon arising and retiring, the other two for one minute each. The patient is to return after four days—the twentieth day of the treatment—without having used an injection during the preceding eighteen hours. There is usually no discharge found, or if there be a trace of it, the misroscopical picture is the same as at the previous examination and this discharge is eventually the result of a prolonged reaction, as it follows the application of any kind of silver preparations. Evidence of this I have often received when patients, for one reason or another, discontinue the injections at this stage without a subsequent recurrence of the trouble. From these almost uniform findings and the identical course the disease runs, I am lead to believe that the largest proportion of these cases may be considered cured in twenty days or less, but that the treatment should be kept up and gradually discontinued in the following ten days. For this purpose the patient should be instructed to inject for three days once in eight hours, for the next three days upon arising and retiring, and for the last four days once in twenty-

four hours. These injections should be retained for five minutes each time.

After a further interval of four days during which no injections are used, the patient if so disposed, should drink some beer or other alcoholic stimulants, which will bring forth considerable typical secretion within twelve hours if the gonorrhea should not be cured.

This test however, may be dispensed with, because even without provocation the discharge in a case of recent gonorrhea invariably returns if treatment be discontinued only for forty-eight hours. A discharge which persists after this time, but is found to be free from gonococci, might be due to other germs, or to an ordinary post gonorrheal catarrh, which readily yields to an astringent like resorcin, sulphate of zinc, acetate of lead or sulphate of copper. Sometimes this discharge is associated with strictures, either traumatic or a remnant of a preceding infection.

Under a suitable treatment of these lesions the discharge soon ceases.

If the gonococcus, in spite of this methodical treatment, persists for more than six weeks, one has to investigate for the cause and it will not be difficult to find the same. It is either laxity of the patient in following instructions, carelessness at the prescription counter, or a constitutional disease like anemia, chlorosis, tuberculosis, lues, which is likely to prolong the trouble. In other cases a stricture, an infected paraurethral duct, or Cowper gland will be found as the cause.

Another source of an unduly prolonged gonorrheal urethritis, and one generally not thought of is a certain degree of atony of the cut-off muscle. In these cases the external sphincter yields to the slightest pressure of the column of fluid injected into the anterior urethra, permitting part, if not all of it, to run back into the posterior urethra. Thereby the purpose of the treatment, the unfolding of the mucosa and exposure of every diseased area to the germicide, is frustrated. This abnormal condition may be readily ascertained in the following manner:

The patient is ordered to urinate, but to keep part of his urine in the bladder. He then injects a sufficient amount of the medicine to slightly distend the anterior urethra. This amount usually varies from two to three drachms. The solution, after being retained for several minutes, is discharged into a graduated vessel, and measured. If a part of the medicine should have entered the deep urethra it will be missed in the returned fluid.

If the patient then empties his bladder completely, the urine which previous to the injection was voided perfectly clear, will be found more or less turbid on account of being mixed with that part of the medicine which has entered the deep urethra.

In this condition the atony of the sphincter muscle must be corrected by pressure exerted on the perineum in some way, either by the hand of the patient or by the patient sitting down on a hard object, for instance the arm of a chair, during the injection.

Protargol solutions, like other silver preparations, should be dispensed in stained glass bottles, and prescribed in small quantities, not more than would last from twenty-four to forty-eight hours. If it were not too cumbersome and practically impossible to be carried out, I should like to have the solution made up three times a day, as it has been proven that protargol and argyrol when dissolved in water are losing a good deal of strength within 12 hours. Perhaps results would then be still more striking.

In cases which give a history of a preceding gonorrheal infection, we shall have to look for lesions left over, and usually we find periglandulitis and granulations. In patients whose general health is below par, these lesions are likely to appear within a few weeks after the onset of an acute gonorrhea, and silver nitrate will have to be employed instead of protargol. A solution of one in one thousand injected three times daily or an irrigation with six ounces of the same strength is generally sufficient. Eventually urethral dilatation will become necessary to crush the granulations and promote the absorption of the infiltrations. In other very stubborn cases, applications of twenty percent silvernitrate solutions through the urethroscope will be required.

Under the above method of treatment if commenced in the first three days of the disease, and properly carried out, I have yet to see a case in which complications set in or which, like cases treated by other methods are indefinitely prolonged and terminate with definite more or less permanent lesions.

No. 5 North Wabash Ave.

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

THE CONTROL OF PROSTITUTION AND VENEREAL DISEASES IN THIS COUNTRY AND ABROAD.*

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PROSTITUTION is an institution which has existed since prehistoric days; for, already in ancient Chaldea, almost 4000 years ago, it was a recognized practice, and we find evidences that regulation existed there, prescribing the dress of the prostitutes, and the places where they might follow their trade. Moses, also, already recognized the transmissibility of venereal diseases, and formulated laws to prevent their transmission, during the exodus from Egypt.

Solon founded brothels in ancient Athens, and formulated regulations governing them. He was moved to do this by the desire to protect the virtuous women of Athens from molestation and insult, and by the wish to protect the health of the nation. In those ancient days it was already found necessary to limit the field of activity of the prostitutes, by segregating them in Piraeus, the port of Athens.

In ancient Rome, stringent laws were adopted dealing most harshly with prostitutes and their hangers on, and with adulterers, etc. The laws were all directed towards the purity of the Roman women, and of the family; yet prostitution, in its most vile and corrupt forms, was never more prevalent than during the days of Rome's greatest glory.

Venereal diseases are said to have raged among the ancient Greeks and Romans, and it was the fear of these that is said to have been in great measure responsible for sexual perversions among these peoples. I find no mention of the sanitary supervision of prostitutes, however, in their history.

Although Paul and the apostles, early in the Christian era, preached continence and the holiness of matrimony, it was not long before prostitution again gained a foothold among the christian peoples, greatly aided in its spread by the wandering priests and monks. In the Apostolic constitutions, ascribed to Pope Clement, we find regulations to be observed by Christian maidens, to differentiate them from the prostitutes; regulations which might well be applied in the streets of our own city, where it has

Read before The American Society of Medical Sociology, at the Academy of Medicine, May 12, 1911.

become so difficult to distinguish the painted, powdered and pomaded maiden or matron from the harlot.

Although various Church councils promulgated laws relating to prostitution, it is in the Proceedings of the Council of Milan in the 16th century, that we find the first record of any definite regulations among Christian nations. In these Proceedings we find the following: "In order that it may be possible to distinguish, at a glance, between the prostitutes and the respectable women, the Bishop shall see to it that the prostitutes shall, whenever they appear in public, wear a distinctive costume, which shall be a mark of their shameful calling. Should they be strangers in the city, they shall not be permitted to pass the night at inns or shelters except their journey compels them to, and then only for a single day. In every city, it shall be the duty of the Bishops to assign to these individuals a part of the city in which they shall all live, at a distance from the cathedrals and the populous quarters of the city. Should they leave this quarter, and dwell, under whatsoever pretext, in another house in the city, then they shall be severely punished, as shall also the residents in whose houses they shall be found."

Turn to whatever time, whatever country, whatever people we will, and read their history, we find that all of the plans which are now being tried or recommended, to suppress, or restrict, or regulate prostitution, have been tried, long before our day, and have failed utterly. The prostitutes and their customers have been looked upon as outlaws, and have been maimed, beaten, pilloried, banished, even killed, but without any lasting effect upon prostitution. Brothels have been tolerated, or licensed, and enslavement and robbery of the women by brothel keepers, or the authorities have resulted. Brothels have been suppressed, and the prostitutes were robbed by those who harbored them, as well as by dishonest officials, who claimed to procure them immunity from punishment, while the women were driven from the streets, into nooks and corners, where they continued to ply their trade in secret, with the addition, however, that public order was, under these conditions, invariably more disturbed, and that venereal diseases became more prevalent.

Morality and sexual abstinence have been preached before our day, and the result has been practically, the same as that of the other methods. The preaching has not been heeded, and the moral tone has not been raised.

Methods have been employed to supervise the health of the prostitute, whether the public, or clandestine, with but little result, until the last few years, for it has only been during the most recent times that we have had any adequate knowledge of the causes of the venereal diseases, and thus any way of studying means to combat them.

Why have the efforts of those who, on the one side, have tried segregation, casernation, and sanitary supervision, and, on the other side, abolition of any control whatsoever, with appeals to the morals and the reason, or the fear of the community, had so little effect upon prostitution? Simply because the one side has looked upon the prostitute as a criminal and an outcast, while the other side has tried to reason away the sexual instinct in men and women.

In dealing with a problem of such vast importance to the welfare of the community as its health, we have no right to distort facts because of sentiment or prudery. Deep down at the root, we find that prostitution springs from two great causes; first, the impulse governing the propagation of the species,—called, by us, the sexual instinct,—and secondly the social and economic conditions under which mankind has existed and still exists.

Nothing which is natural is immodest, wrong or wicked. It is only the restrictions placed by mankind upon the exercise of natural functions, which can make that exercise immodest, wrong or wicked.

The sexual instinct has been planted in the beings of all men and women. That it varies in its intensity in different individuals, is a fact known to all of us, who come in contact, as physicians, with men and women. In one individual, male or female, the instinct may be so little developed that it is easily controlled or even suppressed. In others it may be normally strong, yet be controlled, within certain bounds, by an effort of the will; yet, even then, not indefinitely. In still others, the sexual instinct may be an impulse so strong that it becomes utterly impossible to control it, far less to suppress it entirely, and, if it be not gratified normally, it is sure to break out in abnormal or perverted ways. It is a fact, however, that in man the sexual instinct is as a general rule more strongly developed than in the female, and this is not the result of the indulgence of the male in the sexual act, but is based upon natural factors. Man is the active factor in procreation, and the greater degree of sexuality in the male is merely

a survival from the time when, in the prehistoric days of the human race, owing to the greater destruction of life among the males, one male was the rate of several females. The polygamous nature of man, for that is his nature, in spite of what the moralists say, is then merely a survival of prehistoric qualities, which civilization has not yet completely changed. The monandrous nature of woman is, similarly, also a survival of prehistoric qualities.

How unjust it is, therefore, for us to measure all men and women according to the same sexual standard!

When we consider the social conditions which foster prostitution, we come to a most complex problem.

If we could have all men and women created mentally and physically equal, and with similar degrees of sexual desire; if, when they grew to sexual maturity, we could have them all mate for reasons of pure affection only; if there were assured to each couple, and to their children, enough to live on in comfort, and enough to meet all reasonable needs of the family; if there were no such thing as enforced celibacy, or widowhood, then we might hope for the abolition of prostitution and later, perhaps also venereal diseases. But, until such a day arrives—and it never will—we shall have prostitution and venereal diseases with us.

Although a number of nations which formerly regulated prostitution, have given up the compulsory inscription and the segregation, or casernation of the prostitute, there are others in which these measures are still employed. The opponents of regulation claim better results from the absence of restrictions, while those who support regulation claim the contrary.

The wildest claims are made by the opponents of regulation; yet, since the abolition of control in those countries where the opponents have been successful, it is an utter impossibility for them to present incontrovertible proofs of the correctness of their claims, since all prostitution has become clandestine, and the prostitutes cannot be reached. Therefore their claims cannot be backed up by adequate proofs. They have simply abolished the brothels, and driven the prostitute out among the respectable people. This is exactly what happened, also in the city, some years ago, as the result of the spectacular raids of a certain clergyman. Nor can they produce proofs that the abolition of control has had a beneficial effect upon the spread of venereal diseases.

In Norway Hausteen (Z. B. G. x, No. 4, 1909) tells us brothels were tolerated, and under police control until 1884, when, as a

result of the movement for the enfranchisement of women they were all suddenly closed. The prophylactic control of the prostitutes was continued until 1887, when control and inscription was abolished. Since that time all dealings with venereal diseases had been in the hands of the general health authorities. Although the notification to the health authorities of all cases of venereal diseases has been the rule in Christiania, since 1876, there are no special regulations intended to check the spread of venereal diseases.

Taken from Hausteen's figures which he has complied from the reports of the Norwegian National Department of Health, we find that under the old system there was a steady rise in venereal diseases from 1876 to 1882, and then a steady decline until 1888. The brothels were closed in 1884, and all control was abolished in 1887. From 1888 until 1897, there was again, a steady rise, almost to the maximum of 1882. Then followed a steady decline again, until 1907, when the curve again begins to rise. Hausteen has found these fluctuations in the number of venereal cases to be *independent of the presence or absence of brothels, or control,* and finds that, with the depression in the economic conditions in Christiania, during the eighties there went a decrease in venereal disease, while, during the period 1889-1898, with the rise of economic conditions, there was a corresponding rise in the cure of venereal disease, to be followed by a fall again, corresponding with the financial crisis during 1898-99. He states, further, that it is not to be denied that since the abolition of the brothels in 1884, the evidences of public prostitution upon the streets have become more noticeable than before the change; also that the number of public prostitutes seeking treatment of physicians or hospitals is relatively small, and that the suspicion, that the number of servants and working women infected with venereal diseases has relatively increased, seems to have a certain amount of justification. Surely this can be no glowing victory for the abolitionists.

Prof. Welander of Stockholm—than whom there is no one in Sweden better acquainted with the problem of control of prostitution—states (Z. B. G. 1911. Nos. 11 and 12): Brothels are prohibited: most of the prostitutes practice their trade in rented rooms or in small hotels. Inscription of public prostitutes, with physical examination, is the rule, but the number of the inscribed has of recent years been decreasing—from 422, April 1 1904, to

267, January 1 1907, while the population has increased. He states that the number of clandestine prostitutes in Stockholm is not very large, and that it is his belief that the fear of inscription has deterred many of these women from continuing to practice prostitution. Furthermore, owing to the warning given by the police authorities to young women cited to appear before them, a large number have been returned to their relatives, or admitted to charitable institutions, and otherwise turned from prostitution. He fears this might change were sanitary supervision abolished.

In every district in Sweden there must be at least one hospital, or one hospital division, which receives and treats venereal patients free of any charge. In Stockholm the St. Görau hospital has 272 beds for venereal patients, while the old hospital, with 100 beds, has been reserved for diseased prostitutes.

Welander is of the opinion that the best way to combat the spread of venereal diseases is to isolate the venereally diseased in hospitals. Not every case can, however, be so isolated, and not every one requires it. The large mass of them can be treated outside of hospitals and will subject themselves to the necessary treatment. But there are others who are by reason of their mode of life most dangerous to the community; the worst of these are those who practice public prostitution, and these, he believes, should, when they present evidences of a venereal disease of a transmissible character, be isolated in a hospital. We know, he says, that these women seldom voluntarily report their diseases, and that they are seldom reported as diseased by those who have been infected by them. There remains to us nothing else than to subject them to preventive examinations, so long as we require their isolation in hospitals. But these preventive examinations must be based upon scientific principles,—such as a careful search for gonococci, and a careful examination for evidences of syphilis,—and they must be carried out by competent, experienced persons.

So, you see, in Norway and in Sweden, those who know and understand the conditions from actual experience, rather than from the superficial diletantism of the professional agitator, lean rather to the wish for an increase in the restrictions than for their entire abolition.

In Denmark control of prostitution was abolished by law on March 30, 1906.

England, as you know, is the paradise of the frenzied agitators and the abolitionists, as it is the home of prudery and "Mrs. Grundy." It has no control whatsoever or supervision of prostitutes and prostitution, venereal diseases and sexual perversions flourish now as they have always done. It is impossible to get any reliable statistics about the prevalence of venereal diseases in England, excepting for the British army and these prove the fallacy of the complete absence of supervision, for Great Britain has for her home forces the proud, though somewhat questionable, distinction of having the highest percentage of disability due to venereal diseases of the armies of the world, next to our own. Hammer tells us (Z. B. G. 1907, No. 1) that in 1902-03 the figures for the European armies were per 1000:

Prussian, Saxon and Würtemberg troops	19.4
French	29.9
Austrian	57.5
Italian	91.5

In the report of the Surgeon-General of the United States army for 1910 we find the statement that, according to the latest available statistics the figures for venereal diseases in various armies are:

English home forces	122.7
British (at home)	68.4
British forces, home and territorial	75.8
Austro-Hungarian	54.2
French (at home)	27.8
French, home and territorial	34.8
Prussian	18.7
Bavarian	15.2
United States	196.99

Surely this must be a glorious victory for the abolitionists as against those who favor control, since the United States can show 196.99 per one thousand men and England 75.8 against only a poor 18.7 for Germany and 15.2 for Bavaria.

Austro-Hungary still tolerates brothels and follows the old system of inscription of public prostitutes, with periodical examinations of these women at police headquarters.

In 1909 while on a visit to Vienna, I tried to acquaint myself with the conditions and the methods of control in that city. Still smarting, perhaps, under the disclosures of police corruption which

occurred during the trial of the notorious "Modesalon Riehl" case, a few years previously, the authorities hedged themselves in with such a wall of diplomatic requirements, that I gave up the attempt. It was a unique experience for me in my studies, since this was the first refusal I have ever encountered.

From another source, however, I have learned that in 1907 there were 15 tolerated brothels in Vienna; also 1,400 inscribed prostitutes and it was estimated, 30,000 uninscribed, of which latter class almost 50 per cent were minors. During the trial of the case of the "Modesalon Riehl" (a notorious Viennese brothel) it was disclosed that these establishments were protected—yes, even their profits shared in—by the city officials, and as a result, attempts have been made to abolish tolerated houses.

In November 1906 a meeting of the Commission was held in Budapest, under the presidency of the Mayor, to consider the new regulations formulated by Stadthauptmann Dr. Schreiber. These contained, among others, the following regulations: The system of tolerated houses was to be retained. Permits are to be given only to women over 17 years of age. Of women living outside of tolerated houses only one may live in any one house. These women shall be permitted to frequent certain streets and certain resorts only. The medical examination shall take place in some central bureau and shall be free of any charge.

In 1909, the examinations of the prescribed prostitutes, which were made at Police Headquarters, were such as are made, with but few exceptions, in other European cities, and left much to be desired from the scientific standpoint. The diseased prostitutes are confined in an old barracks-like hospital, where they are kept until pronounced well. Those who are able to be about take their exercise in a large, open court-yard. I was informed by the physician in charge, that Lesbian love was a general and very troublesome manifestation among the incarcerated prostitutes.

Switzerland does not tolerate brothels and has no system of inscription or control. In the latter part of November 1906 conditions in Zurich were the topic discussed at a meeting of the association of purists. Dr. Keller-Huguemin who presented the report, stated as his opinion that prostitution is a necessary result of conditions at present existing, a physiologically necessary fact, and that all attempts to root it out by legal measures are fruitless. The law must seek to grapple with the problem in two directions,

i. e. the protection of public morals and the preservation of the health of the community.

The results of the attempts to suppress prostitution to Zürich, have been to drive the prostitutes to do in secret what the law prohibits; to bring them more often into contact with poor families, with bad results to the morals of these, and to make impossible any attempts at sanitary control.

At the same meeting, the Chief of Police of Zürich, and City Councillor Welti, stated that prostitution exists now, just as it formerly did in Zürich, and that it is an impossibility to root it out. Prostitution has now found numberless nooks in which to hide itself, particularly in the so-called cigar stores.

All through the early history of France we find evidences that prostitution was very prevalent, in spite of the most drastic measures to suppress it. The measures simply forced the prostitutes out among the respectable folk, and led to an increase in crime and disease, and to the annoyance and molestation of respectable women. "It was chiefly on this account," says Delamare, in his Traité de la Police, "that the attitude of the police toward the prostitutes was changed." In 1256, Louis IX who had, previously been most drastic in his dealing with them, caused his chief of police, Etienne Boileau, to formulate regulations governing the prostitutes. Prostitution was thereafter tolerated; but the prostitutes were restricted to certain quarters and streets of the city (Paris); their mode of dress was prescribed and the hours set at which they must leave the streets. Louis IX and Etienne Boileau may then be regarded as the fathers of the modern police control of prostitution.

Thus the matter went on until 1560 when brothels were abolished in Paris; but the evil of prostitution was not lessened in the enormous dimensions in which it had grown, and instead of the public brothels, large numbers of low-class, secret places sprang up, which were the retreats of thieves and cutthroats. No sanitary supervision was exercised over these dens, and venereal diseases were general in them. As a result, the authorities were soon compelled to again tolerate public brothels.

Thus the matter has continued, with fluctuations, up to the present day. The police tolerate prostitution, and attempt to exercise a sanitary supervision over the inscribed prostitutes. Parent-Duchâtelet gives the number of inscribed prostitutes as 3853 in 1867, while he estimated the number of clandestine at 100

times this number. In 1910, I was informed by Dr. Verchére, the chief physician of the police des Mocurs, that the number of inscribed prostitutes in Paris was about 7000. He could not even estimate the number of the noninscribed. Up to a short time ago there were about 200 brothels, or "Maisons de Tolerance," known to the police. Now there are only about 50. The number of houses of assignation greatly increased and there are now estimated to be between 800 and 1000. All of the known brothels must conform to certain regulations laid down to them by the police authorities.

I shall not take up your time with the details of the method of inscription, release from inscription, etc., excepting to say that the names of those only are entered who apply voluntarily for the inscription, or of those who have been repeatedly arrested for soliciting. The legal age of inscription has, since 1893 been 18 years.

The inscribed women are divided, for purposes of examination, into two classes; those young in the business, and those old in the business. The former, who are the more likely to acquire disease, are examined weekly, the latter every second week. The examinations take place at the Prefecture of Police. Those found to be diseased, are sent to the prison St. Lazare, where they are kept under treatment until pronounced cured, whereupon they are sent back to the Prefecture of Police for re-examination.

Germany is perhaps the country in which the system of control has been most thoroughly and carefully tried, and its cities present examples of inscriptions with sanitary supervision, segregation and casernation. I have elsewhere (*N. Y. Med. Jour.* Aug. 17 and Sept. 7, 1907) given the details of the control—methods followed, and shall therefore not take them up again here in detail. The control is in the hands of the police, and examinations are made by police physicians. This holds good whether the prostitutes live in brothels or not.

Bremen permits prostitutes to live in brothels only on certain prescribed streets. Hamburg follows a somewhat similar policy. Nüremberg had in 1906 20 to 22 brothels chiefly located near the old city walls and gates. In other cities, like Cologne, brothels are also tolerated. On the other hand, Berlin, Leipsig, Dresden, Munich, Frankfurt, Stuttgart and others do not tolerate brothels. Yet they have their inscription lists of prostitutes, and sanitary supervision.

It has been my experience that in those cities in which brothels are tolerated, the streets are freer than in those in which brothels have been abolished. Compare the streets of Berlin with those of Hamburg, and the difference is greatly in favor of the latter. While in Hamburg solicitation upon the streets is a rarity, the principal streets in Berlin literally swarm with prostitutes at all hours of the day and night. It is a well-known fact, also, that there is an alarming growth in Berlin of sexual crimes and sexual perversion. It would be unjust to ascribe these facts solely to the suppression of brothels. I believe the chief cause to lie in the astounding rapid growth of the city, both in size and wealth, during the past thirty to forty years. It is a fact, however, that Berlin has grown to be one of the most vicious cities in the world.

In Berlin brothels were definitely abolished in 1844 and since then the greater part of prostitution has been of the clandestine type. In 1896 the number of inscribed public prostitutes was 5098. In 1900, 4147, in 1905, 3135.

In 1906 I was informed by the official in charge of the division of Sittenpolizei, the inscribed numbered about 6000, while more than 60,000 prostitutes were not under control. In Munich, I was informed by a prominent police official that in 1906 there were about 250 prostitutes inscribed on the police lists. The Munich police department reported, in 1909, (Z. B. G. 1910, No. 5) that they had counted 2076 women whom they knew to be secret professional prostitutes. Other authors estimate the number of clandestine prostitutes in Munich to be 15,000. Of the 2076 known to the police 1870 were brought for medical examination during 1909 and of these 592 (that is 31.6%) were found to be venereally diseased.

Since January 1, 1907 the police of Berlin have tried to increase the efficacy of their sanitary control, by permitting those prostitutes who are not inscribed, but who are known to the police to be clandestine, to substitute for the examination by the police physicians examination and treatment free of charge by any one of a number of specialists, who had volunteered to perform this work for the authorities. A woman who wishes to substitute this private for the police examination is given a card and a list of these volunteer examiners, from whom she may choose any one. She must present herself for examination and treatment, at intervals specified by the physician who fills out a report noting her

condition and date for the next visit, which report the woman must take or send to Police Headquarters. So long as the holders of these cards obey the orders of their physicians, send in their reports regularly, and do not engage in public prostitution, they remain free of any police interference. Should they not carry out these requirements, however, then they may be arrested and inscribed. What the effect of this innovation may be, remains to be seen. Dresden has, as I have stated elsewhere, cut down remarkably the prevalence of venereal diseases among its inscribed prostitutes since the introduction of scientific methods of examination and treatment.

Let us now consider our own city; New York has, perhaps, a much more difficult problem to face in any attempts to control prostitution, than have other cities, since its population is made up to so great an extent of foreigners, who, coming from the most widely separated parts of the earth, have brought with them the habits of their home countries—in many of which the moral standard is very low, and who have been compelled, in many instances, to leave their wives and families abroad, while in other cases their earnings, for some years after their arrival here, are not sufficient to permit of their marrying. Then again, the growth of the population and its wealth has been tremendous and this growth in wealth has been always, as stated before, been accompanied by a growth in prostitution. A further factor is added by the large numbers of young men and women who flock to this as to other cities from the country and the smaller towns, in search of greater opportunities for advancement. And, added to all the other factors, are the Anglo-Saxon prudery and hypocrisy in all matters relating to the sexual sphere.

In our city prostitution is held by law to be a crime and is forbidden, and the existence of brothels is also prohibited as criminal. Yet who that knows the true conditions existing in this city will venture to say that the law has been successful in suppressing either! Certainly no one that is at all familiar with the problem. Prostitution is, perhaps, more prevalent now than ever before; affects all strata of society, from the highest to the lowest; is found in all parts of the city, from the slums to the most select neighborhoods; and the prevalence of venereal diseases is said, by various competent authorities, to be rapidly increasing.

Have we a control of prostitution? Of course we have.

Brothels are forbidden: yet they exist in various parts of the

city, and any "rounder," most of the night-hawk cabmen, and a good many police officers can give you the addresses of numbers of them. They are all, of course, clandestine, in so far as their existence is concerned—and so long as they pay their tribute regularly to the interested persons among the police officials. There is no doubt that a large portion of our police who are honest men and who look upon the graft extorted from the prostitutes and their parasites as "dirty money," yet almost every brothel is made to pay certain fixed sums for the privilege of opening up, and certain other sums weekly or monthly for the privilege of continuing business. So long as they pay, they are usually unmolested. But neglect to "come over with the coin" is usually quickly followed by a raid, or by the posting of an officer before the door of a house, to warn would-be visitors away. I have spoken elsewhere of the sums paid and of the character of the places that exist.

Furthermore, we control the prostitutes by driving them from one precinct into another; by arresting and fining them or imprisoning them in the work-house, by making them pay for immunity from arrest, or for the sudden forgetfulness of the police officer when the woman faces the judge; by making them pay bondsmen, lawyers, etc., and by making them prostitute themselves the more frequently in order that they may be able to secure the money to pay this tribute.

Our control of the street walkers is really farcical, or even worse. Soliciting is classed as disorderly conduct, is a misdemeanor, and is punishable by subjection to the jurisdiction of the parole officer, by fine or imprisonment, release under bond, or discharge.

The arrest is supposed to be made only after the officer has been solicited by the prostitute, or when he has heard the prostitute bargain with a man whom she has accosted. It was our present mayor who caused the abolition of the special detail of police officers who formerly obtained the necessary evidence and made the arrests, and insisted that only officers in uniform be employed for this purpose. It stands to reason that no prostitute, however inexperienced in the business, is going to accost an officer in uniform or let him listen to her bargaining with anyone.

It was formerly the custom of some of the police court judges to discharge, in defiance of the statute, every woman arrested for prostitution or solicitation, on the ground that her arrest was a form of persecution. Others regularly fined the women; but, as

a fine simply means that the woman thus punished has to go back upon the streets again to earn the money for this tribute to the law, I believe the fine to be not only not a deterrent, but a contemptible evasion of the issue, and an oppression of the prisoner. Other judges placed the new offenders under probation, or warned them; the previously sentenced were sent to the work-house.

For the act of prostitution itself, I believe such a sentence to be an injustice and oppression, *for I do not believe that the prostitute is a criminal, nor the act of intercourse in itself a crime.* The prostitute, however, who, knowing herself to be venereally diseased continues to engage in prostitution, is a criminal, and should—since it is the common knowledge of all experienced investigators that these women do not voluntarily interrupt their activities when diseased, and submit themselves to proper treatment be confined to some hospital, (not to a penal institution) where she can be properly and adequately treated, and where she can be employed at some form of labor which will reimburse the community for her care and treatment, and leave her something when she is discharged.

It has been advanced that such a form of treatment would be futile, because the prostitute would again become diseased. That does not hold good of syphilis, and need not hold good of gonorrhea, if the women were given, during the period of their incarceration, some wholesome advice, medical as well as moral, to enable them to avoid future infection.

It will, perhaps, be argued that such prophylactic advice would be immoral and a pact with vice. I can only ask: Which is the greater civic crime—to tell men and women how they may avoid disease and misery or to preach to them empty words of advice concerning the salvation of their souls, while their bodily health is allowed to go to destruction? I see my own way clearly, as a physician, and shall continue to advise the salvation, *first of the body*, believing that the healthy mind is more apt to flourish in the body which is healthy.

The much-maligned Page law was, I believe, a step in the right direction, since it took the prostitute, *after conviction for a misdemeanor*, and subjected her to physical examination, by a female physician, an employe of the health department. If the prostitute was found to be diseased, she was supposed to be committed to a hospital, and treated there until pronounced well—or, at least, no longer infectious. The maximum incarceration pos-

sible, under this law, was one year, and commitment was mandatory upon the court, when the woman was found to be diseased.

At once upon the application of the law, a storm of protest arose, having its foundation chiefly in the sympathies of a number of men and women who, while, actuated no doubt by the best of motives, have little or no actual knowledge of the problem of prostitution and its accompanying dangers to the community. Several organizations took up the fight, using as their weapons publications which ingeniously distorted the statements of a number of authorities and near-authorities upon the question of control of prostitution, and finally test cases were brought by means of habeas corpus proceedings in the cases of two prostitutes convicted under the Page law, and the decision was rendered by one of the judges of the Supreme Court, that the law was unconstitutional in that the commitment was obtained upon the evidence of an individual—the health board examiner—not connected with the court. Thereupon the examinations and commitments under the law were interrupted.

Some people think that the matter ended there; but it did not. The district attorney carried the matter up to the Appellate Division and there the matter is at present, still under advisement. If the Apellate Division declares the law constitutional, then the examinations will have to be begun again, unless the law is repealed by the present or some future legislature.

The law provided that a woman arrested for prostitution or soliciting be taken *after conviction* to a room adjacent to the court room and there be examined for the presence of any disease which might be contagious, infectious or communicable. The result of this examination was then to be reported to the presiding magistrate.

I am afraid that—judging by the description of the method of examination given me by one of the examining physicians of the Board of Health—the methods of examination were incomplete and not up to the scientific standard we have the right to expect. Thus from September 1, 1910, until the action of the law was suspended, that is, during three months, 279 women in all, were examined. Under the old regime 50 to 60 women per night, arrested for prostitution or soliciting was a fair average. Of the 279 examined 81 were found to be diseased with gonorrhea, *none with syphilis*, and none with chancroid. Had the examinations been *carefully* made, I feel sure that more would have been found to be diseased.

The medical examinations, I was told by the examining physician, were objected to by the women in only *one or two cases*, and these women, when the nature of the examination was explained to them, readily submitted. Many, I was told, welcomed it, for the private physicians who examine and treat these women are in almost every case absolutely unqualified to properly examine them. Furthermore, the women themselves and the brothels keepers *do not want them to be declared diseased* as that would interfere with their business. Therefore the private doctor who examines the prostitutes carefully and scientifically soon finds that they go elsewhere.

The Health Department erred gravely in compelling the women to wait in the prison for the result of the microscopic examinations. It should have had a qualified microscopist working in the courthouse who could have at once examined the specimens and reported upon them to the examining physician.

It has been advanced as an argument against the constitutionality of the law that the physicians making the examinations had not qualified as experts, and that the defendants were not permitted to submit counter-testimony. That is of course a valid argument, but one which is easily answerable. Let the Board of Health appoint for these examinations only properly qualified examiners and let them qualify as experts at once upon appointment. If the Board of Health were in earnest in supporting such a method of sanitary control, it could easily deputize several of its female physicians to fit themselves by special study of control methods, to qualify as experts. Then deputize them as court officials. Should the prostitutes then desire to present counter testimony, let the law provide for that possibility, specifying that this testimony shall be given only by a medical examiner *who shall also have qualified as an expert*, the counter testimony to be based upon the findings of an examination made by both the court examiner and the prisoner's physician, in the presence of each other. Should there arise any difference of opinion between the examiners, then the court might appoint a third expert, who might act as a referee. In that manner justice could be done to both the community and the prisoner, and I feel confident that the appeals from the verdict of *competent* health board examiners would soon cease.

I do not need to say again to you that prostitution is based, not upon the depravity of men and women, but upon physiological

and economic causes; that the fight to suppress or abolish it has gone on since time immemorial, and that we are, at the present day, no nearer its abolition than was Moses or Solon. I feel sure that whatever failures have followed upon attempts to control prostitution and the spread of venereal diseases have been the result of our inability to bring about a trial of up-to-date scientific methods for sanitary control. Political trickery and official dishonesty, combined with our national hypocrisy, have prevented a full and just trial. We have not yet learned that the rights of the community overbalance the rights of the individual, when the health of the former is threatened.

Those who have opposed any control of prostitution have offered little else than lectures on morality and sexual abstinence as a substitute. I sympathize heartily with the efforts of those men and women who would try to elevate the morals of the community and to reclaim those who had erred; but I cannot sympathize with that blindness which continues to ignore the dangers to the common welfare arising from the spread of venereal contagion—dangers admitted to exist even by the most ardent abolitionists—and hugs to its bosom the fond delusion that it can banish these dangers while entirely ignoring their source.

What do I believe to be the measures necessary to check the spread of venereal diseases?

First, educational: I believe that when children of both sexes reach the age of puberty they should be instructed in school concerning the anatomy and physiology of the sexual organs, the plan of instruction broadening as the age of the pupil advances. Above all else, when they are sufficiently advanced, they should be warned against sexual abuses and the dangers of sexual indulgence should be pointed out to them. This instruction should be imparted to them not by ill prepared school teachers, but by properly equipped physicians. If the Board of Education cannot undertake this function, I am sure that enough specially qualified physicians can be found to volunteer to do it.

Second, personal prophylaxis: *It is not wrong to instruct adult men and women in the methods of prevention of venereal infection.* It may be advanced that the fear of venereal infection is the greatest preventive of sexual laxity and that to show people how to avoid infection is to increase immorality. Those who have had any experience at all with normal adult human beings know that when the sexual desire becomes at all strong all dangers

are forgotten or are disregarded. Why then leave them to their fate when instruction can save them—and so many more who may be innocent—from serious danger? We need only to read of the results of personal prophylaxis in the army and navy of Germany, and recently also among our own forces, to realize that there we have a very powerful weapon to combat these diseases.

Third, notification to the Board of Health of all cases of venereal disease.

Fourth, facilities for the treatment of venereal patients: I do not believe in the establishment of special hospitals for venereal diseases exclusively. There is still a stigma attached to this class of diseases in the mind of the community, which would work against the seeking of relief in such special hospitals by the afflicted. *Venereal diseases are a misfortune and not a crime* and those afflicted with them should have the right of admission and treatment in every city hospital, and also in every hospital maintained by private corporations, so long as these institutions receive any financial aid from the city. The treatment of the venereal patients in these Institutions should be in the hands only of physicians properly qualified as specialists in this particular class of diseases. Every hospital should, furthermore, maintain a dispensary in which a department should be equipped with the means to properly treat such diseases, which department should also be in charge of a competent specialist in this branch. In order to bring these special hospital and dispensary departments into close touch with the Health Department, the chiefs in charge thereof might be deputized as sanitary inspectors acting without salary from the department. All such chiefs should receive pay from the institutions. [I believe that all medical officials of hospitals should receive salaries for their services to these institutions.]

The city should be divided into districts as is done with ambulance work, each hospital and dispensary being required to treat free charge any venereal case—ambulant or otherwise—living within that district and referred to that hospital or dispensary by the Board or Department of Health. The Board of Health should maintain some bureau to which venereal sufferers might apply for guidance. The city might pay a per diem charge to each institution for each venereal patient treated free of charge there, just as it now does in the case of other charity patients.

And a charge per treatment might be paid to each dispensary for each patient treated.

Let there be made a list of volunteer specialists whose qualifications shall be passed upon by the Department of Health, who will agree to examine and treat, free of any charge to the woman, any prostitute who may be referred to them by the Department of Health. This plan is similar to the one employed in the city of Berlin since 1907.

Fifth, inscription: Let the Department of Health establish and maintain a list upon which those women who wish to follow prostitution may have their names inscribed voluntarily and upon which the names of those convicted of prostitution by the police courts shall be entered. Insist that each woman shall be examined at least twice a week by one of the specialists from the list or by one of the deputy inspectors in one of the dispensaries and that a report of the woman's condition be sent to the Department of Health. So long as she reports regularly and does not solicit upon the streets, *do not molest her.* If she does not report for examination or is guilty of a misdemeanor, arrest her. Should a woman so inscribed be found to be diseased, send her to that hospital in whose district she lives. Should she be arrested and found diseased send her not to the workhouse, but to one of the city hospitals on Blackwell's Island until cured.

It has been claimed that it is often impossible to cure venereal patients particularly the women. *That is not so.* Difficult, yes, very difficult it may be; but impossible, no!

But all supervision should not be restricted to the female. As she is, however, the most active spreader of venereal diseases—a statement which is readily capable of proof—the greater attention should be paid to her. And those females who practice prostitution and are found to be venereally diseased should, if they will not voluntarily subject themselves to treatment and abstain from prostitution till cured, *be confined until cured.* I say this because I feel confident that only a small part of the public prostitutes will abstain from this traffic while diseased. The clandestine prostitutes will more generally make use of the facilities of gratuitous examination and treatment.

I have found that the *large majority* of venereally infected men will avail themselves of facilities for gratuitous treatment and will abstain from intercourse while infected, if the dangers of the disease to them and to others are explained to them.

Every dispensary or hospital treating venereal patients should distribute leaflets free of charge, setting forth clearly and in as simple a language as possible the dangers of indiscriminate intercourse and the dangers of venereal disease.

Some day our legislators may be sufficiently enlightened to pass laws which will enable us to examine convicted male vagrants and to subject the venereally diseased among these to treatment also.

Sixth, segregation: I believe in the segregation of the prostitute in so far as may be possible. I believe that the present method of total absence of control has been largely responsible for the great increase in recent years of flagrant solicitation, both by night and by day, upon every prominent street of our city. The saddest commentary upon the futility of our present methods is perhaps the increase in the number of young girls, many of them apparently just entering upon their teens, who may be seen with painted faces by day or night brazenly soliciting upon our streets. It is the consensus of opinion among those who have had any experience with venereal diseases that it is just these younger of the prostitutes who are responsible for the greater transmission of venereal diseases. They are hardest to reach unless arrested for solicitation or prostitution.

I believe that there should be specified certain limits within which prostitutes might live, unmolested by the police, so long as they keep off of the streets, commit no breach of the peace and are not infected with venereal disease. I am not in favor of casernation or the confinement of prostitutes to certain tolerated brothels, since such a procedure leads to their more easy and general exploitation by the keepers of these houses and their hangers-on, the cadets, pimps, etc. I believe, rather, that no house or apartment of prostitution should be permitted to permanently house more than the keeper and one servant; all others making use of one of these brothels *should be compelled to reside outside of the brothel.*

Permit no liquors to be sold or served in any house in which prostitution is practiced and punish severely infractions of this regulation.

Let the police keep a register of all such houses or apartments; put their keepers under bonds to carry out the regulations of the police and the Health Departments; but give them the as-

surance that any complaints which they or the frequenters of these places may have to make will be given a fair hearing.

Strictly enforce the Tenement House Law, except in those cases where a landlord or owner of a certain house may agree to rent apartments in that particular house to prostitutes only and not to individuals with children.

It has ever been and ever will be an utter impossibility to reach every prostitute or every source of venereal infection; but it has always seemed to me that to ignore the *known sources* simply because we cannot reach all is an evidence of short-sightedness. The Page law was, I honestly believe, a step in the right direction, even though it was not perfect. That it was not given a fair trial I also believe. The opponents of this law have, I believe, set back the possibilities of the sanitary control of prostitution and venereal diseases by many years. I hope that if the law should be amended the changes may be such as not absolutely to emasculate it.

That we shall be forced to adopt some method of control I feel sure. I trust they may be adopted before the Great Black Plague has done irremediable damage.

PATHOLOGY: Leo Buerger, M.D.

Concerning Cystitis Cystica, *O. Stoerk.* (Ueber Cystitis, Pyelitis, Ureteritis und Urethritis cystica. *Beitraege zur pathol. Anat. u. z. allge. Path.* 1911, vol 51, p 361).

In a comprehensive paper based upon anatomical and experimental studies, Stoerk discusses the theories of cyst formation in the bladder, ureter, and pelvis of the kidney. The so-called Limbeck-Brunn's epithelial nests are the seat of the cystic process. They may be found throughout the urinary tract either in the form of totally sequestrated inclusions of epithelium or as sprouts in continuity with the surface epithelium. The author believes that the genesis of these bodies may be explained in the following way. In consequence of destructive changes in the mucosa and submucosa, there occurs a reparatory connective tissue growth, rich in the formation of new vessels. By virtue of the persistence of the increased vascularity of the tissue, an over-production of epithelial elements ensues which manifests itself in the elaboration

of the above mentioned nests and sprouts. The nests that have lost their connection with the surface epithelium, have been separated by reason of impoverished nourishment of the binding isthmus, coupled with the tearing influences of muscle contraction such as are so likely to occur in the bladder.

The cysts according to Stoerk arise from the solid cell nests and not from predestined cell-inclusions. As for the manner in which the lumina of the cysts develop the author's view is at variance with most of the other writers who speak of degeneration and fluidification of the central cells. Stoerk holds that the process is secretory and not degenerative. Because of the chronic hyperaemia and excessive nourishment induced by the new formed capillaries, the epithelial cells takes on a secretory function, a metamorphosis that is analogous to the appearance of secreting cylindrical cells in papillary cystitis.

Renal Neoplasms in Tuberous Sclerosis of the Brain. *W. Fischer:* Die Nierentumoren bei der tuberoesen Hirnsklerose (*Beitraege Zur pathol. Anat. u. z. allge. Path.* 1911, p. 235).

From a study of the autopsies of six cases of so-called tuberous (hypertrophic) sclerosis of the brain—(a disease in which the cerebral hemispheres are studded with hard nodules of glia tissue) and from a review of the literature the author arrives at the following conclusions.

1. Lesions of the kidneys, in the form of anomalies or tumors are practically always present.

2. In most cases there are multiple tumors, usually of the mixed variety, made up of smooth muscle, adipose tissue, vessels and sometimes of kidney parenchyma.

3. These neoplasms are benign and usually give no clinical symptoms.

Review of Current Urologic Literature

Case of Retention of Urine. George W. Bury, (*Lancet* Mar. 4, 1911) reports the following case on account of (1) the extremely large quantity of urine retained in the bladder without rupture; and (2) the rapid recovery of vesical tonus after such an enormous distension.

The patient, a married woman, aged 37 was admitted to hospital with the following history. She had apparently been quite

well until 14 days previous to admission, when she complained of severe dragging pains in the lower part of the abdomen, accompanied by nausea and vomiting. She noticed also that she had some difficulty of micturition, but passed a normal quantity of urine. She recovered in 24 hours and was able to do housework. Eleven days later the pain recurred and was very severe, and she had great difficulty in passing urine, and then only a very small quantity. She also noticed that the abdomen was getting larger and on this account called in a medical man, who ordered her to hospital.

Upon admission to hospital the patient was in a comatose condition; pupils contracted, equal and reacted to light. She moved slightly on being spoken to loudly, but did not understand, and was very irritable on being moved. Breath very offensive; skin cold and clammy; pulse feeble and thready, rate 138; temperature subnormal; respirations shallow and sighing.

Upon inspection of the abdomen a large tumour was seen completely filling the hypogastric and umbilical areas, being rather more prominent on the right side. The limits of the tumour were well defined and it was arising from the pelvis. On palpation the tumour was quite hard. The upper level lay midway between the umbilicus and sternum, 1½ inches to the right of the middle line; the tumour was slightly moveable, but no fluid thrill obtained. The tumour was dull to percussion; the flanks of the abdomen and the side of the pelvis were quite resonant. Vaginal examination revealed a lax vagina from old ruptured perineum not repaired. The arch of the pelvis was distinctly felt, no bladder seeming to intervene. Just within the reach of the finger was a mass pressing anteriorly which felt like a soft cervix, but difficult to make out with certainty. The vaginal vault was capacious, and occupying the pouch of Douglas was a hard mass with definite limits and probably connected with the uterus. Per rectum, about two inches from the sphincter, there was a large tumour, palpable, hard but resilient, slightly moveable, which lay in the hollow of the sacrum. It was possible to feel the sacral promontory above the tumour, and the tumour was completely incarcerated in the pelvis, and was probably a retroflexed gravid uterus. This tumour was quite distinct from the abdominal tumour.

A catheter was passed with difficulty, the urethra being lengthened. A stream of uterine began to flow under very high pressure. This was quite clear and not offensive; 166 ounces were

withdrawn. Urine was of specific gravity 1030, acid; no albumin, sugar, or pus. On examining the abdomen the original tumour had quite disappeared. An attempt was made to reduce the pelvic tumour, but this was impossible. An anæsthetic was administered, and with two fingers in the rectum the uterus was replaced above the promontory, and now lay at the level of the umbilicus. A Smith-Hodge pessary was inserted.

The uræmia was now treated by saline infusion, injection of digitalin, calomel, and warmth applied to the skin. A catheter was placed four-hourly, and at first passage 56 ounces of urine were withdrawn. The general condition gradually improved; bowels acted, patient perspired freely, and consciousness returned, though some delirium was present. Forty-eight hours after admission she passed urine normally and became quite conscious. On examination of the abdomen a pregnant uterus was palpable at the level of the umbilicus; nothing else abnormal. Seven days after admission the patient was out of bed, feeling quite well and wearing the Hodge pessary, which kept the uretus in normal position. She had no trouble or difficulty with micturition and the urine was normal in quantity and in every other way. She was discharged quite cured 14 days after admission and advised to wear the pessary for at least two months.

The Prevalent Misuse of the Prostate in Gonorrhea.—Hermann G. Klotz (*N. Y. Med. Journal*, April 22, 1911) says that soon after gonorrhea began to receive more careful attention from the medical profession more or less general experience has pointed to the fact that in a large proportion of cases of posterior urethritis the prostate gland shared the infection. Statistics of the frequency of these conditions from various authors exhibit considerable differences, but unmistakably show a large increase over older reports. This increase has received varying interpretations. Some authors have attributed it entirely to the better examination and observation of the patients by their physicians, while others insist on the actually increased frequency of the cases, and have been inclined to hold directly responsible for the same certain methods of treatment, particularly the direct irrigation of the urethra and bladder under high pressure. To normal men the rectal examination of the prostate in itself is not an agreable procedure, not on account of pain which occasionally is not entirely avoidable. It is not denied that prostatic massage in certain conditions brings relief of various path-

ological sensations and incidentally confers a restitution or improvement of the general feeling of the patient. Massage, however, should be carried out always under control of microscopic examinations and should not be continued too long or repeated too frequently. In this connection Klotz remarks:

"There is no rule or gauge for measuring the force which may be safely applied to the massage of the prostate; so one may use sufficient pressure to squeeze some fluid out of the driest prostate and will consider the appearance of any secretion as sufficient evidence of a pathological condition and as a sufficient excuse for an indefinite course of massage treatment. I cannot convince myself that it is contributive to the welfare of the prostate to be squeezed regularly with more or less energy, the more so as it is generally considered as the seat of various nervous symptoms which constitute or form part of that complex of symptoms usually described as sexual neurasthenia. Indeed, I firmly believe from actual observations of patients that unnecessary massage of the prostate, even if not too severe, is liable to produce a more or less intense and lasting irritation of that gland sometimes with considerable pain and followed by those neurasthenic symptoms, whether the individual has been infected with gonorrhea or not. In the former instance the patients are exposed to another danger, namely, that the prostate in consequence of its treatment may actually be infected with gonococci which might be present in the posterior urethra without so far having entered the prostatic ducts themselves. It is obvious that an organ of the structure of the prostate, surrounded by a rather resistant capsule, when compressed by some force from the outside, will have the tendency to assume its former shape and volume as soon as the pressure ceases to act."

A Recent Series of 200 Cases of Total Enucleation of the Prostate. P. J. Freyer (*Lancet* April 8, 1911) says: "In a lecture delivered by me at the Medical Graduates' College and Polyclinic on March 17th, 1909, and published in *The Lancet* of May 1st of the same year, entitled 'When to Operate for Enlarged Prostate,' I reviewed 600 cases of my operation of total enucleation of the prostate for radical cure of enlargement of that organ. I have now completed a further series of 200 cases of this operation, the results of which I propose placing before the profession in the present paper, at the same time, by means of illustrative cases given in detail, directing attention to many in-

teresting important, and, indeed, remarkable, features connected with the operation.

These 200 patients varied in age from 52 to 87 years, the average age being 69½ years. There were 11 octogenarians amongst them. The weight of the prostates varied from ½ to 16 oz. In the great majority the patients were entirely dependent on the catheter for periods varying up to 18 years. Most of them came in broken health, few were free from serious complications, and many were almost moribund at the time of operation. Indeed, in the majority of cases the patients have come under my care for operation when their condition under catheter life had become so wretched as to render life unbearable.

In connection with these 200 operations there were nine deaths, or 4.5 per cent, the causes of death being as follows:—

1. Five died from *uræmia;* in two of which, aged 59 and 71 years respectively, necropsy revealed extensive pyelonephritis; in two, aged 76 and 83 years, necropsy showed long-standing backward pressure changes (aseptic) leading to almost complete absence of secreting tissue in the kidneys, only a thin layer of cortex remaining; and in one, aged 73, the patient was suffering from an extreme form of paralysis agitans.

2. Two died from *exhaustion.* In one of these, in which death occurred 13 days after the operation, there were almost daily rigors with high temperature, though the bladder was clean; no doubt the kidneys were pyelonephritic, though no necropsy was obtained; the other, aged 87 years, had been confined to bed for six weeks from pneumonia immediately previous to operation.

3. One, aged 74 years, a very stout patient who was suffering from severe cystitis, chronic asthma and bronchial catarrh with dilated heart, succumbed from bronchitis 22 days after operation. Spinal anæsthesia was tried in this case but failed, and general anæsthesia had to be employed, which, no doubt, was responsible for the fatal bronchitis.

4. In one case, aged 78 years, double vasectomy and subsequently castration had been performed by another surgeon several years before, without any benefit to the prostatic symptoms. For two years before coming under my care he had passed his urine through a suprapubic fistula established for this purpose. The apparatus fitted badly, owing to the bladder being filled by the enormous prostate, causing great pain and frequent hæmorrhage, and urine constantly leaked beside the tube. Altogether

the patient was in an extremely wretched condition, and begged to be relieved of his prostate at any risk. The prostate, which weighed 11 oz., was easily enucleated, but the patient succumbed to *shock* in eight hours.

It will be observed that in one and all of these nine cases in which death supervened on the operation the patient was afflicted with one or more grave complications which must have proved fatal after much suffering. In no case did death ensue where the vital organs were sound at the time of operation. Had the cases been selected, therefore, the mortality would have been *nil*. But, as will have been gathered from the cases described in this paper and numerous others of similar gravity could have been given—selection would have condemned most of them to a painful death after more or less prolonged suffering, instead of the complete restoration to health that ensued in each case from operation. It is, of course, impossible to avoid a certain mortality when such cases are operated on; the wonder is that it is so small considering the magnitude of the operation and the age and condition of the patients. But to refrain from operating in such cases, when there is any prospect of success, is, to my mind, utterly unjustifiable."

Report of a Case of Congenital Cystic Degeneration of the Kidney. H. Brooker Mills (*Med. Record*, April 15, 1911) reports the following case: J. B., aged 14 months, was admitted to the wards of the Medico-Chirurgical Hospital on June 28, 1910, in the service of Professor Hollopeter through the out-patient department. The family and previous history of the patient was negative, and apparently the only abnormal condition present was an enormous growth on the left side of the abdomen, which the mother stated had commenced seven months before, when the child was seven months old, and had been steadily progressing.

Three blood examinations were made, the first on July 7, showing reds 6,200,000, whites 11,800, and hemoglobin 70 per cent. Five days later the reds had dropped to 4,220,000, while the leucocytes had increased to 14,600, and the hemoglobin to 75 per cent. Six days later the reds had increased to 4,600,000 and the leucocytes to 17,600, while the hemoglobin had dropped to 70 per cent. The analysis of a catheterized specimen of urine showed a small ring of albumin, no sugar or indican, and microscopically narrow and broad hyaline casts, and a coarse, granular cast, with a few urates, leucocytes, and epithelial cells. Photo-

graphs were taken by Dr. George E. Pfahler, radiologist to the Medico-Chirurgical Hospital, but, except for making certain that the growth was not an enlargement of the spleen, as had been suspected, the photographs were negative.

After remaining in the hospital three weeks the child was operated upon by Prof. William L. Rodman, assisted by Drs. J. Stewart Rodman and Stillwell C. Burns, for removal of the growth. A section of the specimen removed was examined in the pathological laboratory, and the pathologist's report proved it to be a case of congenital cystic degeneration of the kidney. Convalescence was uneventual, and the child was discharged from the hospital one month after the operation, at which time it was in good condition. It is interesting to note the variations in the blood examinations, the reds almost uniformly diminishing, the whites rapidly increasing, and the hemoglobin remaining about stationary.

In addition to the rarity of this disease, two other points are important to notice: First, the uniformly unfavorable prognosis of all cases as claimed by most writers on the subject, either with or without operation, and, second, the difficulty in making a positive diagnosis before operation. At least a half dozen competent men examined this case, and we were aided also by the photographs taken by Pfahler, as well as the blood reports, uranalyses, etc., but, in spite of these aids, the real condition remained undiagnosed. The three conditions suggested as being the probable cause of the trouble were enlarged spleen, hypernephroma, and sarcoma of the kidneys, all of which proved to be incorrect.

Genital Tuberculosis.—J. R. Goffe, New York (*J. A. M. A.*, October 15), says that genital tuberculosis may be either primary or secondary, understanding by primary that the focus in the genital organs may be the primary seat of invasion. This has been denied by some authorities, but cases have been brought to light in which the only lesions found are confined to the cervix, vagina or uterus. He does not think that infection by coition with tuberculous men is probable without the ground being prepared by gonorrhea or the puerperal condition. The possibility of infection by street dust swept up by the clothing is suggested. Tuberculous invasion of the tubes and ovaries may precede that of the peritoneum, be simultaneous with it, or follow it. Direct primary tuberculosis through infection by the blood is believed to be very rare. It

occurs more frequently by contiguity, secondary to tuberculosis of the lymphatic system, or bowel ulcer, or by continuity from the Fallopian tubes. It is desirable, to say the least, that the accurate diagnosis of tuberculosis should be made before operation, but, with all precautions, the surgeons may sometimes be surprised by conditions found in the abdomen. When he recognizes that he is in the presence of tuberculosis the situation becomes clear when he recalls the fact that there is but one basic lesion of which the case in hand is one of the stages. Nature is ever waging its war of resistance, though her defense may be overwhelmed at once, as in cases of ulceration, perforation, cheesy degeneration and mixed infection with resulting hectic fever. On the other hand, we may have disseminated miliary tubercles with abundant ascites, the exudate indicating a protective process due to irritation of the unaffected peritoneum. If the patient gets the advantage we have an obliterative peritonitis resulting in fibrous or cobweb adhesions. In a case in which the infection is from contiguous organs, we find an ulcerative or cheesy form of growth accompanied by fibrous nodules, cicatrizing ulcers or masses of plastice exudate, here and there forming bands of fibrous tissue. These adhesions and bands may form sacculated pseudocysts, filled with tuberculous débris and possibly pus, indicating a mixed infection. The omentum may be matted together by an extension of the process. The surgeon should be prepared to meet any of these conditions. In the first or ascitic type the serum should be evacuated and the wound closed without drainage. These are the cases in which the patients recover so mysteriously and permanently and are usually cases of general miliary tuberculosis. If a definite focus is discovered in the tubes its removal is desirable, but if long buried in protecting adhesions it should not be disturbed. In the second or adhesive class, if the exudate is general and a tendency to organize into adhesive bands is apparent, it should be let alone unless a distinct focus can be easily reached and removed. This should depend on the general condition of the patient. The wound should be closed without drainage. In the third class of cheesy deposits any very radical surgery is inadvisable. Adhesions that presumably shut in intestinal ulceration should be carefully preserved, but collections of débris and pus should be carefully cleansed, and the cavity drained with cigarette drains of guttapercha tissue. Gauze drains should be proscribed. Goffe concludes his paper with reports of seven

cases occurring in his practice and illustrating the points made in the article.

Bilateral Nephrolithiasis; Left Nephrolithotomy. By L. Bolton Bangs (*Medical Record*, March 23, 1911) reports the following case: The patient is a male 44 years of age, of exemplary habits, never having used tobacco nor alcohol. Since his seventeenth year he had had attacks of what he called "irritation" of his urinary organs, compelling him to urinate frequently and causing with each act a stinging sensation at the head of the penis. With the exception of occasional intermissions of a few months at a time, these attacks have persisted up to the present. At 29 years of age he had the first real attack of renal colic. This was on the left side, the duration of the attack being thirty-six hours, when he voided with the urine a small calculus. There was no vomiting nor any perceptible blood in the urine at that time. Four years later he had a similar attack in the left side and again a stone was found. In December, 1908, he had a similar attack, but this time it was on the right side. No stone was found in the urine; he was ill for several days and confined to his home for three or four weeks with fever, soreness in the right side of the body, and generally disability. After this attack he did not fully regain his health for three or four months. For a period of about ten years he had, at times, found in his urine white granular material. In the latter part of 1909 he had, at intervals, a slight, dull pain in the region of the kidneys, more noticeable on the right side. This was considered to be "neuralgic," and he paid no attention to it. In January, 1910, at the end of an act of urination, vesical tenesmus took place, which forced out a small quantity of pus stained with blood. During the first half of 1910 he had attacks of fever, with a temperature rising to 100° or 101° F. During the latter part of the year, although there was no rise of temperature, he had a quick pulse and was not equal to the demands of his business, becoming easily tired and experiencing pain in the back on being jolted when riding in a motor boat or in the cars, or even when walking. At no time has there been any free blood in his urine.

The urine voided at his first visit was loaded with mucopurulent shreds, had a mawkish odor, and its examination showed the following: Color, amber; sp. gr., 10/20 acid; trace of albumin; mucus, moderate large amount; red blood cells, small amount; no casts; epithelia, a few pavement and cuboid; crystals, a few calcium oxalate. The patient is large and corpulent, weighing 210

pounds, and it was impossible to palpate his kidneys. The radiographs, which were made by Dr. Cole, show a stone in each kidney. The left kidney is somewhat enlarged, the stone occupying a large area in the tissue of the organ. Subsequently the ureters were catheterized, and the urine was drawn from each kidney with the following findings: Right Kidney.—Color, red; odor, not offensive; sp. gr., 1019, acid; albumin, present $\frac{1}{4}$ per mille; urea, 1.92 per cent.; blood, small amount; pus, large amount; casts, few hyaline; bacteria, slight bacteriuria; epithelia, numerous, probably from renal pelvis. Left Kidney.—Color, amber; odor, not offensive; sp. gr. 1010, acid; albumin, marked trace, 1.11 per cent; blood numerous cells; pus, moderate amount; casts, very few hyaline; bacteria, slight bacteriuria; epithelia, numerous cells, probably from renal pelvis.

A nephrolithotomy of the left side was done on December 20. The kidney was found to be enlarged, its superior pole adherent to the pillar of the diaphragm, and numerous adhesions held it so firmly in its bed that it was impossible to dislodge it onto the loin. Consequently an incision was made in the cortex of the kidney and the stone separated from its bed with rapid sweeps of the finger. The kidney was at the bottom of a deep hole, which made the extraction of the stone difficult, and it was broken into three fragments. Before the stone was removed the surfaces of the wound were protected by layers of sterile gauze, but with the stone there came a little flow of purulent urine which had a perceptible ammoniacal odor. This was interesting, in view of the fact that the urine obtained by the ureter catheters was odorless. On account of the patient's condition failing, no attempt was made to suture the kidney, its cut surfaces being approximated and held by tampons. He had a rise of temperature of 101.8° F. on the second day, which persisted till the sixth day, after which he did well, but his pulse remained quick, never being less than 98. His physician had reported that the patient had had a quick pulse for several years and that it had ranged from 98 to 120. Primary union of the wound was secured, with the exception of the posterior end, where slight infection had taken place, and where the tampons had rested.

The stone showed concentric whitish deposits around small yellow nuclei. These deposits had probably been taking place for several years, thus preventing the escape through the ureter of the small primary concretions and coalescing to form the large and irregularly shaped stone which I now show you.

THE AMERICAN JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII AUGUST, 1911 NO. 8

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

THE PRIMARY MALIGNANT NEOPLASMS OF THE SPERMATIC CORD.

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THE writer feels that the rarity and diagnostic difficulties of the following case warrant its publication and also a brief general discussion of the subject of the primary malignant tumors of the spermatic cord.

Michael H.,* age 77 years, admitted to Dr. Kammerer's service in the German Hospital, September 20, 1909.

His family history is negative and he denies venereal infection. For a year he has had occasional pain in the right testis. For four weeks he has noticed a swelling in this region. There has been no loss of weight or strength. There are no urinary symptoms.

Examination shows a fairly well-nourished, elderly man. He has a moderate emphysema, with an occasional sibilant and sonorous rale over various parts of his chest. His heart and his abdomen are negative.

In the right scrotum is a hard, nodular, slightly sensitive swelling, somewhat elongated, irregularly ovoid in shape and measuring about 3x3x5 centimeters, the longest diameter running parallel to the cord. The swelling corresponds apparently to the upper part of the epididymis and seems to extend somewhat up the cord. The testis is normal, as is the remainder of the vas deferens. There is no hydrocele. The skin is free. The prostate and seminal vesicles are normal to the touch. The inguinal glands are not enlarged. There are 40 cubic centimeters of residual urine. There is a small nodule the size of a hazel-nut

* Patient presented at the Section on Genito-Urinary Diseases, New York Academy of Medicine, January 19, 1910.

in the left side of the perineum, of the same consistence as the scrotal tumor and to which the skin is attached.

Although the globus minor of the epididymis was free, the Calmette reaction was negative and the age of the patient was against the diagnosis, the case impressed one as a tuberculous epididymitis and an exploratory operation was performed by the author on September 23, 1909.

The mass was exposed and strange to say found to consist of an isolated tumor of the spermatic cord, just above but entirely outside of the tunica vaginalis. The testis, epididymis and vas were absolutely free. The tumor was incised, seen macroscopically to be malignant, and a castration done in the usual manner. The nodule in the perineum was also excised.

Fig. 1. Primary sarcoma of the spermatic cord. Testis, epididymis and tunica vaginalis are incised and uninvolved. Hydatid of Morgagni is also free.

The tumor apparently develops from the areolar tissue of the cord, as can be seen from the photographic reproduction of the specimen (Figure 1). Microscopically it is a very cellular, mixed, small and large spindle-cell sarcoma, as is also the perineal nodule. A nodule higher up in the cord also gives the same histological findings. This latter nodule was apparently a metastasis in one of the spermatic veins. Many of the cells of the tumor show active mitosis and the intercellular connective tissue is rather scant. The tumor is moderately vascular.

On October 4, 1909, a small nodule was noted in the wall of the right lower abdomen, seemingly a thrombus in the right superficial epigastric vein. This was excised under local anaesthesia and found to be a sarcomatous plug in the vein, of the same nature as the primary

tumor. The patient was discharged from the hospital on October 8, 1909, the wounds having healed primarily and no evidence of further recurrence being present.

I again saw the patient in the beginning of January, 1910. He claimed that a few weeks after he left the hospital he noticed a nodule in front of the anus and that other masses rapidly appeared in the pubic and adjacent regions. On examination there was found a large mass involving the perineum and extending into the root of the penis, seemingly infiltrating along the vascular channels of the corpora cavernosa and corpus spongiosum and producing a pseudo priapism without greatly increasing the diameter of the organ. There was a large mass over the left saphenous opening, most probably a metastasis via the superficial external pudic vein. Two smaller nodules were found along the course of the left superficial epigastric vein and one in the left superficial circumflex iliac. He had a slight cough but no signs of fluid or consolidation in the chest. There were occasional moist rales. Abdominal examination was negative.

I subjected the patient to a course of treatment with Coley's fluid, which he stood well. I began with $\frac{1}{4}$ drop and increased the dose gradually to 5 drops every second day. I injected the fluid directly into the tumors. There was a moderate general reaction and the nodules that were injected did really decrease in size. soon, however, a new nodule appeared on the left chest wall; metastases were noted along the vessels of both arms; fluid appeared in both chests; an increasing oedema of the penis, scrotum, and lower extremities, due to actual compression, developed; cachexia became very pronounced and progressive, and the patient died March 5, 1910. No autopsy was obtained.

It had originally been the writer's intention to make a careful research of the literature of this subject and to collect all the cases of this type that have hitherto been reported. Inasmuch, however, as this has been very recently done in two excellent French papers (Tédenat and J. Martin, Tumeurs malignes du cordon spermatique, *Archives générales de chirurgie*, 1908, II. 113; M. Patel and A. Chalier, Les tumeurs du cordon spermatique, *Revue de chirurgie*, 1909, XXXIX, 119, XL, 167), he has abandoned the project as unnecessary, especially as there have been no contributions on the subject since the paper of Patel and Chalier. He has found also that most of the reports in the older literature are so vague clinically and so entirely indefinite pathologically, as

to render them quite unfit for statistical study. The authors, referred to above, have made as careful a study of the question as the material permitted and little could be gained by further investigation.

Of course, it is well-known that testicular tumors may secondarily involve the spermatic cord, but the majority of the surgical and pathological text-books totally ignore or only very casually mention the possibility that malignant neoplasms, and very virulent ones at that, may develop primarily in the cord itself. The importance, so far as diagnosis, treatment and prognosis is concerned, of appreciating this fact is obvious. Naturally these tumors are not a very common occurrence. Tédenat and Martin collected a total of 24 from the literature, including 3 which had not yet been published. Patel and Chalier who have studied the subject much more carefully have found something like 34 fairly authentic cases, although they have rejected a number of the cases of Tédenat and Martin as questionable.

The most common type of malignant tumor of the cord is the sarcoma, which is usually spindle-celled, but may be of the giant-cell variety. Frequently the tumor is of the fibrosarcoma type. Of the 34 cases of Patel and Chalier, 22 were simple sarcomata or fibrosarcomata. It is assumed that they develop from the areolar tissue of the cord. Next in frequency come the so-called mixed tumors of the malignant type. They are presumably of embryonal origin, arising from rests of the Wolffian body or the Muellerian duct or from the vas aberrans of Haller, the paradidymis of Waldeyer or other embryonal organs. Pathologically, the greatest variety of combinations is possible, though mucous tissue is always the basis of the tumor. The following types have been reported: myxosarcoma, myxochondrosarcoma, lipomyxosarcoma, fibromyxosarcoma, myxolipofibrosarcoma and myxochondrofibrosarcoma. In the Patel and Chalier series there were 10 of these malignant mixed tumors. One case of carcinoma has been reported by Tédenat and Vieu. This tumor presumably developed from Wolffian rests. The cells of the tumor were of the cubical or cylindrical type. The case, which stimulated Patel and Chalier to their researches, was a malignant leiomyoma in a boy of 15. It is unique.

Although the malignant tumors of the cord may develop at any time of life, they are most commonly observed in middle-aged or elderly individuals. In about 50% of the cases trauma-

tism seems to have acted as an etiological stimulant. The tumors seem to be most frequently situated on the left side. They vary greatly in size, and may, if not interfered with, reach colossal proportions. They are usually situated in the scrotal part of the cord, but they have also been found in the inguinal portion.

In shape the tumors are generally pyriform and their long axis is parallel to the cord. Their surface is often irregularly nodular and their consistency hard. A complicating hydrocele is quite common. The inguinal glands do not seem to become involved. Extension is usually by contiguity into the scrotum and also along the cord to the iliac fossa. Attention should be again called to the striking venous type of metastases observed in the author's case.

The rapidity of growth is very variable. It may be rapid from the onset or a tumor may be present for years without increasing in size and then suddenly begin to grow with great rapidity. In such a case it must be assumed that a primarily benign tumor has undergone malignant degeneration. This *evolution en deux temps* applies particularly to the mixed tumors.

The malignant tumors of the spermatic cord must be differentiated from the benign variety, of which the lipoma, the fibroma, the myoma and the benign teratoma are the most common forms. The consistency of the neoplasm and its rate of growth usually make this differential diagnosis easy, although it must never be forgotten that the benign growth may at any time become malignant. In the diagnosis of the disease under consideration, the possibility of a secondary involvement of the cord from a primary testicular tumor or tuberculosis must not be overlooked. If there is no marked hydrocele this question offers little difficulty. Finally irreducible epiploceles and tense hydroceles of the cord must be thought of.

The prognosis of these malignant tumors of the cord is very bad. Recurrences, usually local, occur early even after the most radical removal and death follows within a short time. The case of carcinoma was alive 10 years after operation.

Treatment of these cases is necessarily the most radical castration. The cord should be ligated as high as possible in the inguinal canal. As a prophylactic measure all cases of benign tumor of the cord should be operated upon. If the tumor can be enucleated well and good, but if there is any difficulty connected with this procedure one should not hesitate to remove the testicle.

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

UROLOGY—PAST, PRESENT, AND FUTURE.*

By DR. M. KROTOSZYER, San Francisco, Cal.

THE first meeting of the recently formed Section on Urology of the San Francisco County Medical Society marks an epoch in the history of Urology on the Pacific Coast. This occasion—all important and welcome to those of us whose interests and efforts are bent towards this hitherto neglected branch of scientific medicine should not be permitted to pass without a few appropriate remarks upon the past, present and future aspects of Urology.

The history of Urology is best divided into two parts: the pre-cystoscopic and cystoscopic era. The first era produced two distinctly different types of workers in the field of pathologic conditions of the genito-urinary tract. The one group of great clinical surgeons, who owing to the material at their hands or on account of an individual inclination devoted their rare gifts of observational genius and technical skill to the study and treatment of diseases of the urinary tract—men like, Thompson of London, Dittl of Vienna, Guyon of Paris, and many others: the other group comprising the so-called genito-urinary specialists, who treated venereal and in most instances skin-diseases and performed the minor surgery pertaining to the lower male genito-urinary tract. While the genito-urinary and skin—or as he was shorter and less respectfully dubbed—clap-specialist did not rank highest in the estimation of the profession at large, nevertheless it must not be forgotten that one of their rank and file, Albert Neisser, discovered and first described the gonococcus. Through this discovery the impetus was given to the present scientific conception of the pathology and treatment of gonorrhea, its various complications and sequels and this pathological condition formerly considered a negligible quantity was quickly raised to a respectable position in medical nomenclature.

Many and noteworthy were the advances in urological surgery during the precystoscopic era. Time and space however permit to point to but a few of the most prominent facts. The Frenchman, Civiale, gave us the Lithotrite and with the discovery of the lithotritic aspirator by the American Bigelow begins

*Chairman's address delivered at the first meeting of the Section on Urology of the San Francisco County Medical Society.

the era of modern Litholopaxy, an operation in which our own Chismore excelled. Gustav Simon of Heilelberg planned and successfully carried out the removal of a kidney, an organ, without which continuance of life was considered impossible up to that time. The urine of the left kidney of a middle-aged woman was secreted through an incurable uretero-uterine and uretero-abdominal fistula, while the bladder-urine, representing the secretion of the right kidney, was found to be normal. By these means Simon was enabled to ascertain two facts, which in the present cystoscopic era are considered indispensable prerequisites to a contemplated Nephrectomy viz: the presence of two kidneys and the integrity of the remaining organ. Simon's first Nephrectomy was successful, the patient making an uneventful recovery; the patient in whom he, two years later, performed his second Nephrectomy without the knowledge of the condition of the remaining kidney died 21 days after the operation from "pyaemia" according to the official record, but most probably from deficient function of the remaining kidney.

While in precystoscopic times great clinicians studied and clearly described urological lesions, while a few great surgeons exerted their rare technical skill towards the treatment of disorders of the urinary tract, while men like Thompson and Guyon created famous urological centers at St. Peter's Hospital in London and the Hôpital Necker in Paris, where an international audience of physicians sat at their feet listening to their classical lectures on matters urological, nevertheless, it is true, that Urology as a science *per se* exists only since its fundaments of diagnosis and treatment were created by Cystoscopy. Up to the advent of the Cystoscope we possessed a number of famous and gifted genito-urinary surgeons, who by their superior intuition, their enormous experience and individual skill were able to recognize and successfully treat lesions of the urinary tract, that remained a *noli me tangere* to the average medical man. What narcosis and asepsis have done towards advancing and popularizing general surgery, Cystoscopy has accomplished for Urology. From the hands of a few gifted observers and born technicians Urology has come within reach of every honest practitioner who is willing to devote his time and energies to the technique and scientific study of this special field of medicine.

Great and revolutionizing were the changes in the conception and treatment of urological lesions since Nitze presented his first

Cystoscope. Hypothetical or theoretical views, to which in pre-cystoscopic times clinicians adhered for want of better or exact means of interpreting urinary symptoms, were replaced by a real diagnosis. Our views upon the inflammatory conditions of the bladder and the upper urinary tract, upon the cause of pains and the sources or hemorrhage were radically changed. Cystoscopy and its logical sequel, ureteral catheterization, enabled us to localize the focus of an existing distressing pyuria an to devise its proper and effective treatment. The speculative and in most instances fallacious teachings upon the topical diagnosis hematuira were replaced by the exact recognition of the bleeding focus Casper and Richter's work on kidney-function did not only enable us to diagnose obscure renal lesions in their incipiency, but also proved most valuable for the diagnosis of abdominal lesions in general. The differential diagnosis of gall—and kidney-stones and appendicitis on one side and spleen—and kidney-tumor on the other, of retroperitoneal, perityphlitic and perinephritic abscesses and other obscure intra-abdominal lesions is materially aided and in many instances made feasible only by means of our modern urological diagnostic methods. Our views upon the pathology and treatment of tuberculosis of the genito-urinary tract have been revolutionized. Renal surgery has profited immensely through modern urological diagnostic means and the mortality of Nephrectomy alone has been reduced from about 40 to less than 5%. Kümmell for instance lost in precystoscopic times 3 out of 12 cases against 4 of 106 nephrectomies for tuberculosis at the present time and his death-rate of the same operation for aseptic stone-kidney has fallen to less than 3%.

The ranks of those physicians, who still consider cystoscopy and the newer diagnostic urological methods superfluous, too painful and often dangerous are gradually thinning out. Nevertheless, it is true, that cystoscopy is only slowly gaining ground and that the opinion is prevailing among the profession, that the method is unusually difficult of execution and unsafe as regards practical results. If properly executed, though, Cystoscopy and ureteral catherization are almost painless procedures and I venture the contention that every well-trained physician possesses the moderate dexterity required for the execution of an ordinary cystoscopic examination. It is, as I know from personal experience, a method that can easily be learned and no student of medicine should be permitted to enter upon his practical career without

at least a superficial knowledge of the modern urologic diagnostic methods which furnish the key to the correct interpretation of many gynecologic, neurologic and abdominal lesions. A note of warning on the other hand, must be sounded against the opinion prevailing in many minds, that the possession of a cystoscope is coincident with the correct interpretation of intravesical pictures or that it entitles its injudicious owner to apply, for instance, to a contracted tubercular bladder. The cystoscopic tyro is responsible for the mistrust still extant in a large and justly conservative portion of the profession towards a method that, only if properly used, represents a veritable diagnostic and therapeutic boon to physician and patient alike.

The remedy for this evil lies in the hands of our medical under-graduate colleges, who gradually are awakening towards recognizing the importance of competent instruction in modern Urology, which must be accomplished in spite of the overcrowded curriculum of clinical semesters. For the fate and welfare of the sufferer from urinary disturbances lies as ever in the hands of the family physician or general practitioner who sees the patient first-hand. While it would be absurd to expect the average practitioner to be possessed of special knowledge and skill in the various branches of the medical art and science, he must, nevertheless, be familiar with the important points, the possibilities and limitations, the indications, and contraindications, in fact, the actual and practical value of certain special methods which to-day are required for establishing an exact diagnosis. The specialist should not rank higher than the general practitioner; the latter should possess an equally large fund of knowledge as regards the fundamentals and principles of special methods of diagnosis and treatment, and the former on account of his constant occupation with and large experience in a special field should in the more difficult cases lend the aid of his better trained aye and hand.

Urology as a specialty is still in statu nascendi and does not yet occupy the secure position that other well established specialties hold. While it must be conceded that many general surgeons or internists possess the knowledge and skill required for urological work, nevertheless, modern Urology has grown to be an independent field for research and teaching with an immense and steadily growing literature, which can only be absorbed by the one who devotes his life to the study of this special branch. In accordance with a tendency prevailing in other specialties (Gynecology,

Ophthalmology, etc.) that all pathological conditions of certain organs or regions, internal as well as surgical ones, should fall into the hands of the various specialties. Urology embraces the diagnosis and treatment of all lesions of the urinary tract. The surgery of the urethra and bladder as well as that of the ureters and kidneys must be mastered by the modern Urologist who at the same time should have exhausted all means of conservative treatment before resorting to radical measures. The modern Urologist must be well versed in general pathology, bacteriology, radiology and other auxiliary sciences in order to be enabled to correctly interpret many of the more intricate lesions of the urinary tract. He must know the relationship of the urinary tract to the general system and thus avoid becoming a one-sided specialist. The dignity of the urological specialist and his ultimate and lasting success depend therefore mainly upon a liberal training in general medicine.

With Urology is intimately connected the study of the pathology and treatment of the male genital organs, the prostate, testicles, urethra, etc. and so-called Andrology is and in all probability always will remain an essential part of the specialty.

Most of our present-day Urologists entered into the specialty either from general medicine or surgery and on account of their individual inclinations and preliminary training gravitate more or less either towards the internal or the surgical side of the specialty; the future, though, will demand an equally thorough training in all its diagnostic and therapeutic methods. The future Urologist will obtain his special education at urological clinics or hospitals, which will spring up in all parts of the civilized world. Especially all teaching Hospitals will soon possess well equipped urological services, which will furnish the teaching material to the chair of clinical Urology.

Urology is a border-line specialty; it draws from all sides to accomplish its ends and on the other hand entertains many ties of mutual interest and information with the other specialties as well as with general medicine. The deliberations and discussions of this section should be therefore useful and elevating to every member of the Mother-Society. The future of scientific Urology in the West and the success of this section depend not so much upon the efforts and enthusiasm of the few who are more or less specializing in this field, as upon the coöperation and continued support of the profession at large.

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Contributed by the Author to The American Journal of Urology.

COMPLETE SUTURING OF THE BLADDER AFTER SUPRAPUBIC SECTION*

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THE history of complete suture of the bladder after suprapubic incision is rather instructive. In this history we may distinguish three distinct periods. In the first period any attempt at completely suturing the bladder was considered a mistake of art. In the second period the complete closing of the bladder was admitted to be a desirable goal, but the causes of the failures were not properly recognized; all the stress was laid on the choice of the suture material and on the method of suturing employed, hence all the devices of figure-of-eight sutures, pursestring sutures, flap suturing and finally Rydygier's proposition of using the conglutinating power of the peritoneum as a guarantee of success in bladder suture. Then came the third period of evolution, in which two principles were recognized: first that the complete closing of the bladder after suprapubic operation is almost always desirable, and secondly that the success of the suture in bladder work is dependent on the same conditions that rule plastic work in surgery of other parts.

The medical historian may again in this field of work experience a striking observation, namely, how long it always took, and it seems always will take, before sound general principles are applied to bladder surgery.

The gynecologists in their work on vesicovaginal fistulas were a long time aware of the conditions of success in closing bladder defects and acted accordingly, while the surgeons working on the male bladder were still groping in the dark and were experimenting, the latter quite often along wrong lines.

The gynecologists knew for a long time that there are two fundamental factors governing the success of bladder suture; first the prevention of all tension, and second the bringing in apposition of rather broad raw surfaces without any interposition of vesical mucosa. At the same time their experience proved that the choice of the suturing material is of no importance: it is the way the sutures are set, and not the material that counts in results. It also became evident that the existence of a cystitis is a negligible quantity. There is hardly a case of vesico-vaginal

* Read before a joint meeting of the Chicago Urological and Chicago Medical Societies, Jan. 14, 1911.—Il. Med. Jour., June.

fistula operated on that does not present some inflammation of the bladder.

In spite of all, the suturing of the bladder after suprapubic incisions was and still is, in some quarters done by general surgeons in a nonsystematic way, and the presence of a cystitis was also a strict contraindication against total closing of the bladder. Another error in this direction was that after complete suturing of the bladder the muscles and the skin were closed up. It was thought sufficient to insert some drainage in order to prevent all trouble in case some infection should have occurred. But we must allow that our means of drainage may fail to thoroughly drain, and furthermore that in case of infection the subsequent infiltration and swelling of the involved tissues prevent the drainage where it is most needed, and that drainage anyhow, can only remove exudations in liquid form, but does not prevent the most disastrous local consequences of a violent infection, that is, great tension and subsequent necrobiosis of the tissues involved. Another point is this: in a case of failure of the bladder suture for some reason there is no assurance that the inserted drain will be in communication with the leakage and consequently urinary infiltration may occur at a point not reached by our drain.

The demands on a method of complete suturing of the bladder can be formulated as follows: the suturing of the bladder incision has to be done in such a way as to give the best possible chances for a primary union and the best possible guaranty against leakage; the structures forming the abdominal wall must be handled by a method that will prevent all disastrous sequelæ of urinary infiltration or infection occurring during or after the operation; and finally this method must permit a quick reunion of the cleft in the abdominal wall after the above-mentioned dangers are once excluded.

In order to bring broad raw surfaces together, and these only without any interpolation of the vesical mucosa, the mucosa is detached by means of a poker or a knife handle for a few millimeters from the rest of the bladder wall. The sutures are now inserted in such a way that the raw surfaces of the lips of the bladder incision are drawn together while the detached edges of the mucosa protrude like a small ridge into the bladder lumen. It is preferable to begin with the suturing at the lower end of the incision and to use interrupted sutures, because in this way it is easier to get the proper apposition. This suture line is followed

by a running suture drawing some more muscularis over the first closure, so as to prevent any leakage. This second suture line starts and ends beyond the poles of the first suture line. As material, catgut should be used so as to prevent any immigration of sutures into the bladder, which phenomenon is frequently observed, when non-absorbable sutures are used.

After the bladder is closed up, interrupted sutures are inserted through the fascia of the recti and through the skin; these sutures are not tied, and the wound is loosely packed with some antiseptic. If one chooses to insert separate sutures for the muscles and for the skin, the muscle sutures of course will be catgut; if one chooses to insert only one layer of through-going sutures non-absorbable material may be chosen. If after twenty-four or thirty-six hours the gauze is removed and no leakage and no signs of infection are discovered the fascia and skin sutures are tied. Should leakage or signs of infection be noticed, the wound is treated openly until everything is clean and red and then secondary suturing may be resorted to.

As to the question of the permanent catheter, most of the urologists with operative experience become more and more inclined to discard the permanent catheter as a means of draining a completely sutured bladder. It is in fact better to either let the patient urinate naturally or in case he or she should be unable to do so to employ catheterization at regular intervals.

As to the contra-indication against complete suturing of the bladder, it was mentioned before that experience has proven that the mere presence of a cystitis is no contra-indication whatever against completely closing a bladder.

A bladder should not be completely reunited after suprapubic incision if a hemorrhage occurring during the operation had to be checked by tamponade, or if the operation revealed the existence of an infiltrating cystitis, which could only be cured by leaving open a rather large part of the primary incision for some time.

Contributed by the Author to The American Journal of Urology.

PRESENT STATUS OF INTRAVESICAL OPERATIONS FOR TUMORS OF THE BLADDER.*

By Horace Binney, M. D., Boston.

A GLANCE through the medical literature of the last five or six years, bearing on the treatment of bladder tumors, points clearly to at least one fact, namely, that in Northern Europe the intravesical operation has met with increasing popularity. Whereas, at the beginning of the present decade, Nitze and one or two of his pupils seem to have been the only surgeons using this method, the reports in European journals, during the last year, come from at least a dozen surgeons.

In this country, Myer,[1] of San Francisco, and Kolischer and Schmidt,[2] of Chicago, are practically the only surgeons who published evidence of personal experience prior to 1908. Since then a few others have been employing the method, but no publications have appeared except the brief reports of Young,[3] of Baltimore, and Beer,[4] of New York. The increased popularity of the method in Europe, and the fact that in this community the method is employed practically never, seem sufficient reasons for our looking more closely into the question of these intravesical operations.

The development of the intravesical method of operating, which was largely due to Nitze's genius and industry, and the form of instrument used by him, are matters with which every one present is doubtless familiar. I shall, therefore, omit a detailed description of the Nitze instrument, but describe briefly the instruments of a different type which have been recently brought to our notice by other workers in this field. I shall also give a short résumé of the results of reported cases of intravesical operations, as far as known, and shall review the opinions expressed by the more important urological surgeons in the recent French and German urological congresses.

The majority of European intravesical operators and, as far as I know, of American, use the Nitze instrument in its typical form. The chief characteristic of it, namely, the rigidity of the beak supporting the galvanocaustic snare, has been thought a disadvantage by a number of operators, and, therefore, the flexible system, so-called, has arisen. The best known of the flexible system instruments are those of Blum [5] and Kneise.[6] The former

* Read before the New England Branch of the American Urological Association, Nov. 29, 1910.

has advised a mechanism with a cold wire snare which can be attached to a Nitze double catheterizing cystoscope. The Kneise apparatus is designed for use with Wossidlo's catheterizing cystoscope, and also provides for cauterizing, or injecting solutions into, the base of the tumor. The main feature of these instruments is the placing of the wire loop on the end of a hollow carrier which is introduced through the catheter channel, and can be advanced into the bladder as far as needed, and moved through a considerable arc. This greater freedom of motion than is obtained with the comparatively short and rigid beak of the Nitze allows the cystoscope to be held in one position so that the picture is not constantly shifting. This would appear a decided advantage and is claimed by the authors to greatly simplify the technic.

In contrast with this method, known as the indirect, is the one advocated chiefly by Luys,[7] of Paris, and Keersmæcker,[8] of Antwerp. Luys has developed an instrument resembling an endoscopic tube which is introduced with a beak-shaped obturator. He claims, for its advantages, first, that it is used with air as a medium, thereby avoiding the obscuring of the field with blood; second, that a better view of the tumor is obtained and the cauterization can be more exactly performed, being always in full view of the operator. Keersmæcker's instrument is much similar to Luys', but both of these instruments, having no snare mechanism, necessitate a comparatively large number of sittings for the treatment of anything but the smallest tumor or one with a very small pedicle. It can be easily seen that growths situated on the margin of the internal meatus cannot be reached by the indirect instruments, but must be attacked through a straight tube. Frank [9] reports a number of cases in which he has removed polyps at the bladder neck with an endoscope of his own design. He evidently does not employ it for papillomata within the bladder cavity, as done by Luys and Keersmæcker. While perhaps applicable to the female, it is hard to see how, in the comparatively rigid posterior urethra in the male, these instruments can have a very wide range of usefulness.

In this country, Myer, of San Francisco, has described a method of operating on tumors in the female bladder. He devised a slender galvano-cautery shaft which can be introduced by the side of an ordinary cystoscope and a tumor can be attacked in full view without the necessity of shifting the cystoscope. He

claims this to be a simpler and quicker method than with the Nitze instrument, but limited, of course, to the female bladder.

In 1909, Young demonstrated, at the meeting of the American Urological Association, his operating cystoscope, which consists of a two-bladed rongeur through the shaft of which a small straight cystoscope is introduced. A tumor or foreign body, if within reach of its jaws, can be grasped and wholly or partially removed. He has used this in removing recurrent papillomata. Still more recently, a method of attacking tumors was published by Beer, of New York. His instrument consists of a flexible electrode which can be introduced through a catheterizing cystoscope and a high-frequency or Oudin current applied to the tumor. Owing to the flexibility of the electrode, the scope of the instrument is large and the technic simple. He has used it in two cases, succeeding in checking hemorrhage and destroying the growth, but his operations are too recent to say whether or not a cure was obtained.

In considering the results of reported cases, we find that Nitze's exceed those of any other operator in number, but in his personal articles he did not prove convincingly that many cases in which he had successfully removed the tumor had been followed long enough to determine a cure. His pupil, Weinrich,[10] in 1905, reported on 170 cases operated by Nitze and himself. Fifty per cent of these cases showed, on cystoscopic examination three years after the removal, no recurrence. Twenty of Nitze's cases had recurred, or 11% of the whole number. There was one death, and in one case suprapubic cystotomy was performed for hemorrhage; result in the remaining cases not known. Other cases are reported by Suarez,[11] one in which two tumors were removed in five sittings; Weinrich,[12] 3 additional cases reported in 1906; Casper,[13] 65 cases with 16 recurrences, in 2 of which he was obliged to perform a suprapubic cystotomy for hemorrhage (he does not give the length of time since operation in cases that have been followed); Asch,[14] 2 cases, 1 of which had no recurrence seven years after operation, second one, operated eight years before by Nitze, in which recurrences appeared at various times, always benign. Boehme[14] reported 5 cases, four papillomata and one fibroma. In these, no recurrence had appeared at the time of publication, excepting one which, after a year, showed a general papillomatous degeneration. Kneise has performed twenty-five operations with his flexible operating attachment, but gives no account of results.

Blum reports 4 cases of benign papilloma which he removed in from two to eight sittings. Ringleb[14] has performed twenty-one intravesical operations, once obliged to perform suprapubic cystotomy for hemorrhage, but gives no results. Operations performed by the direct method are few in number, but three reported by Keersmæcker and two by Luys. They claim to have entirely destroyed the tumors, but the period of observation is too short to be convincing of cure.

With the dearth of complete reports of the results of intravesical operations, it is difficult to form any definite opinion of their value, and the question must be still considered an open one, but it is of interest, perhaps, to review the opinions of those who have been most vigorously opposed to it, and to mention some of the advantages claimed by the advocates of the method.

Among the earliest opponents was Israel,[15] who did not believe the operation justifiable on account of the danger of hemorrhage on separation of the scar in the Nitze operations. Rovsing,[14] at the German Congress, in 1909, stated that, since even the smallest papilloma may be malignant, he considered it unwise to use a method which entailed any delay, but advocated the more radical and rapid method of suprapubic cystotomy for practically all cases. Von Frisch,[14] believing that at least 50% of papillomata are malignant, considers the intravesical operation unsafe and is therefore, opposed to it. Zuckerkandl[14] and Kapsammer[14] are less conservative and advocate its use in very small papillomata which can be wholly removed in two or three sittings. In France, Cathelin,[16] Rafin and others have been opposed to it on the ground of technical difficulties and believe that the operation is less radical than suprapubic cystotomy. On the other hand, the following definite advantages are claimed for it by Weinrich, Casper, Luys, Blum and others: (1) Its mortality is practically nothing (Weinrich, 1 death in 150 cases as compared with 14% mortality from the suprapubic operation, which is the figure published by Von Frisch in his report on 300 cases). (2) The avoidance of complications such as fistula, sepsis, phlebitis or pneumonia, involving long convalescence. (3) The ability of the patient to continue at his work. (4) The more thorough inspection permitted, less danger of overlooking small beginning tumors than in the surprapubic method, in which the bladder is somewhat collapsed and the mucous membrane frequently covered with blood or other fluid. (5) (Important advantage.) The avoidance of

danger of implanting tumor cells in other portions of the bladder or in the suprapubic wound which might lead to recurrence. (6) Its greater applicability for recurrent tumors after removal of larger growths by suprapubic cystotomy, it being naturally impossible to subject a patient to repeated operations of such gravity.

In weighing the evidence for and against, one is certainly influenced in favor of the intravesical method, at least in case of smaller growths, by the fact that the most careful and thorough suprapubic excision of small single papillomata is sometimes followed by the development of multiple recurrences, more or less approaching the so-called papillomatous degeneration. A number of these cases, following suprapubic operation, have been reported by Casper, Lichtenstern,[17] Zuckerkandl and others, whereas this condition seems to develop less frequently after the intravesical operation, one case only being reported by Asch. As stated before, however, details are so scanty, and after-results are lacking in the reports of so many operators that no definite opinion can be formed on this point.

The results of these reported intravesical operations, numbering something over 200 cases, may be summarized as follows: Mortality, one half of one per cent, or less, there being but one fatal case in the whole number; hemorrhage, severe enough to require control by suprapubic cystotomy in 3 cases; cure for at least three years has been established by cystoscopic examination in 50% of the cases reported by Weinrich. The exact per cent of cures cannot be figured at present, owing to the failure of the operators to confirm as apparent cure by cystoscope. For this same reason, the frequency of recurrence after the intravesical operation cannot be estimated from the reports. In the original statistics of Nitze, the recurrences are given as 18%, which is better than the figure stated by Rafin in his collected statistics of suprapubic operations, which was 26%.

Inasmuch as Nitze operated on tumors of all sizes, while the tendency at present seems to attack only the smaller benign growths, it is profable that there is still greater difference in favor of the intravesical operation in per cent of recurrences.

In conclusion, we may say that the published results of intravesical operations do not at present warrant the adoption of the method for the removal of primary growths except in cases of very small tumors or in patients in whom a suprapubic cystotomy

under an anesthetic is contra-indicated. In cases of repeated recurrences after suprapubic operations, the method is to be recommended over the performance of frequent suprapubic operations.

My personal experience with the intravesical operation is limited to one case which I shall briefly report.

A man (G. R.) aged sixty-one was operated on by Dr. Cabot in 1906 for a large papilloma on the left wall of the bladder. Recent glycosuria cleared up before operation. Suprapubic cystotomy was done and the tumor cut away from the bladder wall with the actual cautery. Patient made a good recovery, but in the winter of 1908 hematuria returned and a recurrence of the growth was seen with a cystoscope. In March, 1908, second suprapubic cystotomy revealed several large papillomata growths in both lateral and posterior walls of bladder. These were removed as before. Patient was well, without further bleeding, until the spring of 1910, when he had one or two brief attacks of hematuria. On Dr. Cabot's invitation, on June 25, 1910, I cystoscoped the patient, finding a rough, pinkish oblong mass at the top of the bladder, apparently in the suprapubic scar. I introduced Young's cystoscopic rongeur, under cocaine, and with 4 oz. of boric solution in the bladder was unable to reach the growth, largely, I thing, on account of the moderate enlargement of the prostate gland. On my drawing off about half of the solution and pressing down on the suprapubic scar, the growth was grasped in the jaws and a piece amounting to about one third of the whole mass was removed. Separation of the portion caught in the jaws of the instrument was difficult and required a rather vigorous pull before it came away, which was painful. There was moderate bleeding, enough to cloud the medium and prevent further attack on the tumor. There was only slight tingeing of blood in the urine for the next twenty-four hours and no reaction. About ten days later, second attempt was made, which succeeded in removing two small fragments only. On inspecting the bladder wall before attacking the tumor, a couple of small papillomata were seen on the left side of the fundus near the left ureter. Following the operation, the patient went away on a vacation, and was apparently free from bleeding for some time. I had hoped to remove the remaining growths at further sittings, but the patient, in September, had a slight hemiplegia, and soon after attacks of hematuria recurred, confining him to bed.

Soon after this the glycosuria returned, and uremic symptoms

developed. His physician recently informed me that the hemiplegia became complete, and death shortly followed. Towards the end, the hematuria was severe, and injections of resorcin into the bladder were without effect.

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URETHRAL HEMORRHAGES.

A. Ravagoli, Cincinnati, Ohio.

SEVERAL cases of hemorrhages from the urethra, which occurred in my practice, have prompted me in the selection of this theme. All these cases of hemorrhages from the urethra have to be referred to the class of traumatisms which in practice are the most common. They have been produced mostly by the use of instruments in relieving organic strictures. In none of these cases has extravasation of blood under the skin of the penis occurred, which is usually found in cases of traumatic rupture of the urethra, as in the case reported by Seifert.[1] The distressing symptom in our cases was the flowing of blood from the urethra in an alarming quantity, after the slightest and most

1 Seifert. "Seltene Ursache von Blutungen aus der Urethra." *Arch. f. Derm. und Syph.* Bd. 97, 1909, p. 19.

gently directed application. Neither one of our patients belonged to hematophilic families as in the case of Wrede,[2] where a hemorrhage followed a slight dilation of the urethra.

It is clear that any injury to the penis causing rupture of the urethra will cause a hemorrhage. It is my purpose to point out cases of very severe hemorrhages from the urethra following the slightest and the most gentle maneuver to treat strictures of the urethra. Hemorrhages, as Friedlaender[3] said, can be avoided by the careful use of instruments, but in some cases they cannot be prevented. When the mucosa of the urethra or of the bladder is thick and inflamed, according to Zuckerkandl,[4] it is much more vulnerable, and any instrumental exploration may cause hemorrhage. In case a soft and succulent granulation tissue has been formed, the introduction of a sound in the gentlest way is liable to produce hemorrhage. Indeed, the appearance of a few drops of blood after the introduction of a sound may easily result, but this is of no significance, as the blood stops by the contraction of the urethra on itself after withdrawing the instrument. In some cases, however, the hemorrhage is so severe as to frighten the patient as well as the physician.

When the hemorrhage comes from the urethra in the pars pendula, a well-applied compression with a bandage around the penis will soon stop the bleeding. When the hemorrhage has its origin from the posterior urethra, usually in the bulbar region, then it is not easy to master the bleeding except by digital compression.

In our practice we had persistent hemorrhage after the dilatation performed with Kollmann's dilator for the posterior urethra. J. N., a strong young man, was troubled with a stricture in the pars membranosa. A No. 12 American steel sound could be introduced without difficulty, yet the stream of the urine was distorted or divded, and drops of retarded urine caused discomfort and a dribbling sensation. The Kollmann dilator was applied without cocaine instillation, in order that the sensitiveness of the patient might serve as a guide. The dilator was opened to No. 30, when the patient complained of a kind of burning feeling. The instrument was held for two minutes, then closed and removed,

[2] Wrede. *Berlin Klin. Wochenschr.* 49, 1908.

[3] Friedlaender, Martin. "Die Krankheiten der mannlichen Harnorgane." Berlin, 1900, p. 114.

[4] Zuckerkandl, O. *Handbook der Urologie.* Bd. I, p. 750.

when it showed some blood on the rubber cover. The patient did not complain of any pain, and the urethra was irrigated with 1 to 5,000 solution of permanganate. After the solution was expelled some pieces of clotted blood came out, and whenever the patient urinated he expelled a large quantity of blood, although suffering no pain. The patient was kept in bed with ice bag on the perineum, whereupon the hemorrhages stopped and the urine returned free from blood.

In another case V. A., an Italian, had an organic stricture affecting the bulbar region. The patient could not pass urine, which was coming drop by drop. No catheter or bougie could pass the stricture, and a filiform elastic catheter was tried without success. As the patient was requesting to be relieved, a thin silver catheter, No. 8 Charrière, was successfully introduced, relieving him from a large quantity of urine. A few days later he came back much relieved. A No. 8 metallic sound was introduced through the stricture into the bladder without much difficulty, but a few drops of blood followed the removal of the sound. The urethra was then irrigated, and after irrigation the blood began to come out in a full stream. The application of the finger on the perineum stopped the hemorrhage, and the compression was continued until the bleeding stopped. A week later we could introduce steel sounds, increasing the size without causing any more bleeding. The patient was much better and was discharged.

Mr. J. S. for many years had suffered with a stricture above the bulb. He had been treated by many local physicians without any satisfactory result. Every time that a sound or a catheter was introduced bleeding followed. The patient was badly worn out, he was passing urine nearly by drops, and urination was very frequent. His sleep was very much troubled by the necessity of getting up every half hour. The prostate was normal, the urine neutral, showing abundant shreds. In the examination a No. 8 metallic sound was introduced, which went through the stricture. This unexpected success encouraged me in employing electrolysis, and during the night after its use the patient found it difficult to expel the urine. A doctor was called, who catheterized him. On the following day he was losing blood in an alarming way, while for several hours he had not passed urine. Another tiny catheter was inserted, but failed to go into the bladder. Hemorrhage followed in a terrific way. The digital compression would stop the hemorrhage, but as soon as the compression ceased the

blood was streaming. In this case the patient was placed under general anæsthesia. A staff was inserted as far as it could go, the perineum was opened longitudinally, and then the urethra was opened and a groove director inserted through the stricture. A large incision gave opportunity to push the finger into the bladder as in lithotomy. A large short catheter was left in the bladder and the wound was tightly packed. No more blood appeared, the wound healing up in three weeks, and the patient has since passed his urine in the normal way.

Another case was of a young man with hypospadias of first degree, who had stricture of the bulbar region. His physician had passed sounds and since then blood had begun to come from the urethra by drops. With irrigations and instillations of mild solutions of nitrate of silver no benefit was obtained. The urethroscope was introduced and it showed that the mucous membrane of the posterior urethra was covered with red, thick, succulent granulations from which the blood was oozing. A six per cent solution of nitrate of silver was used, with a cotton tampon, and the surface was touched every other day. The blood stopped and also the discharge.

In all these cases to which we have referred the urethra was infiltrated and granular, and consequently very vulnerable and liable to bleed at the slightest contact. In the treatment of organic strictures, when the mucous membrane is thickened and a process of cavernitis has taken place, the tissues are so thickened and infiltrated that they easily break. The urethra is an organ supplied abundantly with blood vessels, which have their origin in the pudenda communis, the end of the arteria hypogastrica. The arteria bulbo urethralis supplies the corpus cavernosum urethræ and the arteria profunda penis runs into the corpus cavernosum penis. Blood is abundantly provided by these arteries. When the circulation is somewhat impaired by the enlarged condition of the prostate, then the veins are filled, forming a stasis. The plexus pudendalis internus surrounds the prostatic gland, the seminal vesicles, and the pars membranosa of the urethra, forming a thick net which is also known as the labyrinthus santorini. On account of the venous stasis from compression of the enlarged prostate, or from the inflammatory process, the tissues are imbibed with blood and any injury is liable to produce hemorrhages.

Goldberg [1] has referred to severe hemorrhages, which sometimes occur in patients suffering with prostatic hypertrophy. He remarked that the hemorrhages are often the result of injuries caused in attempting catheterism. In some cases of prostatics who have undergone no treatment the hemorrhage may be the result of chronic cystitis, or from the presence of lithiasis. When the hyperemi of the mucous membrane arising from the continued distended bladder is eased by emptying the urine, the diminishing pressure may be the cause of hemorrhage.

Local infections are sometimes the cause of hemorrhage from the urethra. In fact an acute inflammatory process of the mucous membrane of the urethra often causes formation of blood vessels, and at the same time the effusion of serum makes the connective tissues loose, and renders them liable to bleed. When catarrhal ulcerations are formed, the mucous membrane is so vascular that any slight contact with a sound or with a catheter is liable to cause loss of blood, and when the tissues of the urethra under the urethroscope are touched with a cotton tampon, the bleeding sometimes causes trouble to the operator.

The chronic inflammatory process, according to Zuckerkandl, may in some cases produce necrosis of the mucosa and the exposure of the dilated blood-vessels, which at the slightest contact cause stubborn hemorrhage.

As to other hemorrhages we will only mention those caused by the presence of tumors in the urethra and at the neck of the bladder, which are usually soft and of villous nature. The hemorrhages from these tumors are exceedingly stubborn; often they are reproduced without injury of any kind. Seifert reported two cases of hemorrhages from the urethra, caused from varicosities of the veins, which began at the fossa navicularis and extended to the middle of the urethra. From tuberculosis of the neck of the bladder hemorrhages may have their origin, and often in young men spontaneous hemorrhage from the urethra make us suspect the presence of miliary tubercular nodules.

In all our cases under consideration in this paper, we find that the blood is running from the urethra independently from the urine. The blood is not clotted in the bladder, but comes from the urethra as an essential hemorrhage. In some cases the

[1] Goldberg, B. "Ursachen und Behandlungs methoden schwerer Blutugen der Prostatiken." *Therapie der Gegenwart*, 1906, No 5. *Ref. Zeitschr. f. Urol.*, B. 1, H. 1, p. 72.

blood has followed urination, at first the urine coming free from blood, at the end of the urine was tinged with blood, and then drops of blood have followed the last drops of urine.

Intermittent spontaneous hemorrhages of the urethra are usually the result of tumors, or of tubercular ulcerations at the neck of the bladder. The smallest papilloma, and in the same way the smallest tubercular ulceration, may cause profuse hemorrhages, which lead the patient to an anæmic condition.

In the cases which we have made our subject of study, we have had hemorrhages from the urethra always in consequence of strictures, which are the natural result of a chronic inflammatory process. Hemorrhages have followed the simple introduction of a sound, the dilatation with Kollmann's dilator, the irrigation with Janet method, and electrolysis. The fear of hemorrhage has not prevented us from performing the necessary examinations, and from applying the proper treatment. When the urethra is inflamed and studded with granulations it easily bleeds and it is necessary to master the hemorrhage.

In a slight hemorrhage the application of cold water may stop the blood, and if in the pars pendula a compression with a bandage around the penis often is sufficient to stop the hemorrhage. When the hemorrhage is from the bulbar region digital compression on the perineum usually stops the hemorrhage. The idea of retaining a catheter or a sound for some time to stop the hemorrhage is more hypothetical than real. In my cases, at least, it could not even have been suggested. In cases of bleeding from the granulated mucous membrane, the best way to stop the bleeding is to use the urethroscope, and touch up the granulations with a solution of nitrate of silver from three to eight per cent. Nitrate of silver coagulates the albumin and covers the granulations with a solid coat, stops the bleeding, constricts the tissues and the blood vessels, and heals up the surface evenly and smoothly.

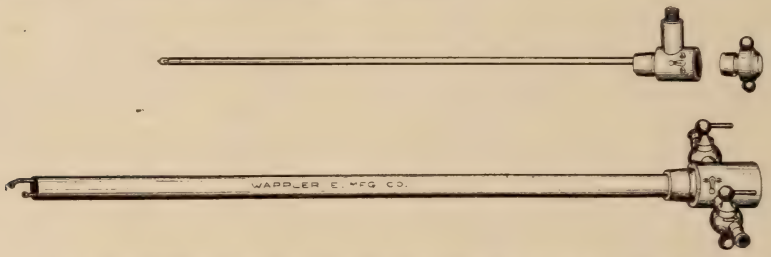
When the hemorrhage is of great volume, and when it is often repeated, there is no time to hesitate. External urethrotomy then has to be performed. We believe that this is the only possible way to save the patient in so dangerous a condition.

AN ATTACHMENT FOR DR. BUERGER'S URETHROSCOPE.

By Victor C. Pedersen, A. M., M. D., New York.

At the St. Louis meeting of the American Medical Association in June, 1910, I described to the Wappler Electric Controller Company, through their representative, Mr. Wappler there, the following simple attachment to the Buerger Urethroscope.

It aims to meet those cases in which treatment requires dryness and applications, such as would be available through the old straight tube urethroscopes, as the Chetwood pattern for example. Any one having the Chetwood and the Buerger instruments might essay to avoid purchasing this extra attachment. The difficulty, however, is that of recognizing with the older instruments the exact point discovered with the Buerger instrument. After about a one-half-year's use of this attachment, however, the writer is convinced of its serviceability.



With the great aid of the magnification and irrigation of the Buerger instrument a definite lesion is located. The telescope is then removed without disturbing the sheath of the instrument and the urethra mopped dry. The attachment is then inserted and by means of its eye piece which repeats the degree of enlargement of the Buerger telescope the lesion is again recognized. The magnifying eye piece is then removed and the treatment applied.

The parts of the attachment are extremely simple as shown in the cut. They are only two fold, namely a light-carrier with its electrical connections, practically in duplicate of the Chetwood light-carrier, which fits into the opening of the sheath of the urethroscope in such a way as to give the maximum space possible for the use of instruments. The second part is a magnifying eye-piece as aforesaid.

The cut shows these parts with great clearness and requires no further description.

THE TRANSPERITONEAL AND SUPRAPUBIC APPROACH TO TUMORS OF THE BLADDER.*

By Charles L. Scudder, M. D.,

Surgeon to the Massachusetts General Hospital; Lecturer on Surgery, Harvard Medical School.

THE most common form of the epithelial tumors of the bladder is the papilloma. In a certain series of 56 operated cases of tumor of the bladder from the Rochester, Minn., Clinic, 42 were of the papilloma type. This affords an idea of the frequency with which papilloma of the bladder is found at the operating table.

There are certain facts of importance which should be considered in deciding upon the operative attack on tumors of the bladder:

1. It is impossible for the pathologist to state with certanty whether or not any given papilloma is malignant without a careful examination of the whole growth, including a section of the bladder wall from which the growth arises.

2. It is even under these ideal conditions often-times impossible for the pathologist to determine whether or not a given papilloma is malignant.

3. Practically speaking, all tumors of the bladder cause the death of the patient sooner or later. The supposedly benign papilloma causes death by hemorrhage or pyelonephritis.

4. All so-called benign tumors are potentially malignant. A papilloma which shows no sign of malignancy may become malignant.

5. If the operative deaths and the rapid recurrences of bladder tumors are combined, as Watson has very properly combined them, under the one head of operative failures, these failures have occurred in 29% of the so-called benign tumors and in 46% of the cases of carcinoma.

6. Of the urethral operations for papilloma, only 28% remained cured more than one year.

Of the suprapubic operations, not resections, only 27.5% remained well more than one year.

Of the partial resections, 37.5% remained well more than one year.

7. Of 55 cases of papilloma operated upon through the

* Read before the New England Branch of the American Urological Association, Nov. 29, 1910.

urethra or suprapubically, or by partial resection, 19 had recurred.

8. The statistics of Nitze in 1901 and 1905 are not corroborated by detailed reports of the cases and consequently should be looked upon as unusually fortunate results.

In view of the above facts pointing to the very great malignancy of papilloma of the bladder, and because of the poor surgical results that hitherto have been obtained by operative treatment, I believe that we should regard, from an operative standpoint, all of the papillomata of the bladder as potentially malignant, and that they should be treated as if they were malignant growths, whether there are evidences of malignancy in any individual case or not.

The approach to the bladder tumor through the suprapubic incision affords, in a certain number of the cases, satisfactory access to the tumor. In a still smaller number of cases the suprapubic approach supplemented by a separation of the bladder from the peritoneum affords easy access to the tumor.

Most bladder tumors are seated at the base of the bladder and in the region of the ureteral openings. For such tumors and for those tumors evidently malignant, I believe that the approach should be by means of the transperitoneal operation of cystotomy. There are certain cases, too, occurring laterally and in the median portion of the bladder that will become more readily accessible through the transperitoneal approach.

The peritoneum is with greater and greater difficulty stripped from off the bladder as one approaches the posterior surface of the bladder low down. Consequently the extraperitoneal suprapubic route is impracticable in many cases. I believe that the transperitoneal approach to the bladder affords the safest means of removing bladder tumors.

The opening of the abdomen enables one to see and palpate the liver, to inspect the peritoneum, the mesentery and the retroperitoneal glands. It is of very great importance that these parts should be inspected before any radical operation is undertaken for the removal of a bladder growth. If mestastases are discovered, as they have been several times, a radical operation would be of no use. A sufficient number of cases have not yet been operated upon by the transperitoneal route to establish the mortality percentage, or the percentage of cures and recurrences, but it will not be long before sufficient evidence has accumulated to reply to these inquiries.

The transperitoneal operation enables the surgeon to operate

with comparative ease, bloodlessly, aseptically and consequently safely.

The investigations of Tuffier, De Quervain, Barney and others have demonstrated that normal, sterile urine is not a great irritant to the peritoneum, so that under the very careful precautions taken at a transperitoneal operation there need be no soiling of the peritoneum and adjacent tissues with urine, and this chance of infection may be practically eliminated.

The more I have to do with cancer in any form, whether the supposedly mild squamous-celled epithelioma of the face, or the squamous epithelioma involving the jaw, the more I am impressed by the absolute necessity of a very thorough procedure to eradicate the disease at the outset beyond peradventure of a doubt.

It is far safer, it is far wiser, it is better surgery, to remove the contents of the orbit when the squamous-cell cancer involves the skin near the inner canthus in the immediate neighborhood of the eyeball, even though the eye be intact functionally, than to temporize with an excision of the apparent growth and be forced to a subsequent attack upon the orbital contents when the disease is too far advanced to accomplish more than a palliative operation.

I believe that the same principle holds true in these cases of papilloma of the bladder, *no matter how benign they may appear.* A primary radical excision with the whole thickness of the bladder wall is indicated in the most benign-appearing cases of bladder papilloma.

The improvement of the operating cystoscope, together with the high-frequency current, enables those so inclined to operate upon these growths, and fortunately, and in a way unfortunately, to successfully remove a few. The advent of the cystoscope has made certain the location of the bladder tumors. The employment of the cystoscope for operating purposes seems to me unsurgical in cases of bladder tumors.

It is by the peritoneal route that a safe and comparatively easy access is provided to the bladder.

Regarding the technic of transperitoneal cystotomy:

Rydygier, in 1888, suggested this route to the bladder.

Harrington, in 1893, and Mayo, in 1908, have stated the salient facts in the technic of this procedure. We are all interested in little details which may contribute to a perfecting of this technic. Each operator who undertakes this major but simple exposure of the bladder will modify his procedure according to individual preferences.

I believe that the use of urotropin two or three days previous to a contemplated transperitoneal cystotomy is wise. Preparation of the region of the operation should be as carefully done as for any abdominal section.

If it is known that a *cystitis* is present, the bladder should be thoroughly irrigated before the operation. Tennant, of Colorado, has demonstrated recently that an intraperitoneal cystotomy can be done with safety even in the presence of a severe cystitis. He reports two cases.

The high Trendelenburg position facilitates the operation immensely.

The *abdominal incision* should be an ample one so that the intestine can be displaced upward behind the omentum completely and with ease. The edges of the abdominal wound should be protected by several layers of sterile gauze. I like, personally, to use for this packing off of the intestine a long roll of gauze which is wet and wrung out of hot salt solution.

If the tumor has been located by the cystoscope in the upper portion of the bladder, the incision for opening the bladder may be placed so as to approximate to the tumor.

If the tumor is nearer the base of the bladder, then a median opening of the bladder posteriorly will be wise.

The operation may be begun extraperitoneally, suprapubically and, if more ready access to the bladder is needed, the transperitoneal method may be used.

The urine is sponged from the bladder as soon as it is opened and the bladder is kept practically dry by occasional gentle sponging. Great gentleness must be observed in handling the bladder. Trauma however slight may be a factor in the recurrence of bladder tumors. Some one has observed that the Trendelenburg position diminishes temporarily the flow of urine from the kidneys.

An excision of the tumor should include the bladder wall. This wound in the bladder wall may be closed by interrupted or continuous suture, or if the wound is not too extensive, the edges and base of the wound may be cauterized with the actual cautery. All hemorrhage should be stopped either through application of the actual cautery or by placing the proper sutures. The suture should be of either plain or chromic catgut.

If the tumor involves the ureteral orifice, this should be excised and the ureter reinserted into the bladder.

Treatment of the bladder wound.—The bladder wound may be

closed by a continuous Connell stitch of chromic catgut through all the layers similiar to the suture used in the closure of the stomach or of the intestine. Or if one chooses, the mucosa and the muscularis may be sutured separately. The peritoneum in either case is approximated separately over the line of the incision in the bladder by a continuous linen suture.

Personally I like to use in wounds of the stomach, intestine or bladder an occasional interrupted stitch to reinforce a continuous suture. I do not often care to trust to a continuous suture alone in suturing any viscus.

If the ureteral orifice is involved and that part of the bladder is resected, or if there appears to be some little oozing of blood, or if the prostate has been removed, it may be wise to permanently drain the bladder either by a suprapubic tube or by a catheter through the urethra. I have used a catheter with the exception of one case in which no drainage was used. I should prefer to avoid the use of any instrument in the bladder unless it were indicated by one of the three conditions mentioned. Mayo and Judd have only rarely drained the bladder in their transperitoneal cases.

The abdominal wound is closed by layers. If there is a suspicion of any soiling of the wound of the abdominal wall, then a thin small rubber tissue drain had best be introduced between stitches down to the peritoneal layer of sutures.

In conclusion, with regard to the surgical treatment of tumors of the bladder, certain of the small apparently benign papillomata may be safely removed by the suprapubic method, but should be removed even with this approach by a good margin of excised, healthy tissue.

The transperitoneal approach to the bladder will enable the surgeon to successfully attack cases of malignant tumor of the bladder which, without this approach, might be forced to a more dangerous extraperitoneal cystectomy. Watson's proposed cystectomy and double nephrostomy should be employed only when a partial cystectomy done transperitoneally is inapplicable. The transperitoneal approach to the bladder will care for many cases that otherwise would have to be treated by Watson's method of cystectomy.

Transperitoneal cystotomy is a procedure that has come to stay. Its employment should lower the percentage of recurrences in tumors of the bladder of all grades of malignancy.

Review of Current Urologic Literature

Acute Urethritis of Chemical Origin, with Report of Three Cases. William J. Robinson (*Med. Record*, April 8, 1911) says that one of the most unfortunate terms in our medical nomenclature is the word gonorrhea; besides the fact that its etymologic derivation is absurd, it makes us link, against our will, every form of urethritis with the gonococcus, so that the word urethritis has practically become synonymous with gonorrhea or gonococcal infection and we therefore often forget that there is such a thing as urethritis of non-gonococcal and even non-bacterial origin.

There is nothing strikingly original in the statement that urethritis may be of chemical origin. Everybody knows, or is supposed to know, it. Still this is often forgotten. He reports three cases of chemical urethritis, each of which teaches a valuable lesson.

Mr. X., 28 years old, was to be married on September 21, 1910. Just a week before, September 14, he considered it necessary to cohabit with a prostitute. Men of a certain class seem to regard it as a sacred obligation to bid *adieu* to their bachelorhood in this distardly manner. The temptation is very great to break out in a tirade against the brutes, who, a few days, sometimes even a few hours, before going to the marriage bed, will subject themselves and their future wives and children to the risk of infection, because, forsooth, after marriage they intend to be faithful to their wives and therefore want to have a "last fling." But what's the use? The brutes don't read medical journals, and if they do they are not affected by our tirades. And so Mr. X. had intercourse on the 14th. On the 16th he noticed, or thought he noticed, a tickling in the urethra. After a few hours the tickling disappeared. On the 17th he thought it returned. In view of the close approach of the important day he became thoroughly frightened—though I believe there was really nothing the matter with him, the tickling being more in his mind than in his urethra—and consulted—a reputable specialist? No: a druggist. The vast majority of druggists I am familiar with are men of high standing, well up in their profession, who would disdain to prescribe or even to advise in cases of venereal disease. But there are black sheep everywhere, and there is no question that some druggists are

as ignorant as they are imprudent. This druggist seems to have been particularly ignorant. His advice to the patient was to dissolve one antiseptic tablet (containing 7.7 grains of corrosive sublimate!) in *about* half a glass of water and syringe three times a day, using several injections for each seance. I have known druggists advising the insertion into the vagina of 7-grain corrosive sublimate tablets as an anti-conceptional measure (and more than one woman paid a severe penalty for this stupidly criminal advice), but I had not heard of anybody displaying such dangerous ignorance.

In the first case the patient, thinking he had gonorrhea went to a druggist who gave him tablets of corrosive sublimate, one tablet to be dissolved in ½ glass of water and the solution to be injected.

The patient did as told and syringed out his urethra four or five times with a half-ounce syringe. This was before going to bed. He suffered agonies the whole night, and the pain at any attempt at urination was so severe that he abstained. The following morning he applied to me. The penis was four or five times its normal size. The swelling and edema were enormous. The glans was so puffed that it was difficult to find the meatus. The patient was badly frightened, but constitutionally he was not ill; no fever, no malaise, no stomatitis, no bad odor; in short, no symptoms of mercurial poisoning. He showed me the tablets which the druggist had given him; they were, as stated, 7.7-grain corrosive sublimate tablets, combined with an equal amount of ammonium chloride. He indicated to me the amount of water in which he dissolved the tablet and the amount was between four and six ounces. In other words, the strength of the bichloride solution which he used as a urethral injection was about 1 in 250 to 1 in 350. And in all he used about 3 grains of corrosive sublimate; but, of course, he let the injection run right out.

"He tried to urinate unaided, but failed. I then with great difficulty anesthetized the urethra, passed a small catheter, and withdrew twenty-two ounces of urine. The patient at once felt relieved. For the penis I ordered compresses of Liquor alumini acetatis (Burrow's solution); to do away with the strangury I ordered rectal suppositories of morphine sulphate (gr. ¼) and atropine sulphate (gr. 1-60); also, internally a mixture of potassium bromide, potassium acetate arbutin, and fluid extract of triticum; also to drink frequently of a cold infusion of linseed

(made as follows: Macerate a teaspoonful of whole linseed in a glass-full of water for five or ten minutes, stirring occasionally; strain, and add a dash of lemon juice to take away the otherwise "flat" taste of the linseed; the demulcent effect of this rather old-fashioned infusion is not known as well as it deserves to be). This treatment improved the patient's condition at once. The swelling went down considerably; the pain and burning on urination disappeared almost entirely. But on the next day a profuse thin discharge made its appearance and the urine contained numerous flocculi. The patient was, of course, sure he had gonorrhea, but I was convinced of the contrary. Numerous examinations failed to disclose a single gonococcus or a gonococcus-like diplococcus. It was pure—one might say chemically pure—pus, caused by an irritating antiseptic. I used no local treatment whatever—only internal demulcents and mild diuretics, and the discharge gradually diminished; it is now reduced to the fraction of a drop in the morning, simulating the morning drop of gonorrhea, and the urine contains flocculi; they are, however, entirely different from Tripperfäden and they, as well as the minute discharge, are entirely free from cocci. The wedding, which was necessarily delayed for a month, is to take place in a few days and I have no hesitancy in giving him my unqualified permission. During one period in the treatment there seemed to be a tendency to the formation of stricture, but several dilatations with Kollmann's dilator, followed by the instillation of a 1 per cent. solution of thymol iodide in oil, restored the urethra to its normal caliber, and it is now perfectly normal in this respect."

In the second case the urethritis was due to the use of injections of zinc sulphate, potassium permanganate and a silver preparation in a patient, who never had any gonorrhea, but had applied to a physician for treatment for night losses. In the third case the urethritis was due to the use of silver nitrate, as a test of cure. The author especially warns against the use of this test. His conclusions are as follows:

1. Urethritis of chemical origin is more common than is generally supposed.

2. While most cases are caused from self-administered injections prescribed by barbers, friends, and others, some cases owe their origin to the over-zealousness of physicians.

3. The unscientific and unjustifiable silver nitrate test, which

should be forever discarded, has been responsible for very many cases of chemical urethritis.

4. The diagnosis of chemical urethritis is made by the history of the case, the freedom of discharge from gonococci and, generally, its improvement on being let alone.

5. One of the most useful agents in the treatment of chemical urethritis is warm sterilized olive or almond oil, or ½ to 1 per cent. solution of some organic iodine derivative (iodoform, dithymol-iodide, europhen) in one of the above oils.

Tendency to stricture should be prevented by dilators or by sounds dipped in the just referred to solutions.

Percussion of the Kidneys. By Otto Lerch (*Medical Record*, Feb. 4, 1911) says: "As plexim.ter, I use a thin ivory plate, and as plexor a hammer with a black rubber or ebony handle and heavy steel head with black rubber t'p.

The hammer is very lightly grasped at the end of the handle between the thumb and index finger, the end of the handle resting on the third finger and the palm of the hand. The pleximeter is placed upon the portion of the body to be percussed, with a slight movement of the wrist the hammer is lightly tossed up and the hammer head is allowed to drop upon the pleximeter with its own weight. As soon as the border of a solid organ or the boundary between two hollow organs is reached, the rebound of the hammer will be more or less, according to the amount of air beneath: practically no rebound is noticed if a solid organ is next to the surface. At the same time the slightest change of vibrations is felt in the finger tips that but lightly hold the hammer, as well as in the hand, and a decided change in the note is readily perceived. We have, then, at once three criteria by which to judge whether the border of an organ is reached.

This method excludes to a very large extent the individual feature of the usually practised percussion and makes the results more uniform.

The results that apply to superficial and deep percussion in the usual way: Application of pleximeter and strength of stroke, the placing of the pleximeter without pressure, a delicate stroke for light percussion, a slight pressure of pleximeter and a stronger stroke for deep percussion, apply to this method. We simply replace the stroke by the drop. Of course it must be left to the examiner how much the drop must be, still it is easier to judge on account of the three criteria we have the rebound of the hammer

seen, the change of vibrations felt, and the changing sound heard. It happens almost daily in my clinical lectures that I am told that I change the strength of the stroke on reaching the border of an organ, the student observing the rebound of the hammer lessening on reaching a solid organ.

Finger-finger and finger-pleximeter percussion may be used, but this requires more skill, as it demands a perfect relaxation of the wrist. With my method I have obtained accurate results, lines corresponding to the large vessels in the chest above the heart, the deep dullness of the heart and liver, the dullness of the spleen, lesions in the lungs, and abdomen. The stomach can be differentiated in most cases from the colon. Results many times tested and found correct on the cadaver.

With my method I have percussed the kidneys for years, and have kept record since 1908, now having several hundred cases tabulated. I find that these organs can be mapped out with accuracy and ease, showing changes in size of a small fraction of one centimeter.

The percussion is best performed with the patient lying face downward with a cushion under his belly, in order to put the muscles of the back on tension. This muscular stretching is not necessary if disagreeable to the patient. It is immaterial whether the colon is filled with fecal matter or distended with gas, and it is unnecessary to empty the intestines before proceeding to percuss. This method gives good results with infants and adults, young or old, fat or emaciated, and it matters not whether the abdominal cavity is filled with serum or pus.

That actually kidney dullness is heard, and that these organs are projected upon the back, that we are not deceived by muscular dullness or fecal matter contained in the colon is shown by the location of the percussion dullness, the left a little higher than the right, exactly corresponding to the location of the kidneys in the body. The form of the percussion dullness corresponds to the form of the kidneys, one checking of the other, the right, the left, the lower border, the upper, the outer, the inner lateral border; even the hilum can be mapped out without any difficulty, and as the location of the left kidney is a little higher than the right kidney, these checks become of still greater value.

In cases of movable kidney with palpable organ the check is perfect. We find on percussion the palpated organ displaced. Occasionally it will float back into proper position when the patient

assumes the posture necessary for percussion. However, if we repeat the process we will discover this without trouble. Usually the kidneys will at least partly return to their natural position—that is, a kidney that can be palpated full length in the abdomen will very frequently be found only one-third or one-half of its size downwardly displaced (percussion dullness). If the kidneys have turned under an angle it may appear smaller in size, and especially so when completely turned and held imbedded by the intestines. Rolling the patient in a horizontal position around, himself displaces the kidney; making him jump from a chair replaces it. This may prove a valuable therapeutic measure in Dietch crises. Nothing more need be said as to the method, except that caution has to be used when, percussing downward, striking the diaphragm a dull note is heard. The percussion must be continued downward and will clear up again when the kidney is displaced. Liver dullness and splenic dullness do not interfere. Very light kidney percussion gives the projection about half size, a superficial dullness of little value for practical purposes except as control.

In every case the clinical symptoms correspond to the percussion figures. If these indicate a contracted condition of the organ, more or less advanced, one or both of the kidneys will be found decreased in size. If a diagnosis of congestion of the organ or of the large white cirrhotic kidney is made the percussion figure will bear out the diagnosis. In movable kidney we find the expected downward displacement of the projected figure.

The method was tested upon cadavers here and abroad, by the author.

Percussion is one of the cornerstones of diagnosis, and its application furnishes most valuable diagnostic results. Kidney percussion, which allows us to study the size of the organ, enables us, in Bright's disease, to determine whether one or both organs are affected. The determination of the increase or decrease in bulk, through tumor or abscess of the kidney, is valuable. In nephroptosis it becomes especially valuable in obese subjects or patients with tense abdominal muscles, conditions which sometimes make it impossible to palpate the organ. In fact, there is hardly any disease in which a knowledge of size and location of the kidneys would not be of value.

These investigations on the cadaver call attention to the importance of intra-abdominal pressure as a factor to keep the ab-

dominal organs in place. This must be borne in mind when a laparotomy on thin patients is to be considered.

To sum up: By replacing the stroke with the drop in percussion, we have a method that enables us to make out with accuracy and ease the organs situated close to the body wall or deeply situated, the percussion lines corresponding sharply to the organs. We have a method superior to the usual method of percussion, in that it permits us to judge from the rebound of the hammer the change of vibrations and the percussion note at one and the same time, and especially that it eliminates largely the individual element and makes results uniform.

Further, according to the most prominent clinicians, kidney percussion has been impossible except in cases of very much enlarged kidneys, when it is for practical purposes useless. My methods give good results in kidney percussion under any conditions and with any patient, supplementing the diagnosis of the diseases of the kidneys and giving a ready and easy means to determine the actual size and location of the kidneys, which is of value in all cases, as stated before."

Tuberculosis of the Kidneys.—Barth (*Deut. Mediz. Wochen.*, May 25,) has traced to date thirty-seven patients whose kidney he had removed on account of tuberculosis; three others died. During the same period he had about forty other patients with renal tuberculosis who were not given operative treatment for various reasons. Twelve of the thirty-seven patients recovered entirely after the nephrectomy and twelve were materially improved while thirteen have died. Analysis of the cases shows that as long as the tuberculous process is restricted to one kidney and its ureter, nephrectomy promises a complete cure. But if the bladder is involved, a cure can be anticipated in only 25 per cent. of the cases; 25 per cent. of his patients succumbed during the year to the progress of the tuberculosis. The others all showed great improvement, but about 25 per cent. succumbed later to the tuberculosis, after an interval of from two to over nine years. Even when the tuberculous process in the bladder heals completely, it leaves permanent disturbances in the form of unduly frequent desires to urinate, particularly annoying at night. He admits the possibility of a spontaneous cure of open or closed tuberculosis of the kidney, but declares that there is not the least prospect of such a cure after the tuberculous foci begin to break down and pyuria appears. The process then spreads

rapidly along the lymphatics in the kidney itself and down toward the bladder. It is impossible to determine the actual healing of a tuberculous process in the kidneys except by repeated catheterization of the ureter; all other signs and information are deceptive and worthless. Nephrectomy with unilateral tuberculosis, normal functioning of the other kidney understood, is, he affirms, almost entirely free from danger. It should be advocated in every case of open tuberculosis of the kidney and if possible before the bladder is invaded. The open tuberculous process in the kidney can be detected in the incipient and early stages only with the aid of the ureter catheter; chromocystoscopy does not locate the seat of the process unless there is advanced destruction of kidney tissue. It is important, therefore, to insist on catheterization of the ureters and bacteriologic examination of the urine in every obscure case of pyuria ("catarrh of the bladder").

Huge Hydronephrosis (Two Gallons Capacity).—Dr. H. J. Whitacre, (*J. A. M. A.*, June 24, 1911), reports the following case:

Mrs. W., aged 68, has been in very good health previous to her present trouble, which began about twenty years ago. Her first symptom was a very peculiar sensation in the right leg, while walking, which extended from the thigh downward, and within half an hour she could not raise the foot from the floor. There was no pain elsewhere. One month later she had a second attack of sharp pain which commenced in the back on the right side and extended downward into the lower abdomen and into the thigh and leg in precisely the same manner as the first attack. There was very great nausea at this time, but no urinary symptoms. Similar attacks recurred until sixteen years ago, when she suffered from a severe attack of "gastric disturbance," which was characterized by very intense pain in the lumbar and right iliac region. Her physician diagnosticated her condition at the time as one of gas accumulation and obstruction. The severe symptoms promptly subsided, but the swelling remained as a soft tumor mass in the right side of the abdomen. During the next several years the patient suffered frequently from stomach and liver attacks, as she designated them. The tumor remained about stationary in size during this period and could always be felt. Four years ago she had a very severe attack of abdominal trouble associated with gastric irritability and severe pain in the right side, particularly in

the region of the liver. During the past four years the tumor has increased greatly in size and she had many attacks of pain. She has never suffered from bladder irritability, passes a normal amount of urine, and has never noticed anything abnormal in the appearance of the urine. Her main symptoms seems to be referable to the stomach. There have been no symptoms referable to the genitalia.

The patient appeared to be very well nourished and in fairly good health. The examination was negative, except for the abdomen, which showed a symmetrical enlargement equal to that of a seven or eight months' pregnancy. On palpation a distinct cystic tumor occupying the greater part of the abdominal cavity could be easily made out, but the right half of the abdomen and the right flank was distinctly more tensely filled out than the left. A fluid wave was easily determined.

A midline incision below the umbilicus demonstrated at once that the cyst was not attached to either ovary and that it was retroperitoneal. The peritoneum was then divided over the cyst, and a large ovarian cyst trocar inserted to draw off the fluid. Two gallons of fluid were withdrawn and perhaps one pint remained in the cyst, which was not measured. The cyst was then delivered by a blunt dissection, which extended as far upward as the liver, without much hemorrhage. A large artery and a large vein were cut between clamps and later found to be the renal artery and vein. An examination now revealed no kidney on this side and a hurried examination demonstrated no special lesion in this ureter. The incision in the peritoneum was closed by continuous suture and abdomen closed without drainage. When the cyst was filled out with cotton the kidney could be easily demonstrated flattened out to a brown-paper thinness on one side of the cyst and the ureter, renal artery and vein could be seen.

This patient made a perfect recovery and is now entirely well.

THE AMERICAN
JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII SEPTEMBER, 1911 NO. 9

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

CONCERNING THE ARMAMENTARIUM OF THE CYSTOSCOPIST, WITH SPECIAL REFERENCE TO THE USE AND CONSTRUCTION OF CERTAIN TYPES OF CYSTOSCOPES

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I. CYSTOSCOPES

FOR the past four years I have been employing a cystoscope* (Fig. 1) which possesses certain advantages over others of the indirect type. These advantages already discussed at length in a previous publication, may be briefly summarized here.

1. The employment of a catheter for washing out the bladder is not necessary, the sheath serving this purpose.

2. The small caliber (24 French), the round shape and the smoothness in the region of the beak and window make the introduction of the instrument easy, and injury to the deep urethra is avoided.

3. Two number 6 Fr., or two number 7 Fr., catheters pass with ease.

4. The telescope and sheath may be removed leaving the catheters in the ureters.

5. Irrigation of the bladder may be very rapidly effected by removing the whole catheter-bearing telescope or by washing through the faucets in the sheath. This may be continued while the process of catheterization is going on.

6. By means of grooved beds, the catheters are separated in such a manner that friction between them is impossible; a new catheter can be inserted at any time without removing the telescope.

* Buerger: Annals of Surgery, February, 1909.

7. The proximity of the lamp and objective lens gives the best illumination for catheterizing purposes.

8. The small size of the lamp and beak make the chances of contact with the bladder wall very small.

9. Inasmuch as the catheter-bearing mechanism is separable from the sheath and is not introduced until the bladder is clean, the likelihood of carrying infection into the ureters is reduced to a minimum.

10. A large telescope for indirect or retrogade vision may be used in the same sheath.

11. A small telescope leaves ample room for the introduction of operating instruments of various kinds.

The result of my own experience in a large number of examinations has been such as to bear out all of these statements. Nor has it been found advantageous to change any of the salient features of the instrument. Experiment and clinical application, however, have led to the development of improvements in mechanical devices, have suggested to me what variations in style and size would be most useful for the exigencies of clinical investigation, and have also brought about the adoption of the most recent improvements in optical construction.

It is my purpose therefore to report briefly what mechanical devices have been adopted, to discuss the various types of instruments employed in routine and special work, and to describe what progress has been made in optical construction, insofar as the latter has any bearing upon the development of a most satisfactory telescopic system.

Let me first call attention to Type I, which has been found most generally useful as a routine instrument.* Its sheath is round, of a calibre of 24 Fr., and it carries two No. 6 Fr. or two No. 7 Fr. catheters. Figs. 1, 2 and 3 show the sheath and obturator, catheterizing and observation telescope of this instrument. Those who are acquainted with the original model, will note the reinforcement of the ocular end of the telescope by means of a strong bar, which serves both to make the exposed end of the telescope more rigid and to give support to the deflecting mechanism. In order to obtain the maximum amount of room between telescope and the sheath for the passage of catheters of large calibre, the smallest sized tube must be selected for the inclosure of the optical system. Such a fine telescope is necessarily supple

* A cross section of this instrument is diagrammatically shown in Fig. 6.

and prone to bend. In those cases where an enlarged prostate, a rigid neck of the bladder or an anomalous anatomical condition makes it necessary to depress the ocular of the instrument considerably, a certain amount of bending of the sheath is inevitable. If the ocular of the telescope be grasped in such cases, the telescope, too, will bend and a portion of the field may be cut off. By increasing the strength of the telescope in the manner indicated, the tendency to bend will be avoided. It will be seen in the chapter on the improvement in the optical system, how even this interference with the integrity of the field may be counteracted.

Fig. 1.

Fig. 2.

Fig. 3.

In the original model the catheters were secured in their beds by means of a closed ring at the objective end of the telescope. It was found that the removal of the telescope (for the purpose of leaving the catheters in the ureters) could be carried out with greater facility if a temporary clip is employed. The clip prevents the tips of the catheters from slipping from the grooves and is to be removed as soon as the catheters enter the sheath.

In order to effect the locking and unlocking of telescope and obturator with ease and with a minimum amount of jar, an improved locking device was adopted. By rotation of a special screw the telescope can either be tightly drawn into the sheath or released.

Although the Type I cystoscope answers for routine work, the surgeon or cystoscopist who has occasion to employ a single

very large catheter, either oval or round (8 Fr.), may provide himself with an additional telescope that has no catheter-groove, and but a single large outlet. I have been using a similar type of telescope with a single catheter bed in the newer type of oval sheath seen in Fig. 7.* Such a telescope (Figs. 7-8) allows of the introduction of flexible forceps for the removal of specimens of new growths and permits the passage of other instruments for operative work.

The smaller round or oval sheathed instrument whose size is 22 Fr., type II, resembles the style just described in every way, except that it permits of the introduction of but two No. 5 catheters. In my own experience the advantages of a smaller sized instrument have been found to be rather meager. Both of these instruments (Types I and II) carry observation telescopes that are large enough to give a brilliant picture, a large field, with sufficient room left in the sheath for irrigation purposes.

The experimental construction of an instrument of smaller size than the last has proved to us that the oval sheath must be adopted for sizes under 22 (French). Thus the author's catheterizing cystoscope for children (Type III) has an oval sheath (17 Fr.), and a telescope devoid of a special catheter bed. Because of the proximity of the ureters to the vesical sphincter, the fenestra was made accordingly small and the canonical distance was also much reduced. The instrument whose cross section is shown in figure 4† has been found satisfactory, and takes a No. 5 Fr. catheter with ease.

Where a large catheter (No. 11 or less) is to be used, I have been employing an oval sheathed instrument, Type IV. The sheath is made from a tube (25 Fr.), whose sides are flattened. The telescope ** is similar to that used in the regular instrument, and a single catheter groove suffices for this particular form. There is ample room for two No. 6 Fr. catheters, or for one No. 11 (Figs. 7-8). A single outlet answers the requirements even when two catheters are employed; for the outlet may be capped with a double perforated tip.

A rational combination of the indirect and direct type of cystoscope was designed by F. Tilden Brown. In this instrument, the author's type of fenestra and catheterizing telescope were

* The cross section is shown in figure 5.

† Cross section of the infant catheterizing cystoscope.

** If a very large field be desired a larger telescope for catheterization may be inserted.

adopted for use in the Brown sheath. The combination of fenestra at the convex and at the concave aspect of the sheath permits of catheterization both by the direct and indirect methods. Although the so-called " universal " or " composite " instruments, combining the indirect and direct types of catheterizing telescope, are believed by some to possess certain advantages, it seems to me that many of the excellent features of the indirect instrument be-

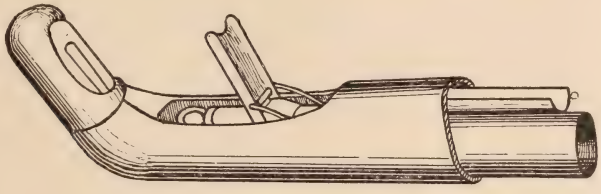
Fig. 4.

Fig. 5.

Fig. 6.

come lost when provisions for the direct method are made. Thus the beak is both too long and too sharply angulated for indirect catheterization. This as well as many other details have made me abandon the use of composite instruments.

From the standpoint of mechanics a cystoscope should possess the following features:—a sheath with provision for adequate irrigation, a large fenestra situated on the concave side, and a short beak set at the proper angle, permitting the close approximation of the mucosa and the telescope. There should be a fixed relation-



Figs. 7-8.

ship between the lid, the point of emergence of the catheter, the center of the lens system, the strength of the objective and the canonical distance. Such a cystoscope should pass two large catheters, permit of an interchange of telescopes, and make it possible to leave the catheters *in situ* whenever this is desirable. These requirements have been met in the round Type No. I, in the smaller Type No. II and in the oval Type No. IV. In all these instruments of the usual variety, the canonical distance has been taken at somewhat over an inch, between 25 and 30 millimeters,

and, in consequence, the magnifying properties of the lens system becomes very apparent when close objects are viewed.*

Inasmuch as the conservation of light is a *desideratum* it is much better to train the eye to become accustomed to a moderate sized inner field or, in other words, to become used to but moderate magnification by the ocular. The larger the inner field with a given objective, the darker is the picture. In the recognition of lesions and in the finding of ureters, the clarity of the picture must not be sacrificed to any apparent enlargement of the inner visual field. We have therefore cut down the size of the virtual image considerably in the older models, giving us brighter pictures, the actual field remaining the same.

Although it was thus found advisable to diminish the size of the picture in the catheterizing telescopes furnished with the optical system constructed along the lines laid down by Nitze, Otis and R. Wappler, recent experiments by R. Wappler and the author, stimulated by the work of Ringleb, have led to the development of an optical system which makes possible a more brilliant picture and larger field in slender tubes, than was formerly obtained in the tubes of larger calibre. The general principles of this system have already been published elsewhere, and the physical basis therefor shall be referred to in our section on the Optical Considerations.

With a knowledge of the intrinsic features, of the optical properties, and of the mechanical construction of the type instrument, comes the recognition of the work that it will do, but also an appreciation of its shortcomings for certain atypical cases. Let us consider for example, the difficulties that may be encountered when, because of our inability to dilate the bladder, the distance between the cystoscope and the trigone becomes considerably diminished. Such a condition is graphically illustrated in Fig. 9 in which the process of catheterization at the canonical distance, is shown. The approach of the ureter to the objective, in cases of contracted bladder is indicated by the dotted line (B. U.). As the proximity of the mucosa and the objective becomes progressively greater, magnification becomes marked and the deflector approaches the floor of the bladder. In such a case we must not push out too much of the catheter, the experienced eye being guided by the size of the ureter and the enlargement of the de-

* In the new upright system, we have reduced the strength of the ocular and also shortened the focal distance slightly. The magnification at close range is also considerably less than in the older systems.

tails of the mucous membrane. Thus in figure 9, the proper catheter length KU (in the dotted lines), for such circumstances is shown. For catheterization at close range all indirect types of instruments with a canonical distance of 25 mm. or more, leave something to be desired. A consideration of the same illustration makes it evident too that in calculating the fenestra, lid and working distance of the objective in a "baby" catheterizing telescope, we must be guided by a consideration of the mean distance between ureteral orifice and the sphincter (U to S), and must reduce the working length of the fenestra LK.

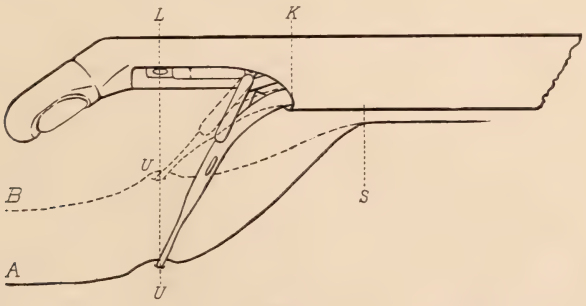


Fig. 9.

Difficulties increase in those cases where through anomaly, the ureter is situated very close to the sphincteric margin as shown in Fig. 10, for here the fenestra itself may partly lie in contact or even within the sphincteric margin, and the lid may act very close to, or almost in contact with, the mucous membrane.

The catheter then has a tendency to slide over the ureteral ostium (Fig. 10, D), it being difficult to utilize the requisite amount of deflection. In such cases we must not attempt to cathe-

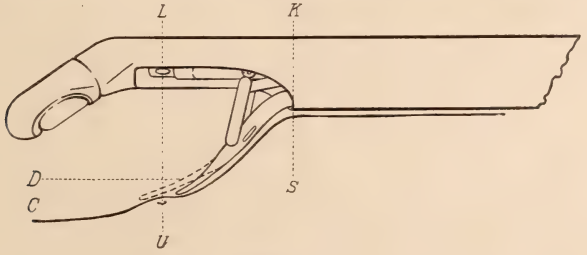


Fig. 10.

terize with the ureter in the center of the field, but it is better to push the cystoscope inward, which means that with inverted image the ureter occupies a high position in the field. Additional dis-

tension is another maneuver that is of value in such cases. Although failure is rare, we always have recourse to either the cysto-urethroscope, or to the author's so-called "close vision cystoscope," (Fig. 11), which shall now be described.

The essentials of this instrument are a working fenestra at the convex side of the sheath, and a telescopic system which is of the indirect type and adapted for work at very short distances. The sheath is slightly oval and carries a beak with the lamp exposed on the convex side. The window is spacious, being cut out at the inferior * surface for a sufficient distance in order to give room for the indirect method of catheterization. The telescope is provided with an optical system which resembles that which has been used in the cysto-urethroscope. The field, however, is somewhat larger and the deflection of the picture is somewhat less ** than 90, so that we are looking down but also very slightly forward.

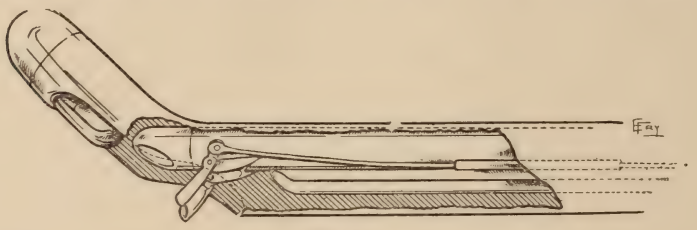


Fig. 11.

With this instrument we are able to catheterize at very short distances, a desirable feature, not only for cases of irritable and contracted bladder, but also in those anomalous cases where the ureter and the sphincteric margin are unusually close to each other. Furthermore it is possible to do operative work in the neighborhood of the sphincter, where the parts come into view with the same distinctness as in the cysto-urethroscope but more highly magnified. Whenever we suspect that an obstruction encountered by the ureteral catheter, is neither a stone nor of pathological nature, and where with the Type I cystoscope, the catheter will not pass into the pelvis of the kidney, a circumstance presumably due to the method employed, or possibly to a fold in the

* When in position for catheterization.

** A forward deflection of 5 degrees is sufficient if the instrument is to be used for near work only. In fact a right-angled prism could be employed if the working distance remain sufficiently short. More recently the sheath described by me in the Amer. Jour. of Dermat., May, 1911, has also been employed for near work.

ureter, we have been in the habit of using this new type of instrument. For, it permits of indirect catheterization, allows of a close approximation of the fenestra and the ureteric orifice, and produces less marked artificial curves or bends in the catheter before the ureteric meatus is reached. By deflection of the ocular, this instrument has been developed into an operating instrument which has been described in a recent publication.[1]

As to the question of the advisability of adopting the (convex) Brenner type of sheath in routine cystoscopy it may not be inadvisable to discuss in brief the relative value of the convex [2] and concave [3] types of instrument. The concave type of sheath was adopted by me because it permits of the employment of telescopes whose optical systems deflect the rays of light 90° just as in the Nitze cystoscope. When we consider the utilization of the convex variety (with the lamp placed at the convexity of the beak), we must be willing to sacrifice right angled vision (deflection of 90°) for a telescope that looks somewhat forward. For only in this way will the illumination become adequate. Were we to use the right angled telescopes the far portion of the field only would be well lighted, the near parts remaining relatively dark.

When I recommended the adoption of the lens system with an optical system the prism of which causes a deflection of *less* than 90° for purposes of close vision in the bladder and the urethra, I did not wish to imply thereby that such an optical system is best for routine work in observation and catheterizing telescopes.

The right angle is undoubtedly the best angle of deflection, and when used in the sheath of the concave [4] variety makes the most serviceable type of instrument. In the close vision [5] type of cystoscope, where we wish to work at close range, in the cystourethroscope,[6] and in the operating cystoscope [7] *only*, is a slight forward view permissible.

Although it appeared to me when devising the operating

[1] Amer. Jour. Dermat., May, 1911.
[2] Brenner type.
[3] Nitze type.
[4] Nitze type with lamp on the concave side of the beak.
[5] Amer. Jour. of Dermatology and Genito-Urinary Dis., Jan., 1911.
[6] Amer. Jour. of Surgery, May, 1910.
[7] Amer. Jour. of Dermatology and Genito-Urinary Dis., May, 1911.

cystoscope ¶ that a slight obliquity of vision or forward view would be attended by but little disadvantage, a more thorough investigation has shown me that such an optical system should only be employed for special work such as the rare cases where a close range is desirable, and for special operative procedures. *The distortion that is an unavoidable characteristic of the forward looking telescopes, makes their use inadvisable for routine cystoscopy and ureteral catheterization.*

Let us explain what is the nature of this distortion and what anatomical and physical factors are responsible for it. Every cystoscopist acquires sooner or later a conception of the appearance of the normal trigone, and he owes his notion of what is normal partly to his memory pictures of that which his cystoscope has unfolded to him and partly to his ability to interpret what is real and what is the product of optical illusion. If we do not take time to consider the relation of the cystoscope to the trigone in ordinary routine examinations we shall fail to notice that even at best the field suffers some distortion when viewed through a right angled telescope. The diagram (Fig. 28) gives

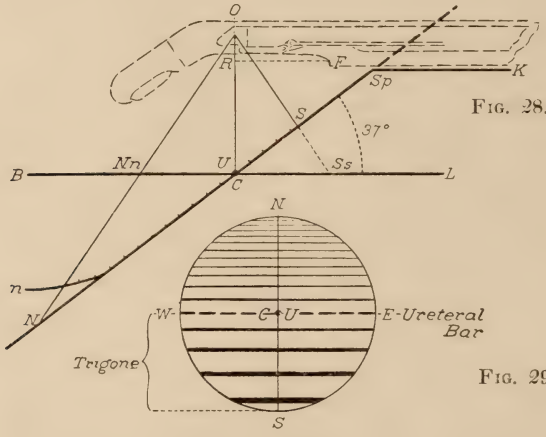


FIG. 28.

FIG. 29.

the position of the cystoscope and the plane of the trigone in an average case.* It becomes at once apparent that the near parts will be enlarged, the far part of the field will look small, thus giving a picture such as is represented in Figure 29, were we looking

¶ Amer. Jour. of Dermatology, May, 1911.

* In fact the declivity here taken as an illustrative example (37°) is less than is often encountered and results in less distortion than if the angle were 45°, which is often the case.

upon a ruled surface. By virtue of the obliquity of the trigone, foreshortening occurs so that the most important area of the bladder becomes smaller than it really is (in the antero-posterior diameter).

Does this picture change with the oblique vision telescope that must be employed in the "convex" sheaths? Obliquity of vision in the forward sense will exaggerate the distortion greatly resulting in a marked diminution of the sagittal diameter of the trigone as is illustrated by Figures 30-31, where the view of the trigone is evidently much reduced.

Fig. 30.

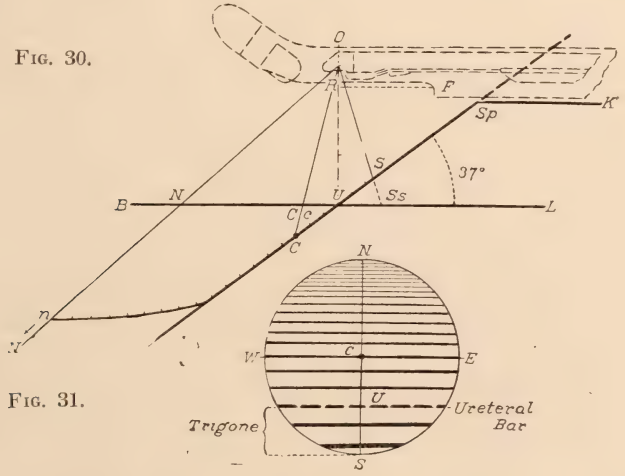


Fig. 31.

A still further disadvantage of the forward view is the circumstance that the objective lens must always occupy a point *distal* * to center of the field of vision. Therefore whenever the cystoscope is drawn back to view parts in the juxta-sphincteric region or distal part of the trigone the objective and deflecting mechanism will engage in the sphincter, sooner in this type of instrument, than in those employing the right-angled view. In truth, a true picture of the trigone could only be had if a right-angled telescope were placed with the long axis parallel to the plane of the trigone. This is impossible in practice. It can only be approximated by elevating the ocular, which limits the field to such an extent that we can judge only of detail and the topographic view is lost. The shortness of the trigone, therefore, and the foreshortening of all obliquely placed fields (except when

* In relation to the patient.

there is very close approximation of instrument and mucous membrane) are the great drawbacks of the oblique vision system.

It may be urged that the removal of the cystoscope to leave the catheters in the ureters, is easier of execution in the convex type, and that the likelihood of dislodging the catheters in this procedure is less. This contention does not hold in the case of the type proposed by me since the separability of the telescope and sheath, and the long fenestra furnish conditions that are ideal for the purpose in question. After the telescope has been removed the sheath may be withdrawn easily without fear of displacing the catheters.

In my own work I find it of value occasionally to employ a close vision instrument. For this end the convex type * or close vision type, furnished with a telescope of the variety used in the cysto-urethroscope, gives me good service. Being adopted for near work only, the forward obliquity of the line of vision need only be slight, or may be dispensed with altogether, whereas in a catheterizing cystoscope for routine work a greater degree of forward displacement is required to insure good light at greater distances.

The convex type carrying either the old or the new lens system,† is therefore not to be recommended for routine cystoscopy and ureteral catheterization, for:

1. It distorts and foreshortens the trigone, increasing the normal illusion due to the declivity of the trigone.

2. It necessitates the engagement of the fenestra and deflecting mechanism in the urethra when the distal portion of the trigone and when parts near the sphincter are viewed, making for traumatism and interfering with the action of the catheter deflector.

3. It diminishes the diameter of the trigone in an anteroposterior sense, abbreviating the working distance, making the approximation of the instrument and the mucous membrane a prerequisite of good vision.

4. It offers no advantage over the author's concave type other than that of facilitating the approximation of the objective lens and mucous membrane in those cases where the capacity of the bladder has suffered great reduction. In these instances a specially short lamp used on the concave type will even nullify this advantage.

* Buerger: Amer. Jour. Dermatology and Genito-Urinary Dis., Jan., 1911.

† Buerger: New York Medical Jour., April, 1911.

The field of usefulness of the convex type should therefore be restricted to close vision when it is furnished with a special * optical system and for operative work when provided with an angulated ** telescope.

Let us now take a brief survey of those optical principles that explain the development of the most recent improvements in the lens system of the cystoscope, and then give the details of a system that embodies in a satisfactory way the results of experimentation along these lines.

II. OPTICAL CONSIDERATIONS

For a thorough comprehension of the improvements that have been made in the lens systems of cystoscopes during the last few years, it may be well to review briefly some of the underlying elementary physical facts. It will be remembered that the single telescope system exclusive of the prism, consists of an objective lens or lenses, a middle lens or inverting lens, and an ocular or eye piece. The function of the objective is to gather the rays of an object or field, into the narrow confines of the telescope, (Fig. 12) and thus to form a real inverted picture at a point not very far removed from the image side of the objective or field lens. This reduced picture is transplanted by the middle or inverting lens to the eye or ocular extremity of the telescope, where it is taken up by the ocular, and enlarged so as to become visible. The eye sees a virtual, enlarged image, whose apparent size depends in a general way upon the diameter of the telescope and the magnifying power of the ocular. The illuminated disc that is seen when the objective of the telescope is held towards the sky, may be called the " inner field " or apparent or virtual image, the true " outer field " varying with the relative position of the objective lens and field upon which the telescope looks. Thus as the objective approaches the object to be seen, the extent of the actual or outer field diminishes, whilst it becomes enlarged. The reason for this must be apparent when we consider that the angular field of view, (namely that cone which represents the visual potential of the objective), is approximately† constant. At infinity, a cystoscope telescope will have an infinitely great field of view; and as the field approaches the telescope, its area will become progressively less. A simple explanation for this has been given by the author in a previous communication‡ and will not be repeated here.

* Optical system of the author's cysto-urethroscope.

** Buerger: Amer. Jour. Dermatology, May, 1911.

† See detailed discussion given in footnote on following page.

‡ *Amer. Jour. Surgery,* May, 1910.

In the paper referred to, a mathematical discussion was omitted for the sake of simplicity, and an explanation was given, which although not exact from a mathematical standpoint, was sufficiently reliable for those not interested in the more intricate phases of the optical problem.†

A good cystoscope telescope must not only bring clearly into

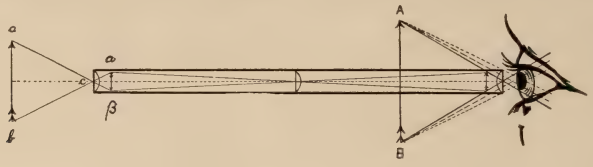


Fig. 12.

view a fairly good sized area of the bladder but must also give a well illuminated, bright picture. For our perception of the details of a picture depends greatly upon the amount of light that enters the pupil of the eye. Thus we may enlarge the inner or virtual field by the use of a strong ocular, just as we may magnify the picture in the microscope. But the clarity of the picture will suffer greatly thereby. The experienced microscopist as well as the cystoscopist will soon learn the great value of concentration of light in the telescope and will prefer a " light-strong " telescope to one giving a large but dark view.

Without taking the illuminating sources into consideration, confining ourselves to the working of the telescope alone, the amount of light entering the optical system, can be measured by what is termed the " entrance pupil." The limits of the entering beam of light are confined by an imaginary diaphragm which we

† For those who may wish to study the problem of magnification, as well as of the variations in the position of the telescopic image, the following discussion may be of service. It would be best to defer a perusal of it until the general considerations of geometrical optics to be given later on, have been mastered.

Given an objective lens of a focus (F) of say 3.5 mm. a canonical distance of the field from the telescope, of 30 mm. (e); a maximum lumen of 5.0 mm. $= 2Y$. Let $x = e - F$. Then according to formula (1) $\frac{Y}{y} = \frac{F}{x} = \beta$, ($\beta$ being the relationship between size of image and object.)

When $e = 30$ mm. $\beta = \frac{3.5}{e-3.5} = \frac{3.5}{30-3.5} = 0{,}13$

Say $Y = 2.5$ (one half of the tube lumen)
then $y = 19$.
When $e = 10$ mm. $\beta = 0.54$ for the same angle,
then $y = 6$ and $Y = 3.24$.

Therefore the image would vary from 2.5 to 3.24 mm. The angular field of view would therefore not be constant when it is limited by the diameter of the telescope.

can place in front of the objective or field lens. This pupil is the image of that stop, or diaphragm which will to the greatest extent limit the divergence of the entering beam into the object lens. To illustrate:—Let L S R T (Fig. 13) be the ocular half of a cysto-

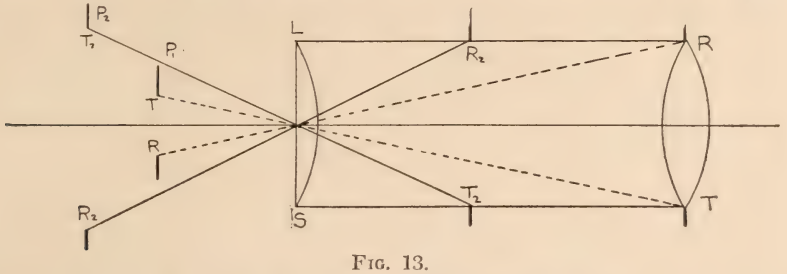


Fig. 13.

scope system, L S the objective and R T the middle or inverting lens. It is evident that only that entering beam will be effective which can pass an imaginary stop or diaphragm, (P′) erected at a point where image of the middle lens T R would fall if projected through the lens into the object space. Let us construct the image of T R at P. A wider beam would come to a focus in the telescope before reaching the middle lens, and thus become lost to the eye. Only that beam will be wholly preserved which is limited by the image of the stop T R in the object space.

Given an inverting lens nearer to the objective. How will this affect the size of the pupil? R_2 T_2 will have an image at P_2 and will consequently allow a larger beam to enter. The entrance pupil becomes larger as the distance between the objective and middle lens diminishes. We shall see from the equations that are to follow how the pupil can be measured.

Let us explain the workings of the pupil by Figure 14 in

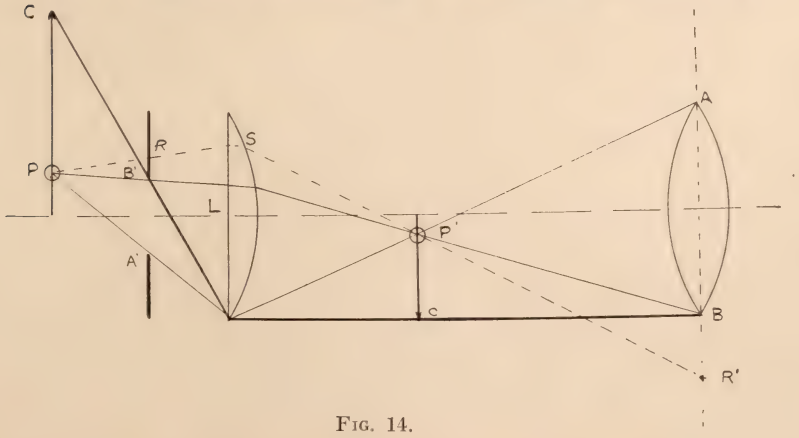


Fig. 14.

which A B is the middle or inverting lens, L is the objective lens, the aperture between A′ and B′ being the entrance pupil, and C P the object plane. The beam of light (A′ P B′) limited by the pupil and emanating from P, will be focused at P′ where its rays diverge and fall upon A B. A ray P R falling outside of the pupil, will naturally strike the wall of the telescope in its passage towards the imaginary point R′. Hence only those beams that are limited by the entrance pupil and that fall on the objective lens will come into play.

ELEMENTARY FORMULÆ

The mathematical solution of the size of the entrance pupil is easy if we understand certain fundamental facts and equations. We may graphically show the method of finding the image of an object through a simple lens, as given by Gauss, in the following diagram. (Fig. 15.) The object of O B has for its image I M; L S, and Ll Ss representing the principal planes of a simple lens. Construct B S through the principal focus f; it will emerge parallel to the axial ray. Similarly B L, parallel to O C will pass through the focal point f′, and meet S-Ss at M. I M will be the image. In the same way Ii-Mm is the image of Bb-Oo.

From this diagram we obtain the following:

$$O\ B:\ C\ S = f\ O:\ f\ C$$

Let $O\ B = y$; $I\ M = Y$;

$O\ f = x$; $f'\ I = X$

$f\ C = F$

$$y : Y = x : F$$

$$\frac{Y}{y} = \frac{F}{x} \qquad \text{Formula (1)}$$

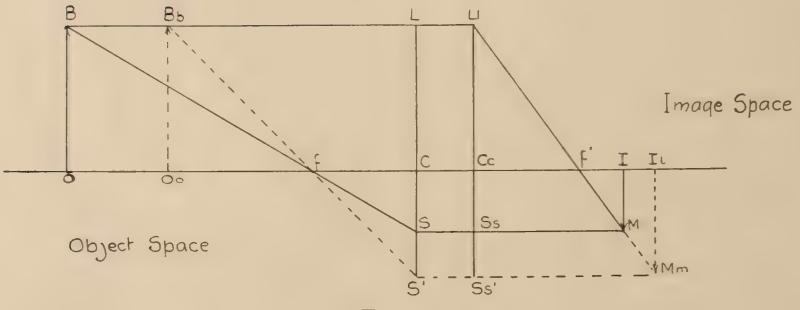


Fig. 15.

The size of the image is to the size of the object as the principal focal length is to the distance of the object from the principal focus.

A simpler diagram is given in (Fig. 16) where O B is the image, L C S the objective lens and I M the image in the telescope. For the sake of clearness, only one half of the linear object and image are shown. Let x be the distance from object to the principal focus; X, from image to the principal focus.* Let e be the distance between object and objective; E between image and objective. The canonical distance for air is 25 to 30 mm. and shall be taken as 30 mm. in our calculations. Furthermore to avoid additional calculation, the difference of refractive index of the boric acid solution, on the side of the object space, and the air, on the side of the image space, will be neglected.

Let us calculate for air where the relations are simpler than in the immersion system ** actually employed. The changed relations due to the immersion of the objective in boric acid solution,

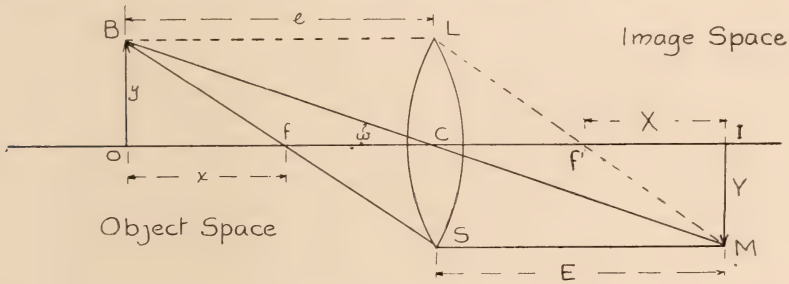


Fig. 16.

shall be considered later. Let angle w be one-half the angular field of view, taken for a given lens as 35°; Y the image, F the principal focal length (Fig. 17). Y occupies one half of the diameter of a given telescope tube which we shall take as 5.0 mm.

$$\text{Then } \tan w = \frac{Y}{F}$$

$$F = \frac{Y}{\tan w}. \qquad \text{Formula 2.}$$

The focal length is equal to the ratio of the linear magnitude of the image formed in the focal plane, to the apparent angular

* Plus and minus signs have also been omitted.

** The objective is immersed in the filling fluid, usually either boric acid or oxycyanate of mercury solution.

magnitude of the infinitely distant object; Y being the image of objects at infinity.

$w = 35^\circ \quad \tan w = .70$

Y = one half of the tube diameter,* = 2.5

$$F = \frac{2.5}{.70} = 3.57 \text{ mm.}$$

The focal distance of the lens is then 3.57 if the instrument were used as a telescope, giving for an infinitely distant object with an angular field of view of 70°, an image filling the whole tube. (Fig. 17.)

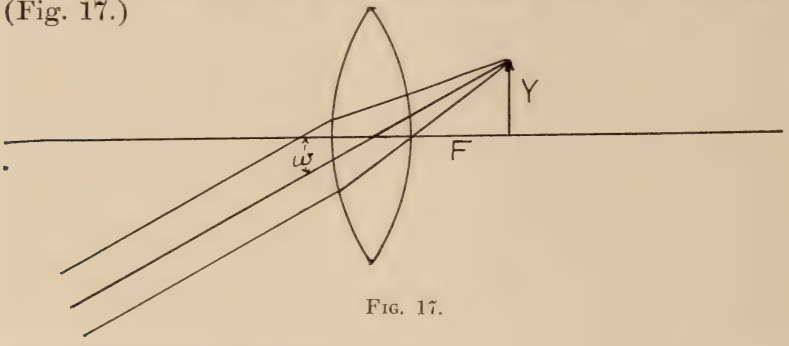


Fig. 17.

Referring to figure 16 we have

$$\frac{y}{Y} = \frac{e}{E}$$

Formula 3.

Given $\frac{Y}{y} = \frac{F}{x}$ $\qquad x = e\text{-}F$

$$\frac{Y}{y} = \frac{F}{e\text{-}F}$$

$$x = e\text{-}F = F.\ \frac{y}{Y}$$

$$e = F + F.\ \frac{y}{Y}$$

Formula 4.

$$F = \frac{e}{1 + \frac{y}{Y}}$$

$$= \frac{e}{1 + \frac{e}{F}} \qquad \text{since } \frac{y}{Y} = \frac{e}{E}$$

$$= \frac{Ee}{E + e}$$

* Allowing for lens mounting, if the total tube diameter be over 5 mm.

$$\frac{1}{F} = \frac{E+e}{Ee} \quad ; \quad \frac{1}{F} = \frac{1}{e} + \frac{1}{E} \qquad \text{Formula 5.}$$

From Formula 4

$$F = \frac{e}{1 + \frac{y}{Y}}$$

$$\tan w = \frac{y}{30} \qquad \text{(Fig. 16.)}$$

$$y = \tan w\ (35^\circ) \times 30$$
$$= .70 \times 30 = 21.$$
$$Y = 2.5$$
$$F = \frac{30}{1 + \frac{21}{2.5}} = 3.19 \text{ mm.}$$

Translated into words this means that when the tube diameter is 5 mm. and there is an angular field of 70°, the focal length of the objective for objects at the canonical distance of 30 mm. is approximately 3.19 mm.

The Size of the Entrance Pupil: To find equations for determining the size of the entrance pupil.*

Let 3.19 be the principal focal length of the lens and the middle lens 5.0 mm. in diameter, situated at 100 mm. (1/2 tube length) from the lens, to find the image of this stop or diaphragm. In figure 16, let

y = the object; Y = the image.
x = distance from the object to the principal focus of the lens.

Then $\frac{Y}{y} = \frac{F}{x}$ (see formula 1)

$y = 2.5$

$F = 3.19$

$x = 100 \text{ mm.} - 3.19 \text{ mm.}$

$$Y = \frac{2.50 \times 3.19}{100. - 3.19} = .082$$

or the entrance pupil is twice Y = .164

* For a system used in air.

From this it becomes apparent that the size of the entrance pupil depends upon the distance of the middle lens from the objective, as already seen in our diagram, figure 13. Since $Y = \frac{y\ F.}{x}$ the greater the distance between the middle lens and objective lens, the smaller the pupil, and conversely.

Formula for Pupil: Another way of arriving at a formula for the pupil is as follows:—

n = the number of focal lengths contained in the distance between middle lens and principal focus of the objective lens; i.e.

$$n = \frac{x}{F}$$

$$\frac{Y}{y} = \frac{F}{x} = \frac{F}{e-F}$$

$$= \frac{1}{\frac{e-1}{F}} = \frac{1}{n}$$

$$\frac{F}{x} = \frac{F}{e-F}$$

$$\frac{x}{F} = \frac{e-F}{F} = \frac{e-1}{F} = n$$

$$n + 1 = \frac{e}{F}$$

$$F(n + 1) = e \qquad \text{Formula 6.}$$

(or more simply, it is evident that $\frac{e-1}{F} = n \therefore F(n + 1) = e.$)

$$\frac{Y}{y} = \frac{F}{x} = \frac{1}{n}$$

$Y = 1/2$ pupil

$$2\ Y = \frac{2\ y}{n} \qquad \text{Formula 7.}$$

From formula 6

$$e = 100.$$

$$n + 1 = \frac{100}{F} = \frac{100}{3.19} = 31.35$$

$$n = 30.35$$

$$2\ Y = \frac{2 \times 2.5}{30.35} = 0.164$$

(compare with figure previously found in the paragraph on the "Entrance Pupil.")

CALCULATIONS FOR A THEORETICAL SIMPLE SYSTEM.

Let us put the formulas thus far obtained into actual use in calculating the strength of the lenses and the size of the pupils and the field of view in the case of a simple cystoscope provided with but one middle or inverting lens. (Fig. 18.)

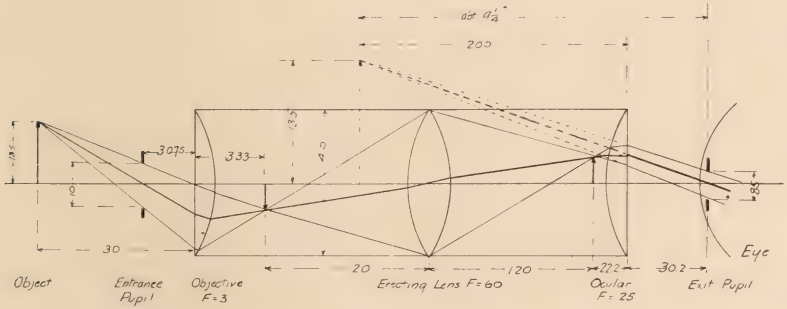


FIG. 18.

Assume the principal focal length of the objective to be 3 mm., and that the distance of the object from the field or objective lens to be 30 mm. (canonical distance).

According to Formula 1

$$\frac{Y}{y} = \frac{F}{x};\ \text{so also} = \frac{X}{F}$$

then $xX = F^2 = 9$

$x = 27$ (30–3), hence $X = .33$ mm.

Hence distance of the first image from objective is 3.33 mm.

Assuming a tube diameter of 4 mm., and a maximum field of view stop of 3 mm., the following figures may be obtained. Let it be remembered that this 3 mm. is purely theoretical, and that a

larger figure, that is a larger first image may be obtained in a tube of 4 mm.

Then, since $\frac{Y}{y} = \frac{F}{x} = \frac{X}{F}$

$$y = Y. \frac{x}{F}$$

$$\text{or } \frac{1.50 \times 27}{3} = 13.50$$

or Diameter of field view = twice this or 27 mm.*

Assume the distance from the first image to the middle lens is 120 mm.† *To get the size of the entrance pupil.*

$x = 0.33 + 120 = 120.33$; Tube diameter 4 mm.;**

$$y = \frac{4}{2} = 2$$

$$Y = \frac{yF}{x} \qquad Y = \frac{2 \times 3}{120.33} = .05 \text{ (approximate)}$$

P or pupil = 2 Y = .10 mm. in diameter.

To get the distance of the entrance pupil from the objective, we have from the formula cited above,

$$X = \frac{F^2}{x} = \frac{9}{120.33} = .075 \text{ (approximate)}$$

Since distance = F + X, = 3 + .075 = 3.075 mm.

The angular field of view (w).

$$\tan w = \frac{13.50}{26.925} = .50 \text{ (approximate).}$$

(for tan w = y divided by the canonical distance (30) minus the pupil distance, 3.075.)

Hence, tan w = .50 = 26° 34′ total angle = 53° 8′.

This is small, as is to be expected from such a small first image, and, in view of the size of the tube and the relatively large dis-

* For a field of view stop of 4 mm., in which case the first image would necessarily fill the whole tube, a larger field would result: Thus $\frac{2 \times 27}{3} = 18$; $2y = 36$ mm. In actual practice such a large field is difficult to obtain.

† Total tube length about 250 mm.

** It will be appreciatel that we are assuming a very thin tube.

tance of the inverting lens, 120 mm., the total tube length being about 25 cm.

Let us assume an inverting middle lens with a principal length of 60 mm. This is the approximate focal length of this system. For we wish to displace the first image to a point equally removed from the other side of the lens. To do so $X = F$.

In the formula $\frac{Y}{y} = \frac{F}{x} = \frac{X}{F}$

$$\text{then } \frac{F}{x} = \frac{F}{F} = 1.$$

$$\text{Hence } x = F$$

$$\text{or } x + F = x + F$$

$$2F = 2F.$$

That is, an image at a point twice the focal distance is brought to a focus at a point twice the principal focal distance. Hence we select a focal length equal to one half the desired displacement. This is 120 mm., in this case, and hence we take it as 60 mm.

According to such an arrangement the inverted second image near the ocular will be 120 mm. from the middle lens, and of 3 mm. diameter.

Assume an ocular with principal focal length of 25 mm. According to the usual custom, let the final image appear to be of the same size as the object, say 27 mm. in this system.

$$\text{then } Y = 13.5$$

$$y = 1.5$$

$$F = 25.$$

$$\text{Since } \frac{Y}{y} = \frac{F}{x}$$

$$x = \frac{F.y}{Y}$$

$$= -25 \times \frac{1.5}{13.5}$$

$$= -2.8 \text{ (approximate)}$$

This gives us $25 - 2.8 = 22.2$ as the situation of the second image near the ocular.

The distance of the virtual image produced by the ocular may be calculated thus:—

$$\text{Since} \frac{Y}{y} = \frac{X}{F}$$

$$X = F. \frac{Y}{y} = F. \frac{(-13.5)}{1.5} = F. (-9).$$

Hence $X = 25. (-9) = -225$ mm.

Hence distance of this image $= -225 + 25 = -200$ mm., or about 8 inches from the ocular lens.

To find the exit pupil.

$$y = 2$$
$$x = (120 - 2.8) = 117.2$$
$$F = 25$$
$$Y = \frac{2. (2.5)}{117.2} = .427 \text{ (Diameter of pupil} = .854.)$$

Location of exit pupil.

$$X = \frac{F^2}{x} = \frac{625}{117.2} = 5.2$$

Then the total distance of the final image from the eye = 230.2 mm. = about 9 1/4 inches, which is good enough for clear vision and easy accommodation. (Fig. 18.)

These calculations have not been given in order to afford an example for the construction of a simple cystoscope, but to point out a simple way of arriving at certain data in any cystoscope: these are the various focal distances of the lenses, the size of the field and size of the pupils. It must not be forgotten that the immersion of the objective end of the telescope has not been taken into consideration. The formulae employed, too, have been simplified and of course apply only to theoretical lenses, where thickness of the lens and other more complicated optical features have been ignored. In general, however, if we follow the line of reasoning and the calculations given, these data can be taken as illustrating the general method that is applicable to the construction of an optical system for a cystoscope.

CONCERNING THE ATTAINMENT OF INCREASED LIGHT

In a previous discussion it has already been shown how the size of the entering beam determines the amount of entering light

and how this depends on the situation of the stops, the size of the tube and the strength of the objective lens. We may now amplify this introduction into the subject of available light, by considering first the approximate theoretical formulae and then taking a concrete example as is afforded by the new optical system adopted by the author.*

Referring to our old formula $\frac{Y}{y} = \frac{F}{x}$ we have for the estimation of the pupil, $Y = \frac{y\ F}{x}$; Pupil $= 2\ Y$. For a practical discussion, x may be taken as the distance of the inverting lens from the objective, when discussing the entrance pupil, and from the ocular, in the case of the exit pupil.

y = 1/2 tube diameter, hence is constant.

F = either objective or ocular focal lengths; in considering telescopes these are constant.

Hence, Y or En (entrance) = a constant, say $\frac{C}{x}$; or 2 Y, 2 En, is inversely proportionate to the distance of the middle lens. Now for a simple system with one middle lens, and one inversion, this distance is say 120 mm.

$$\text{Thus, } En = \frac{C}{120}$$

Let us suppose that the distance x, is reduced by virtue of the employment of two inverting equidistant lenses, to 80 mm.

$$En' = \frac{C}{80}$$

$$En : En' = 80 : 120$$

or this system gives $\frac{120}{80} = \frac{3}{2}$

That is the diameter of the entrance pupil of system En′ is 3/2 as large as of system En. Since the total increase of light is proportionate to the area of the entrance pupil,

$$\frac{3^2}{2^2} = \frac{9}{4} = 2\tfrac{1}{4} \text{ times as much light.}$$

In the new system adopted by the author where there are six

* New York Med. Journal, April, 1911.

middle lenses, with an approximate interval (x) of say 40 mm., we gain as follows:

$$\frac{En''}{En}(\text{new system}) = \frac{120}{40} = 3$$

The diameter of the pupil En'' is three times as large as of En, or the area is about 9 times * that of the first system considered.

We may also put the subject in the following way, developing a general formula expressing the relationship between entrance pupil, exit pupil, and principal focal distances of the objective and ocular. En = entrance pupil; Ex = exit; D = diameter of stops; A = distance between objective and middle lens; B = distance between ocular and middle lens; and L = tube length; F = principal focal length of objective; F of ocular.

Then $En = \frac{D.F}{A}$ approximate (see above) $Y = \frac{y\ F}{x}$

$$Ex = \frac{D.F'}{B} \text{ approximate}$$

$$A = B = \frac{L}{2}$$

$$En = \frac{D.F}{\frac{L}{2}}$$

$$Ex = \frac{D.F'}{\frac{L}{2}}$$

$$\frac{Ex}{En} = \frac{F'}{F}$$

THE REDUCTION OF THE ANGULAR FIELD IN ACTUAL PRACTICE

When a cystoscope is used in boric acid solution, the refractive index of this solution must be taken into consideration. We are dealing with an immersion system in which a reduction of the size of the angular field occurs. In a general way we may say that an object must be considered as lying further removed in the solution than in the air, or we may say that an object must be far-

* This is only approximate since the first middle lens may not absolutely determine the position of the stop that gives the entrance pupil. For a general discussion, however, these figures will do.

ther removed in the fluid in order to be brought to the same focal point. Thus the objective lens system is practically weakened, if we may use this term.

In judging of the size of the field of a cystoscope we must therefore not be guided altogether by what we see in air, since a considerable reduction occurs in actual practice.

For those who are interested in the mathematical solution of the influence of different refractive indices, the following discussion may be useful.

Reverting to our formula $\frac{Y}{y} = \frac{F}{x} = \frac{X}{F}$ in which we have made no distinction in the focal distances, since in air

$$F = -F'$$

$$xX = F^2$$

$$\text{then} \quad x = \frac{-F'^2}{X} = \frac{-FF'}{X}$$

Now let x = the changed distance of the object in boric acid solution.

F = the changed focal distance in boric acid solution.

n = refractive index of boric acid solution = 1.335.

Then the new focus

$$F = -nF'$$

$$x = \frac{-FF'}{X}$$

since $xX = FF'$.

If we multiply F′ by n, we must also multiply X.

$$\text{Hence} \quad x = \frac{FF}{x} = \frac{F.nF'}{x} = \frac{F'^2}{\frac{x}{n}}$$

$$X = \frac{x}{n}$$

$$\text{Hence} \quad x = nX$$

Hence the distance of the objective is to be multiplied by n(1.335). This means that by immersion in boric acid, the field will have to be situated at a point further removed from the objective [n(1.335) times x] to give the same focal distances in the telescope.

To find the effect on the angular field.

$$\frac{y}{Y} = \frac{x}{F}$$

$$y = \frac{Yx}{F} = \frac{Yx}{F}$$

Since $F = nF$ and

$$x = nX \quad y = \frac{YnX}{nF} = \frac{Yx}{F}$$

y remains unchanged.

Hence y (one half diameter of new field) at $n.x = y$ at x.

$$\tan w' \text{ (of new field)} = \frac{y}{n.x}$$

$$\tan w = \frac{y}{x}$$

Since $y = y$

then $\tan w' : \tan w = x : x$.

But $x : x = 1 : 1.335$.

Therefore at canonical distance, say 25 mm., x being constant, y or $\frac{1}{2}$ the angular field can be obtained by dividing by 1.335.

These formulæ expressing on the one hand the effect of an immersion system on the focal distance and on the size of the field, must not be taken as accurate. For, as has been pointed out before, in this discussion, we are dealing with a hypothetical system in which the lenses have practically no thickness. No allowance has been made for this, in order to avoid complicated formulæ. For our purpose it is sufficient to be able to draw the conclusion, that in watery solutions there is considerable variation in the size of the field, depending largely on the refractive index of the fluid employed.

CONCERNING THE USE OF DIFFERENT TYPES OF PRISMS

A comprehensive disquisition on this most interesting part of the optical system of the telescopes, would carry me too far and I shall therefore confine myself to a brief mention of those varieties of prisms and lenses, that have geen found most useful. The

right angled prism (Fig. 19) employed by Nitze together with

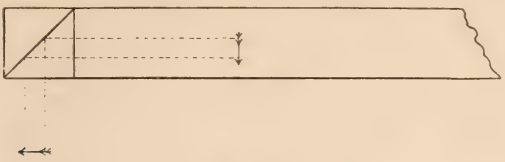


Fig. 19.

one or two convex lenses, composes the objective of the simple Nitze telescopes. Such a prism causes one reversal of the picture in the sense of North and South, and no change in the East and West points.

In this country, through the efforts of Otis and Wappler, a distinct improvement in the Nitze prism was achieved, by the construction of the hemispherical lens (Fig. 20). If the plane surface of such a lens make an angle of 45° with the axis of the telescope, a portion of its spherical surface serves for the entrance of the field rays and the rest of this surface turned towards the telescope tube, becomes a convex lens for the exit of rays in their path into the tube. Such a prism or lens-prism combines then the virtues of a simple prism with the properties of a convergent lens. For the construction of simple telescopes, at moderate cost, such a combination of prism and lens must appeal to the cystoscope maker.

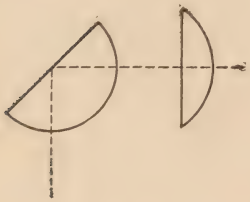


Fig. 20.

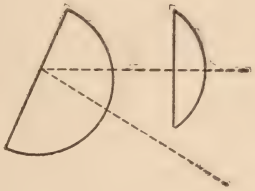


Fig. 21.

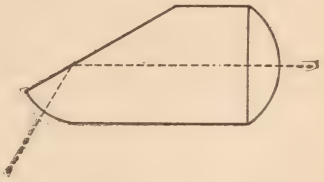


Fig. 22.

In actual practice, besides giving an increased angular field of view, this lens has the additional advantageous property of bringing into better view parts of the field that are practically in contact with it. Thus in viewing the internal sphincter, the advantage of the Otis-Wappler system becomes at once apparent. This feature was formerly of more importance than to-day, inasmuch as we are now able to see the sphincter and posterior urethra with great distinctness by means of the cysto-urethroscope.*

* *Amer. Journ. of Surgery,* May, 1910.

By a backward tilt of the hemispherical lens it is quite easy to obtain a retrograde view as shown in (Fig. 21). So also by a forward tilt, and an additional convex surface, a useful prism for forward vision is secured.** (Fig. 22.)

A recent advance in the construction of cystoscope objectives is found in the prism lens used in the author's cysto-urethroscope. I will not dwell at length upon the properties of this prism here, since the latter has already been presented elsewhere.† Suffice it to say that the prism in figure 23 causes a double reflection of the entering rays, in the sense of North and South, thereby producing a first image in the prism, whose North, South, East and West points have not suffered interchange of position, as in the case of the Nitze and Otis-Wappler prisms. Combined with a convex lens or made out of a cylinder with a convex surface ground at one end, this prism lens has been found indispensable where the requirements of "close vision" have to be met. Thus it makes the ideal objective for the cysto-urethroscope, as well as for any other instrument whose function it is to bring objects at *very close range* into view. It may even be ground out of an Otis-Wappler prism as shown in (Fig. 25).

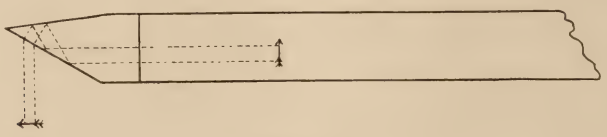


Fig. 23.

By the addition of a strong convergent lens, in the form of a bar carrying a convex surface at one end, we are able to increase the angular field of the prism lens just described, and can employ it for the construction of observation telescopes where an upright and side-correct picture is desired (Fig. 24). The conservation of the relation of the North and South points in this variety of prism as compared with the right angled prism, is illustrated by Figs. 19 and 23.

Finally, for the new, "light strong" system * described later on, we have again come back to the use of the hemispherical lens, the field aspect of which is ground flat. The correction of inverted points of the picture is brought about by an additional

** Suggested by F. Tilden Brown.

† Jour. Amer. Med. Ass., Mar. 26, 1910; Amer. Jour. of Surg., May, 1910.

* *New York Med. Journal,* April, 1911.

prism placed in the ocular, just as it had been accomplished in the Frank modification of the Nitze cystoscopes.

III IMPROVED OPTICAL CONSTRUCTION OF CYSTOSCOPES

In the discussion on Optics, I have attempted to give in as simple a manner as possible, the working formulæ by means of which it is easy to determine the following: — the requisite focal

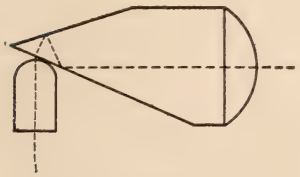


Fig. 24.

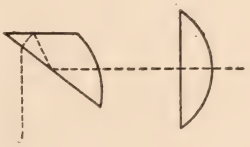


Fig. 25.

length of the various lenses, the size of the tube images, the angular field of view, and the size of the entrance and exit pupils. Further, the calculations for a hypothetical simple cystoscope were given, and the importance of the pupil in determining the amount of light delivered through the telescope was briefly considered. For those who are not interested in the mathematical aspect of this subject, the matter may be put in somewhat different form. Since it is particularly the question of increase of light and of field of view that appeals to the cystoscopist, I will review, here, the essential facts that are important in an understanding of the new optical systems now being adopted for the author's instruments; for these systems give more light and a larger field than the older types.

In the development of recent improvements in the design of the catheterizing cystoscope, it was necessary to sacrifice certain optical features that are of advantage in the ordinary observation instrument. In order to gain room for two large catheters, the size of the telescope had to be correspondingly diminished. This was necessarily attended with a loss of light and a certain constriction of the field of view. Although I believe that the angular field of view of the cystoscope designed by me some three years ago is quite as large as that of any other cystoscope employing a telescopic tube of similar diameter, it was deemed desirable to direct our efforts towards improving both the field of view and the

amount of light. From the optical standpoint, it is of greater importance to obtain a brilliantly illuminated picture than one of large surface capacity. It was particularly in quest of an optical system giving ample light that the efforts of Ringleb in Germany, and of other workers in this field, have been directed.

R. Wappler, in his construction of the Otis-Wappler-Nitze telescopes, had already approached the solution of part of the important problem of illumination, when he increased the number of lenses between the objective and ocular. Since then Ringleb had achieved even better results by a still greater multiplication of lenses. In his system an Amici prism and several middle lenses were employed. The reason for the utility of increasing the number of middle lenses in the telescope is very easily comprehended if we remember that the amount of light is, to a great extent, determined by the size of the beam of light that can enter the objective. The entrance beam is theoretically limited by the so-called "entrance pupil."

For the sake of clearness let us recall to mind the arrangement of lenses in a simple cystoscope telescope in which for simplicity, the prism has been omitted, and which consists of an objective, a middle lens, and an ocular.

Referring to figure 12 we see that the actual field is concentrated as it were by the objective, which forms a minute image of a relatively large area, at a point close to the lens and indicated in the diagram by the small arrow. This small image is transplanted by the middle lens to a point close to the ocular, where it is enlarged by the latter. It is then evident that only the rays of light that strike the middle or inverting (for it inverts the first image) lens reach the eye. The question then arises as to what rays really do strike the inverting middle lens. Fundamental optical principles teach us that the size of the entering beam is determined by the so-called "entrance pupil" of the lens system under consideration. To ascertain the site and size of the entrance pupil of a simple cystoscope, the system must be regarded as composed of a "stop" at the situation of the middle lens, and of an objective (one or more lenses) placed just behind the prism. The size of the pupil is measured by an imaginary diaphragm such as can be constructed in the object space in front of the objective, and which shall represent the image of whatever interferes with the rays at the site of the middle lens. Theoretically the limitation of light at the site of the middle lens is dependent on the tube

wall or the lens margin. Practically this " stop " is somewhat less than the tube diameter, since all the peripheral rays falling on the lens are not available. If we construct an image of the middle lens, as if it were thrown backward through the objective into the object space, we will have the so-called " entrance pupil."

Figure 14 will explain how the rays are limited by the entrance pupil. Let L be the objective, A B the middle lens of the cystoscope, C. P. the plane of the field, and P′ C′ the image thrown in the tube by the objective lens. Let us construct B′ A′ as the image of the stop A B. Then only such rays from the object C P will strike the middle lens, as are limited by the imaginary diaphragm B′ A′. The beam of light B′ P A′ enters the lens S, is focused at P′ and meets the middle lens A B; in other words, it can reach the eye. Let us follow the ray P R S that falls outside of the pupil B′ A′. Such a ray intersects the others at P′ but strikes the tube in its further course to R′ and is almost lost. It is evident then that the amount of entering light is determined by the size of the entrance pupil.

If we diminish the distance between the inverting lens and the objective, the conjugate image of this lens or stop will be situated farther from the other side of the objective and the pupil will be correspondingly larger. Let L S (figure 13) be the objective, R T, the middle lens and T R be the image of R T on the side of the object space.* T R is the entrance pupil (P_1). Given a system in which the inverting lens is placed at R_2 T_2. The entrance pupil will be situated farther from the objective, at T_2 R_2 and will be larger.** With a larger pupil, we attain the desideratum of a larger entering beam of light and consequently better illumination. In order to conserve this light and to keep the exit pupil (or that which is determined by the ocular side of the lens system) relatively large, we must again multiply our lenses, on the ocular side of the system for the same reason already given for the objective side of the telescope.

After considerable experimentation a combination of lenses and prism was adopted for the catheterizing cystoscope, which, thanks to the skill of Mr. Reinhold Wappler, seems to give a

* By " object " space we mean the space in which the objects lie, in contradistinction to " image space " which is situated inside of the telescope.

** For the sake of clearness the size of the pupils P_1 and P_2 has been greatly enlarged. In the cystoscope system these pupils are usualy very small in relation to the tube lumen.

larger field and more light than any other cystoscope of the same or even larger diameter constructed heretofore. For the objective, we have employed the most recent improvement of the Otis-Wappler prism, namely the hemispherical lens with one plane side. To increase the angular field, one, and in thin tubes, two plano-

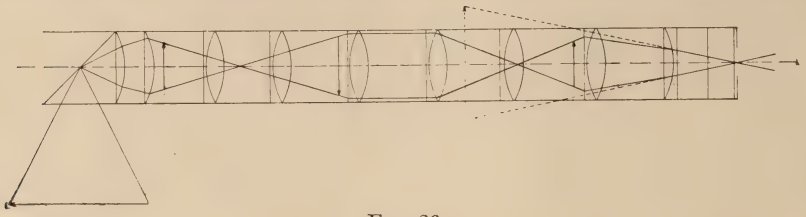


Fig. 26.

convex lenses, were added. Six middle achromatic lenses and an ocular lens make up the rest of the system.

Let us follow the course of rays in this combination of lenses. The objective lenses bring about one reversal of the picture, and the middle lenses are so selected and placed as to cause two additional reversals. In the sense of North and South, the prism causes another reversal, so that we have a total of 4 reversals for North and South points, and 3 reversals for East and West points.

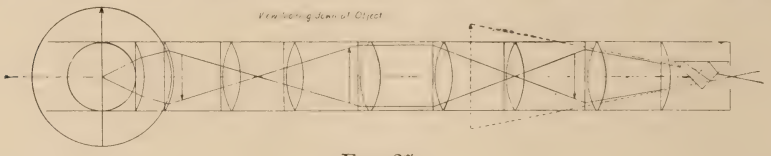


Fig. 27.

This naturally results in the production of an image whose North and South poles are upright and correct, and whose East and West points are reversed. The interchange of these points is then brought about by a simple reversing prism of 90° that is placed in front of the ocular. The course of the rays as regards North and South is illustrated in figure 26 and as regards East and West in figure 27.

In short, by means of the Wappler lens prism and a combination of middle lenses giving two inversions * of the tube image, it has been found possible to conserve as much, and even more light in a small catheterizing telescope, than we have been able to re-

* By the employment of 9 middle lenses giving 3 reversals, or a total of 5 reversals for North and South, 4 for East and West, together with a correcting prism, the small catheterizing telescope conserves the light quite as well as the 6 lenses do in the system described. Such a complex system is, however, hardly necessary in practice.

tain heretofore in the large simple observation telescopes. The field of view has been also increased resulting in an angular field of view showing a gain of 30° or about half again as large as in the older instruments.

Conclusions:—In the course of practical work with the cystoscope and as the result of experimentation, certain types of observation and catheterizing cystoscopes have been developed. The general form and the mechanical features of the instrument described by the author, have been found adequate for routine work. For special purposes, an "oval" type and a "close vision" instrument are considered advantageous. Where the region of the neck of the bladder, the details of the trigone and the posterior urethra are to be studied, the cysto-urethroscope must be relied upon.

More striking than the improvements in the general mechanism and assemblage of parts, has been the development of an optical system by means of which the brilliancy of the pictures has been enhanced and the size of the field greatly increased.

LEGENDS.

Figs. 1, 2, and 3. Author's cystoscope; from above downward the following parts are represented: (fig. 1) the sheath with obturator; (fig. 2) the catheterizing telescope; and (fig. 3) the large observation telescope. (Type I.)

Fig. 4. Diagrammatic cross section of the "baby catheterizing cystoscope."

Fig. 5. Diagrammatic cross section of the "oval type" cystoscope.

Fig. 6. Diagrammatic cross section of the "type I" cystoscope.

Figs. 7-8.* Beak end of the author's "oval" type cystoscope, showing sheath and general construction of telescope.

Fig. 9. "Normal" ureteral catheterization: S the sphincter; U the ureter; L objective lens prism; A bladder mucosa at the canonical distance; B the same at close range; K ocular end of fenestra.

Fig. 10. Catheterization in the case of an anomalous situation of the ureter. When the mucous membrane is at the level C, the tendency of the catheter to ride over the ureter U is shown by the dotted line D.

Fig. 11. Author's "close vision" catheterizing and operating cystoscope; a portion of the wall of the sheath is cut out in the drawing to show the position of the catheterizing telescope. Only the beak end of the instrument is shown.**

* Fig. 7 refers to the sheath, figure 8 to the telescope.

** For the newer models of the sheath of the close vision and operating cystoscope, see *Amer. Jour. of Dermat.*, May, 1911.

Fig. 12. Diagram showing the course of the rays in a simple cystoscope in which the prism is omitted for the sake of clearness: ab is the object, $\alpha\beta$ the first tube image, and AB the virtual as it appears to the eye.

Fig. 13. Diagram illustrating the effect of the position of the middle lens on the size of the entrance pupil.

Fig. 14. Diagram showing the exclusion of rays falling outside of the entrance pupil.

Fig. 15. Geometrical graphic method of determining the image through the lens whose principle planes are at LS and Ll Ss.

Fig. 16. Simpler diagram in which the principle planes of the lens are omitted.

Fig. 17. Figure showing the relation between tube image and principal focal length in terms of the angle w. This holds good only when the objects viewed be at infinity.

Fig. 18. Diagram illustrating a simple telescope of very small calibre in which calculations have been made.

Fig. 19. Right angled prism employed by Nitze, and its effect on the relation of the North and South points of the field.

Fig. 20. The hemispherical lens and collective lens forming the objective of the Otis-Wappler lens system.

Fig. 21. Effect of tilting the hemispherical lens on the location of the field; the production of a retrograde view.

Fig. 22. Lens prism giving a forward view.

Fig. 23. Double reflecting prism showing effect on the relation of the North and South points of the field.

Fig. 24. Same prism (as an 23) with the addition of a convergent lens. In front of it is placed the extra lens-cylinder.

Fig. 25. Same prism ground out of an Otis-Wappler lens.

Fig. 26. The new light-strong system showing the relation of rays in the sense of North and South.

Fig. 27. The course of the rays as regards the East and West points illustrating also the correcting prism at the ocular end.

Fig. 28.* The concave (author's type I) cystoscope in position for ureteral catheterization. Sp, sphincter, Xn O Ss is the angular field, n S the actual field, Sp U N the plane of the trigone. RF= fenestra, O the lens, U the ureter.

Fig. 29. View obtained with the above position.

Fig. 30. The convex type illustrating the effects of forward vision.

Fig. 31. View with the oblique vision type (Fig. 30) showing the short trigone, and distortion.

* Figs. 28-31 inclusive were added after the proof reading. They follow Fig. 11.

ABSTRACTS

Latent Pyelonephritis.—F. Kermauner calls attention (*Wienerklin Wochen*, May 18) to Göppert's important research on pyelocystitis in children, especially in infants; 89 per cent. of the children thus affected were girls. Interesting further is Heubner's assertion that pyelitis is especially frequent in children who have had some mild infectious disease, measles or varicella. In infants the pyelocystitis is most frequent in the second half of the first year and it seems to heal, but it recurs before puberty in about 20 per cent., and Kermauner thinks that it probably persists in a latent form for years when the colon bacillus is involved. This bacillus seems to thrive in the urine, while the urine is bactericidal for other bacteria. This demonstrates, he thinks, that colipyelitis may be traced into early childhood and that it may flare up after prolonged latency in consequence of some intercurrent injury. The menstrual periods may influence it to some extent, but the greatest influence is exerted by a pregnancy. This is liable to act as an intercurrent injurious influence bringing on an acute attack in some cases or merely aggravating the latent pyelitis. He reports a case in a woman of 30 who had had measles three times during childhood, and during menstruation had always experienced intense tenesmus and smarting in the vagina. At the fifth month of the pregnancy there was severe pain in the right kidney region for a few days, with turbid urine, but no fever and there is still a sense of oppression in the kidney region. He explains the case as a latent pyelonephritis, and recommends in such cases internal treatment with hexamethylenamin, although he does not think that an acute cure can thus be realized. If this medication clears up the urine, the diagnosis of latent pyelonephritis is rendered more probable. He does not advocate catheterization of the ureter and lavage of the pelvis unless the attack lasts for more than a week or is unusually severe. With latent pyelitis, local measures are best deferred until after the childbirth.

Removing Renal Calculi—H. A. Kelly, Baltimore (*Journal A. M. A.*, July 1), says that a variety of methods should be at command in removing renal calculi. We have to vary our procedure according as the kidney is fixed or movable, the shape

or size of the stone, the length of the lower rib and the stoutness of the patient, etc. A nephrolithotomy if well done is a comparatively safe procedure; otherwise it may be fatal. Kelly gives a method devised by himself, which, he says, except in the simplest cases with an easy exposure, is, as he believes, quicker and safer and better than pyelotomy or any other transrenal operation.

The technic is described as follows: "A renal catheter 1.75 mm. in diameter, large enough to obturate the ureteral orifice and prevent a reflux of fluid into the bladder, is inserted through an open-air cystoscope and introduced well up to the kidney just before giving the anesthesia. The patient is then put to sleep, preferably with gas, semiprone, on an Edebohls cushion. An incision is made in the loin and the superior lumbar triangle is pulled open and the kidney exposed and freed on all sides from its fatty capsule. The stone is then felt and the kidney gently loosened as far as possible on all sides and brought toward the wound. Then an assistant forces fluid (1/1,200 silver nitrate) into the renal pelvis, until it puffs out tense. As a rule, with a careful preliminary study, the exact capacity of the renal pelvis is already known. When the pelvis and kidney are swollen up tense the surgeon first incises the capsule and then plunges a blunt-pointed, blunt-edged knife through the cortex in the middle of a pyramid somewhat on the posterior surface, easily entering the renal at once and enlarging the incision, in a transverse direction if the stones are small. There is a gush of fluid which stops as he introduces his finger and feels for and finds the stones, which he at once grasps with a smalll stone forceps and removes. The calices and the mouth of the ureter are now examined for more stones and the kidney is palpated on all sides with both hands, one finger being inside the renal pelvis. After all stones are removed the wound is plugged or held closed, while the pelvis and the calices are again distended with the silver solution, when the finger is suddenly withdrawn, letting the fluid escape with a rush, bringing any small calculus debris with it. This may be repeated several times."

He emphasizes the following advantages which he thinks this method possesses: "1. It involves a minimal amount of damage to the kidney. 2. It is done through the part of the organ most easily accessible. 3. The distention is invaluable in offering a bag of fluid, overlaid with a zone of soft tissue, which is

easily punctured. 4. An exploration is easily conducted through the opening, revealing the presence of other caculi. 5. If it is desirable to keep it open awhile for drainage the transverse incision is a good one for this purpose, as it can be left open and will close rapidly when the irrigations are omitted. 6. In the last case in which operation was done no sutures were put into the kidney, and yet there was no escape of urine after twenty-four hours and practically no bleeding through the incision."

Renal Infections—Dr. G. E. Brewer, New York, (*J. A. M. A.*, July 15), discusses the infections of the kidney and says there are five routes of infection generaly conceded as possible: 1. By direct penetrating wounds. 2. By direct extension from a neighboring focus. 3. By catheterization of the ureter. 4. By an ascending process from the lower urinary passages, and 5. By the blood-current. The first and third of these are unquestioned. The second is so rare as to be a surgical curiosity. He, therefore, takes up the fourth and fifth and gives a history of the investigations and their results in regard to the possibility of ascending infection and reports his own experimental studies. From a review of the known pathologic evidence, the experimental investigations of others, his own researches and clinical experience, he thinks we are justified in saying that: "1. An ascending infection is responsible for a certain proportion of the acute surgical infections of the kidney. 2. In the great majority of such instances, the infectious material is carried upward to the kidney by a reflux of contaminated urine into the ureter and renal pelvis through the ureteral orifice, as the result of some interference with its protective mechanism. The factors which favor this process are, in the order of their importance: (a) A chronic obstruction to the normal bladder outflow, a urethral stricture, obstructive prostatic hypertrophy, prostatic or vesical new growth; (b) acute cystitis with severe tenesmus and violent expulsive efforts; (cc) severe inflammation, ulceration, calculus or new growth involving the ureteric orifices, interfering with the normal sphincteric action; (d) urethral and detrusor paralysis from spinal injury or disease; and (e) the possible temporary paresis of the ureteric sphincter by the passage of a large ureteral calculus. 3. In certain rare instances the process may occur by a direct extension of the inflammation along the mucous membrane of

the ureter by continuity of tissue, as proved by numerous clinical observations, although I have been unable to reproduce it in animal experiments. 4. In other rare instances the infection may ascend by the ureteral or peri-ureteral lymphatics, and this is more likely to occur if there exists an infection in the deep structures of the bladder-wall involving the vesical lymphatics. 5. As stated by Legueu, these methods in certain cases may be combined and concomitant."

Next, taking up the subpect of hematogenous infection, he reviews the investigations of others and gives details of his own experiments on rabbits and dogs by injecting cultures of various pathogenic bacteria into the veins. He concludes from all the evidence obtained by himself and others and the accumulated clinical experience, that, during the progress of any acute infectious disease, a certain number of microorganisms find their way into the blood-current and that many of these are excreted through the kidneys. If the number of these organisms is comparatively small there may be no demonstrable injury, but if the number is large and they are highly virulent or if one or both kidneys are diseased, overwhelming or fatal toxemia may follow or any of the pascal types of renal infection suppuration. While the trouble may be bilateral it is often unilateral on account of a diminished resistance of the infected kidney from disease or trauma. While he has been able to produce these lesions in animals by the *B. coli*, *the Streptococcus pyogenes*, the *Staphylococcus aureus*, the *B. typhosus*, as well as the pneumococcus and *B. pyocyaneus*, in clinical cases he has been able to isolate only the first four of these. In some of his clinical cases however, notably one of scarlet fever, search for bacteria proved negative. He has also been struck in his study of the subject by the great difficulty in producing ascending nephritis in animals as compared with the ease with which the hematogenous infection is produced. This would seem to corroborate the impression produced by clinical experience that hematogenous infection is responsible for most cases of renal sepsis, even when septic condition of the lower urinary passages also exists.

THE AMERICAN
JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII OCTOBER, 1911 NO. 10

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

A CLINICAL STUDY OF RENAL FUNCTION BY MEANS OF PHENOLSULPHONEPHTHALEIN*

By E. L. KEYES, JR., M.D., and A. R. STEVENS, M.D.

IN May, 1910, Rowntree and Geraghty offered before the American Association of Genito-Urinary Surgeons an exposition of the advantages of phenolsulphonephthalein as a test for the functional activity of the kidneys, and published this two months later.[1] In this communication they tabulated the results obtained with these tests upon 130 patients, upon many of whom other functional tests were employed by way of comparison. As a result of this comparison they maintained that the phenolsulphonephthalein test has many advantages over the tests previously employed.

A few weeks after this report was made, Dr. Stevens began a series of observations upon the efficiency of phenolsulphonephthalein as a renal function test, and in October Dr. Keyes joined him. We have applied the test 154 times (coupled with ureteral catheterization in 40 instances) to 100 cases.

We propose to record our experiences with the technical difficulties, with a few variations in methods, and our observations on patients with supposed normal kidneys and on several groups of pathological conditions.

TECHNIQUE

As shown by Abel and Rowntree, this drug is excreted almost exclusively by the kidneys. It is readily identified in urine, even in bloody urine, by its brilliant scarlet color in alkaline solution—

* Read in part before the N. Y. Academy of Medicine, May 4th, 1911.

[1] Journal of Pharmacology and Exp. Therap. July 1910, Vol. 1, No. 6.

the alkalinity being obtained by the addition of a few drops of a 25% sodium hydroxide solution.

In all our observations, 6 mg. of phenolsulphonephthalein (1 c.c. of solution) has been used uniformly. It is injected subcutaneously, or better intramuscularly (exceptions in our work are referred to later), the time noted, and the first appearance of a pink tint attentively watched for as urine drips from a catheter previously inserted in the bladder into a vessel containing a little alkali. The catheter is withdrawn and the collection of specimens begins with this first appearance of color. We have as far as possible collected urines for two full hours at intervals varying from 1-4 hour to one hour. At the end of each interval of time, catheterization may be resorted to, or the patient may be allowed to void, provided there be no residual urine. It is better, though not necessary, to give 200 to 400 c.c. water before the test, to ensure the secretion of larger quantities of urine, merely to minimize the error due to the loss of small amounts during catheterization and manipulation. Especially is this advisable before ureteral catheterization (or during the first half hour, in order to combine the experimental polyuria test), as this procedure tends to overcome the functional anuria so often induced by cystoscopy. We have obtained large percentages of phenolsulphonephthalein from small amounts of urine and confirm the belief of Rowntree and Geraghty that additional water *does not* increase the output of phenolsulphonephthalein.

The percentage of phenolsulphonephthalein injected hypodermically which is contained in the several urine specimens is determined colorimetrically by means of the Dubosc̨ Colorimeter. A trial by one of us of another and less expensive instrument (Schreiner's) convinced him of the unreliability of the latter for this use. A standard for comparison is obtained by adding 3 mg. of phenolsulphonephthalein to a liter of distilled water, made thoroughly alkaline with caustic soda. We agree with Rowntree and Geraghty that this strength of solution affords the most convenient one, and that in general the most satisfactory results are obtained when the indicator corresponding to the plunger lowered into the "standard" reads 10. However, often, especially in dealing with relatively small amounts of phenolsulphonephthalein or relatively large proportions of other coloring matter, we have changed the standard to 5 and feel confident after many comparative tests that not seldom this is the better procedure. A solution of 1½

mg. to the litre has been tried, but this adds an unnecessary complication and reducing the standard from 10 to 5 gives practically the same results.

The urines to be tested are each diluted with water to varying amounts up to 1000 c.c., depending on the depth of color. NaOH is added till there is no further deepening of color, and *lastly* the mixture is filtered. The degree of dilution best suited to an individual specimen is a matter of experience; the effort should be made to compare columns of fluids of approximately the same height. The color of the urine containing phenolsulphonephthalein is rarely of just the same hue as the standard (with water as the diluent). The pigments of the urine impart a reddish tinge, more marked of course with deep amber urine and with small percentages of phenolsulphonephthalein. Blood gives a brownish red tint. A test solution made of urine instead of water could be used to obtain a better color for comparison but would have to be renewed daily (whereas the water-standards remain constant a long time), and in practice this procedure is unnecessary. Chart I indicates the degree of accuracy of the routine method. Phenolsulphonephthalein was added to eight flasks each containing 25 c.c of clear *deep* amber urine, in proper amounts to make 50% (of 6 mg.), 25%, etc., to $\frac{1}{2}$%. These various mixtures were then diluted and treated precisely as in the usual estimations. The readings made immediately and two days later are indicated on the Chart (I), also the faded condition of each mixture after standing four weeks by a window in the sunlight a few hours each day. In 25 c.c. of highly colored urine, two to three per cent. is not easy to read correctly, and smaller percentages appear as "traces." A small drop of blood added to 15 c.c. of the 50% and 25% mixtures on the second day altered the readings but little practically—50 instead of 53.2 and 18% instead of 21.4%. That the percentages of phenolsulphonephthalein in urine do sometimes change on standing is indicated on Chart I and needs emphasis. Urines (infected) from case 86 showed 26.3% and 17.9% of phthalein the first day after collection, 22.7% and 10.0% the fourth day, and 16.7% and 8.9% the seventh day. Hence readings should be made within 24 hours after collection of specimens, if possible, surely within 48 hours.

Rowntree and Geraghty recommend the 2 c.c. Ricord syringe. It is the most satisfactory in every way except for the great care

necessary to avoid breakage during sterilization. We compared seven syringes representing five makes with a standard 1 c.c. glass pipette such as is used in chemical laboratories. The "Ricord" cubic centimeter was .96 of that measured by the pipette, and the other syringes recorded .70, .80, .80, .88, .90, .90 of a cubic centimeter. These absolute variations are of no consequence if one will adopt these suggestions. Use only a tight syringe with a smoothly gliding plunger. Use the same syringe for all cases. Use this syringe to measure the phenolsulphonephthalein in making up the standard solution. Any error in absolute measurement of the syringe is carried along in the preparation of the standard, and the final percentage readings will be correct.

To avoid inaccuarcy due to evaporation during sterilization of the phenolsulphonephthalein solution, it has been our practice to sterilize a convenient portion and make a standard from this. A new standard was thus made after each such sterilization. As a matter of fact, these different solutions were frequently compared and always but once read within one to two per cent. of one another. In one instance, however, the standard seemed to have faded 5 to 10% in two months.

As to the site of injection, we have used many regions of the body, but avoided any oedematous spot. Whether the results depend on the site of injection our data will hardly answer. In eight cases giving a practically normal output, in whom the deltoid muscle was used, the color appeared on the average in 7 minutes. In seven similar instances, in whom injections were in the thigh, the color appeared in $8\frac{1}{2}$ minutes. The outputs for the first and second hours in the two groups were practically the same.

NORMAL CASES

Rowntree and Geraghty found as a result of 27 tests upon 21 patients with apparently normal kidneys that the drug appeared in from 5 to 12 minutes, that, as measured by the Duboscq Colorimeter, from 41.6% to 66.6% was excreted within the first hour thereafter, from 11.9% to 26.5% in the second hour; a total for the two hours of from 6.1% to 85.8%.

Our eleven observations (with intramuscular administration) upon eight cases with probably normal kidneys, gave similar but lower figures. The onset of excretion varied from $5\frac{1}{2}$ to 12 minutes; excretion in the first hour, 35.7% to 57.9%; during the second hour, 5% to 16.7%; total for the two hours, 49.4% to

71.2%. (See Chart II). After the second hour the percentages are always very small, often only traces, at most (in six observations) only 4% during the third hour. Thereafter one finds traces for variable periods (from 5 to 8 hours) in normal cases, though when renal disease restricts the earlier output, the later amounts are relatively higher.

Thus one needs measure only the output during the first two hours after the appearance of color in the urine (made alkaline). Whether the average normal excretion for the first hour, second hour and total two hours, shall be set as high as 52.3%, 19.0% and 71.3%, as given in the original series, or 47.0%, 10.2%, and 57.2%, as in ours, the future must decide. We can say that our observations upon abnormal kidneys, and kidneys suspected of disease confirms our opinion that 40% for the first hour and 50% for the first two hours, is in practical work a sufficient output for two normal kidneys. It should be noted, however, (Chart II) that our group of normal kidney cases had some minor ailment or had recently recovered from such. These pathological conditions may have diminished the excretory functional capability of the kidney tissue, which would account for our lower figures.

It seems that probably this test is of great delicacy and surely does show variations in the same individual which cannot be accounted for clinically. These variations in figures when these figures are relatively high, we believe are of no practical importance, bearing in mind the wonderful reserve power of the kidneys. The functional capacity of normal kidneys is probably varying from time to time, with physiological processes, and the limits within normal, of these variations, we do not know.

For the purpose of estimating the time of maximum output of Phenolsulphonephthalein after intramuscular injection, there are arranged in table III four cases with practically normal kidneys (output in each over 60% in two hours), in whom the collections were made at half hour intervals. The kidneys excreted on an average in the first half hour after the appearance of color in the urine, 32.3%; in second half hour, 18.2%; in third half hour, 9.8%; in fourth half hour, 4.8%. That is, over 50% of all the drug excreted in two hours was recovered in the first half hour.

Phenolsulphonephthalein was administered intravenously to four patients (cases 8, 10, 21, 104) in all of whom the intramus-

cular method was also employed. In every instance the drug appeared in the urine at least two minutes earlier when given by the intravenous route; and a *larger* percentage of the total amount recovered, appeared in the first hour. The shortest time of appearance was 3 minutes (case 104—9 days after nephrectomy for tuberculosis). In this instance, the specimens obtained at quarter-hour intervals showed in the first hour, 18.6%, 31.1%, 8.0%, 3.8%; specimens at half hour intervals during the second hour, gave 3% and "trace." 77% of all the drug recovered in two hours appeared in the first half hour. Obviously, if one employed intravenous injections, briefer intervals than one hour would be necessary.

We have found a very grave source of error in studying the total kidney function from specimens obtained by ureteral catheterization—and one seemingly overlooked by Rowntree and Geraghty. This is retention of the drug as a result of the functional disturbance incident to ureteral catheterization, which however does not seem to vitiate the accuracy of the ureter catheter readings as compared with each other. That this functional disturbance may upset all percentage calculations, whether of nitrogen, urea, freezing point, or phloridzin, has long ago been noted by Kapsammer and others. The error is readily disclosed by a control observation taken the day before or the day after cystoscopy.

Singularly enough, in the employment of various tests of renal function, with none of them have we found pre- or post-cystoscopic control more necessary than with phenolsulphonephthalein. We would emphasize that the retention of the drug under these circumstances apparently does not alter the value of the test in a differential comparison of the two kidneys, but that the repetition without cystoscopy is often found necessary to obtain correct notions of the absolute renal function.

For example, a case of polycystic kidneys (No. 62) showed on February 2nd, 1911, 7% from the right kidney and 3% from the left one in one hour, and only a trace from the bladder at the end of that hour, and again a trace at the end of the second hour. On the following day the test was repeated without cystoscopy. It then showed 38.5% in the first hour, 17.9% in the second. 56.4% in all. Two days thereafter ether was administered and the right kidney removed. The patient's convalescence was entirely uneventful.

Another case suspected of renal tuberculosis, when cysto-

scoped under spinal anesthesia showed only traces of phenolsulphonephthalein in the various specimens examined. Indeed so faint was the color in the first half hour that it was difficult to determine the precise time of onset of the drug. Yet the next day the color appeared brilliantly in 8 minutes, and 44.6% was excreted in the first half hour, 6.6% in the second, 51% in all.

Another case, this time a man with very mild bilateral bacillus coli pyelitis, gave by ureter catheter in one hour 4.3% from the right kidney, 6.25% from the left, and a trace from the bladder; total 11% in one hour. Four days later, without cystoscopy, he excreted 40.4% in the first hour, 8.6% in the second, 49.0% in all.

In one instance, however, one of us, not suspecting the possibility of this error, catheterized the ureters of a patient with polycystic kidneys, obtained but traces of color in two hours, and prophesied that the patient would soon be dead. She thereupon engaged as a scrubwoman in Bellevue Hospital, worked there for two months, and then left in a huff, exhibiting every sign of mental and physical vigor.

Since such a marked inhibition of phenolsulphonephthalein excretion may result from ureteral catheterization one naturally infers that the same phenomenon may occur without cystoscopy, and may render the ordinary, non-cystoscopic readings inaccurate. That such a disturbance does not often occur is obvious, but that it may occur seems to us probable. But a non-cystoscopic reading requires but little manipulation to terrify, or physically to disturb the patient. The hypodermic injection is as painless as may be, and as a rule (if there is no residual urine in the bladder) the only other instrumentation required is the passage of a catheter to determine the moment when the color appears in the urine. Yet we have reason to believe that even this (whether by urethro-renal reflex, or by psychic inhibition, we do not know, and for our present purpose it does not matter) may exceptionally cause sufficient inhibition to vitiate the test. Such inhibition must be rare, yet the possibility should always be borne in mind, if the phenolsulphonephthalein test gives results contradictory to those derived from other tests, or from clinical observations. Under such circumstances it should be repeated.

The possibility of this inhibition is moreover only one of many reasons why it might be practicable to omit all notice of the delay in appearance of the drug in estimating percentages, and

to count the hours from the time of injection instead of from the time when the drug appears in the urine.

It is true that marked inhibition of phenolsulphonephthalein excretion by renal disease is often associated with marked delay in its excretion, yet this delay is totally unreliable, and has been a negligible factor in most of our cases. Rowntree and Geraghty themselves concur in this.

MEDICAL CASES

We have classed 19 of our patients as medical cases (See Chart IV). The first of this group (case 29) was a man 75 years old, who at the time of the test presented a typical picture of broken cardiac compensation in extremis—large heart, very marked oedema of lower extremities, Cheyne-Stokes respirations, small, weak pulse, and practically unconsciousness. The output, 35.2% in the first hour, seemed amazingly large. This experience stimulated work on medical patients of the cardio-vasculo-renal group, and gave rise to the hope that the use of phenolsulphonephthalein might prove a valuable factor in differentiating the primary cardiac from primary renal cases. Such a study to be of value should be substantiated by careful necropsy examinations. We were able to secure but one such (Case 85). The phenolsulphonephthalein test was done the day before death. Color appeared in the urine in 11 minutes; 14.5% of the 6 mg. injected was recovered in the first hour and 8.0% in the second hour. Clinically, the case seemed primarily cardiac, with dyspnoea and marked oedema of lower extremities and Cheyne-Stokes respirations. The urine showed a trace of albumin, and a few granular casts. Blood pressure was 155 mm. Hg three days before death. Post-mortem there was double hydrothorax; the left ventricle was markedly hypertrophied and somewhat dilated; the right ventricle much dilated; the mitral valves thickened; the aortic cusps fused for 4 mm. on each side and thickened. Both kidneys were small, cortex of moderate thickness, markings indistinct, capsule stripped, leaving slightly granular surface. Microscopically there was general chronic passive congestion, and in different parts of each kidney were to be found sometimes a normal appearance, sometimes acute inflammation, again chronic inflammation, the fibrous tissue crowding the tubules. Some glomeruli were normal, others had undergone complete hyaline degeneration. On the whole, there seemed a fair amount of functioning

kidney parenchyma. The case is not a very striking one, but the findings seem to us to tally with the prediction of the test. The amount of the drug recovered in two hours (20.5%) was rather low, but not indicating an immediate fatal issue from renal deficiency.

In the absence of pathological proof, we shall not discuss the Nephritis cases, clinically so diagnosed. Diagnosis of this group of diseases and the findings after death are too often at variance. The data are recorded in table IV. Two patients, pregnant 4 and 5 months, respectively, both having albumen and casts in the urine, are of interest because of the relatively high excretion, in each case over 50% of the drug in two hours. Three cases of polycystic kidneys (Nos. 56 and 62 of table IV and 61 of table IX) were tested with phenolsulphonephthalein *during ureteral catheterization* and all gave exceedingly small amounts; in but one of these was a second test made, without cystoscopy, and the output in two hours was 56.4% (contrasted with 10+% the day before during ureteral catheterization). Our inability to repeat the test on the other cases leaves us in the dark concerning the absolute functional renal capacity of these patients.

The most striking fact in this group of medical cases is the uniformly large amount of phenolsulphonephthalein recovered from cardiac patients with broken compensation, and critically ill. All had albumin in the urine and usually casts were also recorded.

MISCELLANEOUS CASES

Table V gives, in tabulated form, data on a miscellaneous group of cases, most of them with lesions of the lower urinary or the genital system. This work is confirmatory of our general conclusions. The principal facts are stated in the table. No further elucidation seems necessary in this place.

RESULTS IN PROSTATIC HYPERTROPHY AND CARCINOMA

Let us now consider the results obtained by the phenolsulphonephthalein test in cases of prostatic hypertrophy and carcinoma.

Drs. Rowntree and Geraghty studied 53 such cases, about half of them operated upon after the test. We have made 33 tests upon 17 patients, 9 or them operative.

Rowntree and Geraghty observe that "taken in conjunction with the clinical conditions, it (this test) is of more value than the

study of urine output, total solids, total nitrogen, and urea estimations" (p. 627).—"A marked decrease in the amount eliminated almost invariably means severe derangement of renal function" (p. 627).

"When the time of appearance is delayed beyond twenty-five minutes and the output of the drug is below 20 per cent. for the first hour, operation is postponed regardless of the patient's clinical condition. If, under routine treatment, the output remains low but constant, the renal function is probably in a stable condition, and the operation may be undertaken, care being taken to select an anesthetic which will not further depress the renal function. In one instance a successful operation was performed with an output of 8 per cent. for the first hour, but this output had remained constant for a period of five weeks. The low output here was ascribed to chronic interstitial changes in the kidney, and nitrous oxide was accordingly employed."

"When the residual urine is large and the patient has been leading a catheter life, even if the output at a single determination is large, operation is deferred in order to determine whether the functional activity is stable, for it has long been recognized that following the relief of retention the function of the kidney is extremely variable. Repeated determinations should be made, and, except when unavoidable, operations should not be performed when the tests indicate a decreasing function. There have been two such cases in our series in both of which operation was followed by death from acute suppression."

"Again, when only a trace of dye is excreted, operation should not be attempted, as grave renal changes exist. Two cases excreting only a trace died of uraemia within a short period. In neither case was any operation performed, though clinically at the time of the first test no evidence of uraemia was detected." (pp. 657-8).

In our work (see Table VI) the time of appearance of color has not been a factor of much assistance. In general, the patients who give a lower output of phenolsulphonephthalein have a longer lapse of time between the injection and the appearance of the drug in the urine. The times of delay in three striking instances of low output (Nos. 22, 24, 94) varied between 18 and 50 minutes. We ventured the opinion above, that it migth be a satisfactory working scheme to begin the time of collection of urines from the time of hypodermic injection, neglecting this interval of

"delay," inasmuch as this figure alone is not to be depended upon as a guide. In such an event, obviously a new series of normal cases would have to be studied. However this interval is usually easily ascertained, affords one more (though minor) point of interest, and includes the time of absorption (from injection to the presentation of the drug to the kidney cells), which is probably a very variable factor in ill patients, and one we should like to differentiate from renal excretory capability. The very long periods of delay (1 to 1½ hours) in five tests on case 95, with relatively good percentages of the drug recovered in each of the two following hours is suggestive of an occasional possible source of error if the simpler precedure were adopted.

Concerning operation in the face of low excretion of phenolsulphonephthalein, cases 24 and 94 with but traces (2-3%?) and less than 5% in two hours, respectively, died of typical uræmia on the 7th and 5th days after prostatectomies, the exit of case 94 being hastened by a terminal pneumonia. No. 24 was a feeble old man of about 65 years with benign prostatic hypertrophy, a poor operative risk clinically but with no uræmic signs prior to operation. He stood preliminary suprapubic drainage but succumbed to subsequent perineal prostatectomy under spinal anæsthesia. No. 94 was an older patient (said to be 80 years) with a benign hypertrophy but in better clinical condition. We advised against immediate prostatectomy, basing advice on this test, but the operator felt justified in going ahead, and removed a calculus and the prostate suprapubically. The patient died on the 5th day, uræmic.

In contrast to these two cases, No. 22 is most instructive. This man of 55 years, with pasty pale color, had had much vomiting and chills during the winter of 1910, and had lost considerable weight. His urine contained nearly 5% of albumin (by volume). On October 29 and November 6, phenolsulphonephthalein was injected, and color did not appear under 45 minutes. In the subsequent two hours on the latter date, but 5.5% of drug was recovered. Suprapubic drainage under cocaine was performed November 8th, and the drug output had risen to 8.+% on November 11th. Under spinal anæsthesia, perineal prostatectomy was performed on November 15th. Convalescence was quite satisfactory and the excretion of phenolsulphonephthalein for two hours rose to 17.0% on December 9th. The preliminary bladder drainage and use of spinal anæsthesia are regarded as extremely

helpful features in the conduct of this case, who we believe would probably have died had immediate prostatectomy under general anæsthesia been done.

The other operative cases gave good outputs and did well subsequently. In case 91, this function test was a distinct guide. The operator had declined to interfere, basing his judgment on clinical appearance and examination, but did perform perineal prostatectomy under general anæsthesia on the strength of our report. The outcome thoroughly justified the advice.

A substantial increase in excretion of phenolsulphonephthalein after prostatectomy is noted in cases 22, 25 and 26, and after suprapubic drainage in No. 17, showing improvement in renal excretion for this drug at least. Case 8 (benign hypertrophy) showed no such improvement in renal function after prostatectomy. This man however had been dependent upon, and had used a catheter regularly for 20 years. Moreover, as proved by ureteral catheterization 8 weeks after operation, both kidneys were free from infection. In such an instance, one would hardly expect removal of the obstruction in the lower tract to materially benefit the renal excretory function, at least after so short a time.

Urea percentage and total urea of a specimen of urine collected during a brief interval of time afford no estimate of the combined function of a patient's kidneys. If it were worth while, abundant proof of this could be extracted from these records. But more dependence is usually placed upon the urea percentage and total urea of a 24 hour collection. We have arranged nine cases with these data in table VII, and make the reference here inasmuch as two prostatic patients afford our most conclusive basis for comparison of this method of estimating renal function with the phenolsulphonephthalein test, which comparison is in favor of the latter. One case (clinically in very poor condition) gave 13.1 grams of urea one day and 38.5 grams a few days later, while our color test gave uniformly low figures on corresponding days, thereby agreeing with the clinical facts. The other patient, who died after operation of definite uræmia, gave before operation only traces of phenolsulphonephthalein but 16.6 grams of urea in 24 hours (within normal limits!).

Our experience with hypertrophy and carcinoma of the prostate leads us to subscribe most heartily to the following principles. We find that—

(1) The phenolsulphonephthalein test does indeed indicate

renal deficiency more accurately than any other urinary test; and that—

(2) Operation is contraindicated when only traces of the drug appear in two hours after injection.

But we disagree with Rowntree and Geraghty upon the following points:

(a) We do not recognize a diminishing phenolsulphonephthalein output as an absolute contraindication to operation (note case 8, table VI).

(b) We do not pretend to know how low the phenolsulphonephthalein output may be, and yet the patient survive prostatectomy. In one case we operated successfully upon a patient under spinal anæsthesia who excreted only 2.5% in the first hour (after 50 minutes delay) and 5.5% in the second hour. Moreover—

(c) We feel that apart from hexamethylenamin and water before operation (both of which may be overdone), the patient's gratest safeguard, in desperate cases, lies in preliminary drainage by suprapubic or perineal section, followed, after an appropriate interval, by prostatectomy under spinal anæsthesia.

THE TEST IN SURGICAL RENAL DISEASE

The conclusions reached by Rowntree and Geraghty from a study of 17 cases of renal infection, (of which 6 came to operation) by ureter catheterization, phenolsulphonephthalein injection and other tests are as follows (p. 659):

"It has been demonstrated that the time of appearance and the percentage output is practically the same for the two healthy kidneys. When only one kidney is diseased, the time of the appearance of the drug is delayed on the diseased side and the amount excreted is not only relatively but absolutely decreased. The amount of delay in the time of appearance is comparatively of little value. Reliance is only to be placed upon the quantity excreted during a period of at least one hour. It is possible by using large doses and extending the observations for a period of two hours, each side being collected separately, to demonstrate in some degree the reserve functional ability of each kidney.

"Although in the majority of these cases of unilateral disease the combined output is equal to that of two normal kidneys, the greater part of the excretion is shown to be performed by the healthy kidney. In proportion to the decrease in function on the diseased side, approximately there is a proportionate increase in the function on the healthy side. In such cases following ne-

phrectomy the remaining kidney eliminates an amount of drug which is normally excreted by two healthy kidneys. In all cases studied, the output from the remaining kidney has been greater than the combined output from the two kidneys prior to operation.

"In one case of pyelitis no disturbance of function was indicated."

We have studied 33 such cases, five of whom had previously been nephrectomized, and five others upon whom, for various reasons, the phenolsulphonephthalein test was not employed in conjunction with the ureter catheter, leaving 23 upon whom the combined test was applied. Ten patients with renal infection (tables VIII and IX), and one with cystic kidneys not infected (case 62, table IV) submitted to nephrectomy after the test. We have based our deductions chiefly upon these cases.

The technic of the test with ureteral catheterization is not complicated but the interpretation of results requires close attention. One should use as large ureteral catheters as convenient; in our experience the flute-tipped ones drain well and allow the least extra-catheter flow. With the best of catheters, this leakage *may* occur at any time. Accordingly, the results are of greater value if the bladder contents (if any) be obtained at the end of each period of collection. If but one ureter be catheterized, the bladder will contain the secretion from the other side plus extra-catheter flow. A dilated renal pelvis (with residual urine) may greatly vitiate one's interpretation of the test. We do not for one moment neglect the usual chemical and microscopic examinations and urea estimations. The latter figures compared with the output of phenolsulphonephthalein in individual specimens help mightily to clear the skies in some instances.

We shall consider some of the more instructive operative cases briefly. No. 61 (table IX) with cystic kidneys, one infected, presented but traces of color in two hours after an injection of the usual 6 mg. of phenolsulphonephthalein, yet survived nephrectomy admirably. This case does not discredit the test, however, for the following reason: The patient was a nervous, apprehensive, mistrusting individual and unfortunately the only test made was applied in conjunction with ureteral catheterization, the marked inhibitory effect of which procedure has been already discussed. Cases 42 (table VIII) and 67 (table IX) interested us particularly because of the falling output of phenolsulphonephthalein before operation—from 45.2% for two hours in December, 1910, to 15+% in April, 1911, in the former (R. renal tu-

berculosis); from 21.8% to 17.4% in the latter (L. renal calculus). The amount of phthalein excreted just before operation in each case was rather small, yet not small enough for this factor alone to be regarded a contraindication to operation. Both stood nephrectomy well and subsequent tests showed gains, a very striking increase in No. 42. The renal calculus patient had pulmonary tuberculosis, which unhappily became acute after a few days, and was regarded as the chief cause of death on the sixteenth day following operation.

The increase of phenolsulphonephthalein output after nephrectomy is a striking confirmation of the clinical observation that one good kidney alone (after operation) does better work than a normal kidney and a diseased one combined. Case 42, just cited, is illustrative of this fact, and from No. 75 (table VIII) we recovered 29.4% of the drug in two hours before operation, and 38.1% in two hours just three weeks after.

Two other deaths remain to be recorded. Case 27 was one of severe infection of a horseshoe kidney of seven weeks' duration who died about eight days after operation, which could be little but an exploratory one. The output of phenolsulphonephthalein was 25.3% in two hours, four days before operation. That the individual could survive the immediate effects of operation was about all one could expect any function test to indicate in such an unfortunate condition. Case 45 tells another story. The man, aged about 50 years, had had clinically R. pyonephrosis for 4 years. Before operation his condition seemed perfectly good. On January 3rd the phenolsulphonephthalein excretion was delayed 13 minutes, was 38.4% for the first hour and 16.6% for the second; on January 13th he voided 1600 cc of urine with 1% urea in 24 hours. Cystoscopy had shown the R. kidney to be the source of the pus, and R. nephrectomy was accordingly done on January 7th. In 50 hours after operation, the patient voided but 20 ounces of urine; the bowels moved freely; there was repeated vomiting. The pulse became irregular and rapid at times. He had "air hunger," and without showing any nervous symptoms or delirium died 53 hours after operation. The tongue was moist an hour before death. The remaining kidney was removed post-mortem and examined by Dr. Symmers, who reported as follows:

"Specimen consists of a kidney 10 c.m. in length. Capsule is thin and surface is smooth, except for a few retained fetal lobulations. The organ is diffusely bluish-red in color, and on

section cuts readily. Cut surface is smooth, deep bluish-red in color and drips blood on pressure. The consistence is that of a normal kidney. The cortex and medulla are well proportioned and well differentiated. The cortex does not bulge markedly beyond the cut edge of the capsule. The cortical markings are distinct, especially the vascular apparatus, in which the Malpighian bodies are unusually prominent, standing out as minute bright red points. Microscopically, the vascular apparatus throughout is deeply engorged. The inter-tubular capillaries are widened and tortuous, and the red cells in them are closely packed and show marked effect of reciprocal pressure, or are even fused. The epithelium in the convoluted tubules is in a state of advanced granular degeneration.

"*Note*—The histological changes in this kidney correspond entirely with those occasionally encountered in athletes who, after severe exertion, have suddenly subjected the overheated body to the effects of cold, in which event contraction of the peripheral vessels is followed apparently by loss of vasomoter control in the kidneys. The vessels dilate and become tortuous and the red cells in them fuse. At the same time, stagnation of blood results in nutritional changes in the lining epithelium of the tubules and granular degeneration occurs. Very similar changes are met with in the kidney in subjects dead of tetanus, of hydrophobia, or of certain irritant poisons. The condition is relatively rare, but by no means unknown, as a sequence of simple ether anaesthesia and sometimes follows nephrectomy of the opposite kidney. In the latter circumstance, the combination of anaesthesia and suddenly increased functional demands upon the remaining kidney consequent upon the removal of its fellow, is possibly the best available explanation. Death usually succeeds upon complete anuria and may occur within a few hours or be delayed for days: thus in one patient death occurred on the twenty-first day after an operation for epithelioma of the penis."

This would seem to be an instance most damaging to the reputation of the test. Had the pathologist discovered chronic lesions of the "good" kidney, we should have interpreted it so. But the congestion was surely of recent origin and doubtless did not exist before operation. A test of prophetic value is beyond our fondest hope.

A mild kidney infection (shall we call it pyelitis) may interfere little or not at all with renal function as far as we can determine it. Rowntree and Geraghty cite such an example, and from No. 31 of our series, with pus and staphylococci from both ureters, we recovered 63.+% in two hours.

Instances illustrating the effect of general anaesthesia are too few in our series to warrant definite statements yet it would seem that general anaesthesia does *not* interfere with subsequent excretion of phenolsulphonephthalein.

Our conclusions agree quite closely with those of Rowntree and Geraghty, but we venture the following criticisms:

I. The intake of phenolsulphonephthalein may indeed be measured more accurately than that of the constituents of urea, and its output is more prompt and more readily measurable than that of phloridzin or indigo carmin. Yet, while we have found it far superior to the other artificial color tests, it shows marked superiority to the estimation of urea percentage, and urea in cgm., and especially the experimental polyuria test, only as an index of the total kidney function, not of the relative function of the two kidneys as compared with each other.

In 12 out of 15 ureter catheter examinations in which the data justified a comparison of the phenolsulphonephthalein output with the urea in cgm., these two indicators told the same tale and gave the *same ratio* of functional ability for the two kidneys, while the three cases in which they differed were better diagnosed by comparison of successive specimens obtained by ureter catheter than by any evidence derived from single specimens. Moreover, the study of successive specimens prevents errors from eccentricities of urinary excretion during the first half hour of ureter catheterization.

II. We have found that in 5 out of 11 cases, ureter catheterism so diminished the output of phenolsulphonephthalein (proved by subsequent tests) as to render it most misleading in determining total kidney capacity; although, as we have already observed, the relative inefficiency of the diseased kidney, as compared with its mate, was correctly indicated by the test.

Hence we deem it advisable usually to make two phenolsulphonephthalein tests, one with ureter catheterism, one without, just as one would make two urea tests, one with ureter catheterism, and one on a twenty-four hour specimen of urine. If the output of the drug is high during ureteral catheterization, clearly the second test is superfluous for estimating functional ability at this time.

When the phenolsulphonephthalein test is employed with the ureter catheter only for the purpose of comparing the relative efficiency of the two kidneys, the patient's discomfort may be lessened, the possibility of error by extra-catheter flow diminished,

and much time saved by collecting urines for successive brief periods, and comparing these with each other. As a general rule, for phenolsulphonephthalein, as for urea readings, 20 to 30 minute periods are preferable to shorter ones.

The microscopic findings remain, as ever, the most important elements in ureter catheter diagnosis. Urea and phenolsulphonephthalein estimations should confirm these, and successive specimens, for comparative readings, are unnecessary in the majority of cases, but are most helpful in the precise interpretation of ambiguous ones.

That phenolsulphonephthalein is not to be depended upon as an absolute or infallible guide of the actual renal function, or of the reserve force of the kidneys to withstand the shock of nephrectomy, any more than any other test, is suggested by the three casualties cited, in one of which nephrectomy resulted in death by kidney insufficiency despite a good showing before operation, and in two of which such death did not result in spite of a falling output.

Finally, we must once again insist that we agree entirely with the essential parts of the report of Drs. Rowntree and Geraghty. We have felt obliged to insist upon the points of difference rather than upon those of agreement between our findings and those recorded in their publication. In our hands, to be sure, the test has not been found mathematically accurate, but that is only because of the unfathomed human element, both in our patients and in ourselves. We regard it the equal of any test yet devised for comparing the functional value of the two kidneys, and superior to any for determining the total renal capacity. This latter phase of its use is the important one, affording a tangible basis for estimating renal function. Obviously the power of the kidneys to rid the blood of one drug should not be assumed to be an indicator of their ability to eliminate all other substances. Yet in practice, the excretion of the drug under consideration has been an amazingly accurate index of renal efficiency. Just how low the output may fall before the danger point is reached in a given situation should not be fixed dogmatically. No two cases are alike in all particulars.

We shall continue to use the phenolsulphonephthalein test, not only as a help in pre-operative diagnosis, but also in many other connections.

TABLE I

Test Readings on Duboscq Colorimeter

Each specimen contains 25 cc of deep amber urine plus the amount of a solution of 0.6 gram of phenolsulphonephthalein to 1000 cc distilled water, required to make the percentages given. This same aequeous solution was used as a standard for comparison.

Actual percentage	Immediate reading.	Reading 48 hrs. later	Reading same date as last column, after adding 1 drop blood to 15 cc of mixture	Reading of original mixtures, one month later
50	53.7	53.2	50.0	trace
25	25.5	21.4	18.0	no color
10	10.2	3.0(?)		no color
5	5.17	ft. trace		no color
3	3.35	no color		no color
2	2.5	no color		no color
1	trace	no color		no color
½	ft. trace	no color		no color

(Table II, See Next Page)

TABLE III

Showing Time of Maximum Excretion

(Intramuscular Method of Injection)

Patients with normal kidneys– each giving over 60% in 2 hours.

Case No.	Percentage 1st ½ hr.	Percentage 2nd ½ hr.	Percentage 3rd ½ hr.	Percentage 4th ½ hr.
38	35.2	20.7	8.0	4.0
39	32.9	18.7	7.4	4.0
40	31.6	19.2	9.9	5.3
31	29.4	14.0	13.9	5.7
Average	32.3	18.2	9.8	4.8

TABLE II

CASES WITH SUPPOSED NORMAL KIDNEYS

Case No.	Age	Date	Diagnosis	Time of appearance in minutes	First Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Second Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 2 hrs.	Remarks
2	34	5-26-10	Syphilis Spiral Cord	8	57.9–440–0.4	13.3–191–0.5	71.2	Partial retention. Third hour, 4.1–90.
		5-31-10		9	45.9–340–0.8	10.1–105–0.85	56.0	Third hour, 0.8–30–?; fourth hour, trace–23. No change of condition, clinically.
4	26	6-2-10	Recent gonorrhoeal epidid. Temperature below 100° for past week	7½	45.9–690–0.1	12.5–150–0.4	58.4	Third hour, trace–32; fourth hour, trace–60.
5	42	6-2-10	Lacerated scrotum	5½	45.8–375–0.4	9.6–195–0.6	55.4	Third hour, trace–138; fourth hour, tr.–112.
6	40	6-2-10	Swelling of testicle for 12 yrs.	8	41.9–135–1.5	10.9–98–1.2	52.8	Third hour, 4.3–138; fourth hour, tr.–60.
9	29	8-25-10	Convalescent from epididymitis and acute prostatitis	10	38.2–450–	16.7–332–	54.9	Leaving hospital today.
10	24	8-25-10	Hypospodias. 2½ wks. post op.	12	51.0–430–	5.0–235–	56.0	
		9-15-10	Excell't condit'n. Before 2d op.	11	35.7–365–	13.7–120–	49.4	
		10-18-10	" " " "	7	55 6–400–	6 2–66–	61.8	
		10-20-10	" " " "	5	56.0–215–	trace–80–	56.+	Intravenous injection.
21	30	10-15-10	Gonorrhoeal Epididymitis	7½	48.0–43–	6.6–37–	54.6	10 days after operation. Temp. below 100°. Patient up and about.
		10-20-10		5	53.1–70–	trace–65–	53.+	Intravenous injection.

TABLE II—Continued

82	35	3-30-11	Syphilis of testicle	9	51.5–62–	7.7–110	59.2	3 weeks after intramuscular injection of Salvarsan.
47	30	1-4-11	Pain and restricted motion of L. hip	10 10	R. ureter–14.5–18–2.5 L. ureter–10.3–13–2.8 Bladder–trace–140–?			X-ray shadow near, but not in L. ureter. Urines normal.
93	25	4-19-11	R. renal colic (?) for two weeks; no pain now	20 14	R. ureter–1.0–6–1.2 (¼ hr.) L. ureter–0 6–5–1.3 (¼ hr) –1.4–3–? (6 min.) Bladder–1.0–3–?			Urines normal.
96	32	4-30 11	Cystitis	10 14	R.U.–2.4–18.–.28 (½ hr.) L U.–4.7–30.–.25 (½ hr.) Bl.–9.5–94–? (½ hr.)			Urines from kidneys normal.
100	45	5-3-11	Chronic Prostatitis	10 10	R.U.–3.7–5–? (½ hr.) L.U.–3.6–4.5–? (½ hr.) Bl.–? (½ hr.)			Urines from kidneys normal.
105	?	5-11-11	Kidneys normal	no color in 20 m.	R.U.–sl. tr.–40– } 1 hour L.U.–sl. tr.–45– } from Bl.– tr.– 10– } injection			Urines from kidneys normal.

TABLE IV

MEDICAL CASES

Case No.	Age	Date	Diagnosis	Time of appearance in minutes	First Hour: % of drug excreted	First Hour: amt. urine collected in cc	First Hour: % of urea	Second Hour: % of drug excreted	Second Hour: amt. urine collected in cc	Second Hour: % of urea	Total % P. for 2 hours	Remarks
29	75	12-3-10	Cardiac	13	35.2	30		8.3	25		43.5	Mitral Insufficiency. Very large heart. Marked oedema of lower extremities. Urine contained considerable albumin, hyaline and granular casts. Blood pressure varied from 70 to 100 mm. Hg. At time of test, almost in extremis, unconscious, Cheyne-Stokes respiration. Died in a few days. No autopsy.
84	45	4-1-11	Cardiac	10	34.0	25		12.9	29		46.9	Mitral Insuff. Large heart. Moderate oedema of legs. Orthopnoea. Blood pressure 170. Urine—trace albumin, no casts, Sp. Gv. 1025; 36 ℥ in 24 hours, urea 2.6%. Died April 6. No autopsy.
87	53	4-4-11	Cardiac	17	11.7	120		17.1	80		50.1	Very large heart; mitral insuff.; slight oedema of legs; moderate dyspnoea. Temp. not over 100°. Urine—much alb., no casts, 1028. Bld. press. 125.
88	63	4-4-11	Cardiac	8	30.1	110		13.6	190		43.7	Fairly large heart; marked oedema. Urine—1020, much alb., hyaline and granular casts, urea 1.6%. Blood pressure, 145.
85	65	4-1-11	Cardiac Nephritic Autopsy	11	14.5	30		8.0	14		22.5	Fairly large heart; marked oedema; orthopnoea. Urine—1020, trace alb., few gran. casts; ℥ 35 in 24 hrs., urea 1.8%. Blood pressure 155. See text for necropsy findings.
43	27	12-27-10	Parenchym. Nephritis	15	13.9	66		14.7	60		28.6	No symptoms. Urine—considerable alb., hyal. granular and epithel. casts. This urinary condition known to have existed six years.

TABLE IV—CONTINUED

49	35	1-7-11	Parenchym. Nephritis	11	37.3–100–	7.4–80–	11.7	Feet swell. Sometimes vomiting and giddiness. Urine—980 cc in 24 hrs., 1.8% urea, much albumin, hyaline and granular casts.
60	22	2-1-11	Bilateral haematuria Par. Nephr.(?)	?	R. ureter-1.5-2-0.2 (2nd ½ hr.) L. ureter-3.7-7-0.2 (2nd ½ hr.) Bladder-?			Cystoscopy under ether anaesthesia. Urine—much albumin and casts.
102	35	5-5-11	Parench. Nephr. (?)	20 20	R. U.-2.0-3- (20 min.) L. U.-6.2-9- (20 min.) Bladder-?			Very alcoholic patient. Had one profuse haematuria. Kidneys not palpable. Urine—albumin and hyaline and granular casts, no pus.
58	?	1-28-11	Pregnant 4 m. Pathological urine	9	35.6–110–	23.8–125	59.4	No headache, no nausea, no oedema. Urine—albumin and hyaline, granular and blood casts. Subsequently cleared.
103	?	5-7-11	Pregnant 5½ m. Pathological urine	6	40.0–145–	11.5–54–	51.5	Urine contains alb. and casts. No grave symptoms.
64	67	2-7-11	Interstitial Nephritis	9	10.4–180–	4.0–120–	14.4	Occasional haematuria. General condition excellent at times of all 3 tests.
		3-16 11	Ulcer of bladder	8 8	R.U.-1.5-60-0.7(½ hr.); 1.8-55-0.8(½ hr.) L.U.-13-65-0.8 (½ hr.); 1.3-43-0.7 (½ hr)	4.5–170–	10.1	Very sl. oedema of feet. Urine—trace albumin, little pus and blood, no casts
		3-21-11		9	4.5–110–	3.0–60–	7.5	found.
80	57	3-30-11	Interstitial Nephritis ?	?	14.7–138–	18.9–227– Third hour–; tr.–130–	33.6	Oedema of legs. Dyspnoea. Large heart. Urine 116 to 144 ℥ in 24 hours daily for many weeks; 1010, trace albumin, few gran. casts. Blood pressure 185.
81	45	3-30-11	Interstitial Nephritis	5	8.3–260–	7.0–230–	15.3	Sl. oedema heretofore, none now; easily dyspnoeic. Moderately enlarged heart. Albuminuric retinitis. Urine—35 to 61 ℥ in 24 hrs.; 1010, much albumin, no casts. Blood pressure 240

TABLE IV—Concluded

Case No.	Age	Date	Diagnosis	Time of appearance in minutes	First Hour {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Second Hour {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 2 hours	Remarks
77	42	3-24 11	Interstitial? Nephritis? Hepatic Cirrhosis	15	3.1–15–	8.3–40–1.8	11.4	Typical picture of cirrhosis. Thin man with large belly. Been repeatedly tapped. Urine—25-40 ℥ in 24 hrs.; 1015, much alb., few casts, urea 1.2%. Blood pressure 110 to 135.
56	30	1-24-11	Polycystic Kidneys	46 38	R.U.–tr.–20–1.0 L.U.–tr.–20–1.1 Bl.–	R.U.–tr.–11–1.5 L.U –tr.–20–1.2 Bl.–tr.–95–0.9 (at end of 2nd hour)	tra's+	Was in good general health when last seen, 2 months later.
62	36	2-2-11	Polycystic Kidneys	10 10	R.U.-3.7-50-0.5 (½ hr.); 3.3-90-0.3 (½ hr.) L.U.-2.1-28-0.5 (½ hr.); 0.9-28-0.2 (½ hr.) Bl.-tr.-116-0.3 (end of 1 hr.)	tr.–140–0.3	10.+	No symptoms.
		2-3-11		10	38.5–40–1.9	17.9–27–1.65	56.4	R. kidney later removed. Normal convalescence.
69	?	2-22-11	L. haematuria	6	55.6–102–1.6	9.1–114–1.45	64.7	Blood seen coming from L. ureteral orifice. L. nephrectomy stopped haematuria—kidney seemed normal. Urine—no pus, no casts.
78	53	3-25-11	Alcoholism Arterio-scleros's Terminal pneumonia	8	45.5–30–	8.7–22–2.4	54.2	Was having temperature 102° to 103° daily. Irrational at times. Symptoms of "wet brain." No oedema. Heart not enlarged. Urine—35 ℥ in 24 hrs.; trace albumin, urea 0.9%, granular casts. Blood pressure 125. Died April 6. No autopsy.

TABLE V

MISCELLANEOUS CASES

Case No.	Age	Date	Diagnosis	Time of appearance in urine	First Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Second Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 2 hours	Remarks
101	?	5-4-11	Ureteral Calculus	9	43.5–105–	16.0–105–	59.5	Stone 2 inches from pelvis of kidney. Urine not infected. Stone removed by operation, after test. Convalescence normal.
34	50	12-9-10	Calculus in bladder	10	14.2–32–1.6; 27.2–25–2.3 (½ hr.) (½ hr.)	10.4–165–0.9	51.8	Pus in urine. Residual urine ℥i. Sharp cystitis. Operation after test. Convalescence normal.
70	67	2-27-11	Calculus in bladder	8	31.6–51–	10.1–60–	41.7	Few hyaline and granular casts. No stone in kidneys. Bladder stone and middle lobe of prostate removed suprapubically. Convalescence normal.
71	20	2-28-11	Bladder tumor	8	14.4–140–	20.8–250–	35.2	Bilateral nephrotomy showed normal kidneys. Convalescence normal.
38	42	12-20-10	Tuberculosis, lungs, sem. vesicles, epididymis	5	35.2–34–; 20.7–26– (½ hr.) (½ hr.)	8.0–22–; 4.0–26– (½ hr.) (½ hr.)	68.0	Few pus cells in urine. Kidneys apparently normal. Some vesicles and epididymis removed. Convalescence normal. Living but weakening from pulmonary tuberculosis, 6 months later.
63	41	2-7-11	Tuberculosis, testicles, prostate, lungs	8			44.6	Ill 8 months. Lost 50 pounds. Few red blood corpuscles in urine; No casts, no pus. Some frequency of urination. Daily temperature up to 103°. No operation.
33	57	12-8-10	Stricture of urethra	8	23.15–35–; 14.0–26– (½ hr.) (½ hr.)	16.4–66–	53.5	Perineal section for stricture Dec. 1, 1910. Normal temperature now.

TABLE V—CONTINUED

Case No.	Age	Date	Diagnosis	Time of appearance in urine	First Hour: % of drug excreted – amt. urine collected in cc – % of urea	Second Hour: % of drug excreted – amt. urine collected in cc – % of urea	Total P. for 2 hours	Remarks
52	55	1-10-11	Stricture of urethra	18	trace–210–	13.9–270–	14.0+	Neither test is accurate, as patient was not catheterized and he had residual urine.
		1-28-11		none allowed	trace–92–(1 hr. from injection)	15.6–88–	16.0+	Resection of stricture Jan. 10, 1911. Had several cardiac attacks, in one of which he died about three weeks after operation. No autopsy.
55	30	1-17-11	Stricture of urethra	none allowed	18.0–15–(1 hr. from injection)	20.8–32–	38.8	Test immediately after perineal section. Much blood in urine.
		1-28-11		none allowed	31.3–90–(1 hr. from injection)	18.5–16–	49.8	
107	43	5-23-11	Stricture of urethra	9	12.1–43–	15.8–30–	57.9	Emergency operation for perineal abscess and stricture 16 days ago. Has been mildly delirious with septic temperature. Better now; temperature below 100°. No oedema. No headache. No hiccough. Later developed femoral thrombosis.
32	46	12-8-11	Perineal abscess, prostatic?	7	33.3–260–; 10.0–152– (½ hr.) (½ hr.)	6.9–204–	50.2	Perineal section, Nov. 24. Now walking about. Residual urine 5i.
39	35	12-20-11	Perineal abscess, prostatic?	6	32.9–42–; 18.66–48– (½ hr.) (½ hr.)	7.4–42–; 4.0–46– (½ hr.) (½ hr.)	62.9	Operation 32 days ago (perineal section).
40	40	12-20-11	Perineal abscess prostatic?	7	31.6–25–; 19.2–26– (½ hr.) (½ hr.)	9.9–27–; 5.3–25– (½ hr.) (½ hr.)	66.0	Prostatic abscess drained 6 days ago.

TABLE V—CONCLUDED

50	30	1-7-11	Prostatic abscess; Acute retention	10 10	R.U.-8.3 55-0.7; S.3-60 0.9 L.U.-2.9-32-0.3; trace-18-0.25 Bl.-? (½ hr.) (½ hr.)	6.2-150-0.3 trace-55-0.3	25.8 Acute retention 11 days ago; was catheterized every four hours. Abscess broke into bladder, as noted by cystoscope. No casts nor pus from ureters; no pus in bladder urine now.
		1-13-11		10	18-50-1.4	31.3-65-1.3	49.3 First and second hour specimens perhaps confused. Urine clear. Steady general improvement.
1	49	5-26-10	Double Hydrocele, infected	12	27.5-215-0.6	14.6-112-1.0	42.1 Third hour:—5.5.-88-1.4. Operation 3 weeks ago. Temperature normal. Wound suppurating. General condition good.
		6-7-10		13	7.94-353-0.1; S 84-83-0.55 (½ hr.) (½ hr.)	6.4-128-0.3; 1.7-86-0.6 (½ hr.) (½ hr.)	27.9 Third hour:—4.0-150-0.5.
53	23	1-14-11	Diagnosis? Pus in urine Fever prolonged	10	37.0-61-1.4	31 4-240-1.0	68.4 Urine—Trace albumin, few hyaline casts, few red blood cells, pus. Note large amt. urine in second hour—Bladder probably not completely emptied at end of first hour. Urine from both kidneys normal—Bladder urine contains pus but no casts.
		1-?-11		13 9	R.U.-5.0-5-2.5 (½ hr.); 6.9-6.5- (½ hr.) L.U.-6.4-7-3.3 (½ hr.); 5.0-4.5- (½ hr.) Bl.-13.6-120-0.75		
51	55	1-10-11	Malignant papilloma of ant. urethra	10	22.7-265-	12.8-255-	35.5 Test made 3 weeks after operation for supposed stricture. Condition fair. Later stood emasculation well.
65	16	2-16-11	Exstrophy of bladder	9-	22.1-34- ; 16.0-18- (½ hr.) (½ hr.)		Urine collected in Kelly pad for one hour only; some of it lost. Pt. later stood Peter's operation well. Doing well 3 months after operation.

TABLE VI.

HYPERTROPHY AND CARCINOMA OF PROSTATE.

Case No.	Age	Date	Diagnosis	Time of Appearance in Minutes.	First Hour {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Second Hour {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 2 hours.	Remarks
7	68	6-7-10	Hypertrophy	11	26.5–53–1.8	4.6–3.3–1.5	31.1	Third hour—:2.55-51-1.6. Perineal prostatectomy May 12, 1910. Now, residual ℥ i. Urine—1010, albumin (trace), hyaline and granular casts.
8	74	8-8-10	Hypertrophy	12	31.2–62–	16.4–64–	47.6	Led catheter life past 20 years. Kidneys free from infection 8 weeks after operation. Bladder badly infected.
		8-16-10		10 Intravenous	19.2–55–	5.2–85–	24.4	Intravenous injection.
		10-1-10		13	19.3–115–	4.0–70–	23.3	Perineal prostatectomy August 18, 1910.
		10-12-10		10	R. N. trace–192–0.34			Satisfactory convalescence.
				10	L. N. trace–108–0.35			Readings made 3 days after test. Colors had faded notably. Patient in good condition June, 1911.
11	57	8-25-10	Hypertrophy L. Pyonephrosis	9	27.8–332–	14.2–215–	42.0	Perineal prostatectomy Sept., 1909. Now pain over bladder, vomiting, headaches. No residual.
		9-10-10		15	R. – 5.0–110– (1 hr.)			Urine from bladder thought to come largely from R. kidney. Condition better.
				15	Bl. –13.0–185–			
		9-29-10		?	Bl. – 8.33–?–1.75 (¾ hr.)			Better condition.
				0	L. – 0–?–0.85			
15	60	9-15-10	Carcinoma ?	12	13.2–140–	12.5–140–	25.7	Residual urine ℥ i. Pus in urine. Frequency of urination 4 years. No operation.
16	50	9-15-10	Carcinoma ?	14	21.7–165–	11.6–118–	33.3	Symptoms 2 months. Complete retention now. Fever. Pus in urine.
17	63	10-1-10	Carcinoma	17	7.8–39–	5.5–14–	13 3	Complete retention.
		10-18-10		16	14.7–33–	9.0–45–	23.7	Suprapubic drainage under cocaine Oct. 14. Died (apparently of cancerous cachexia) in Dec., 1910. No autopsy.

TABLE VI—CONTINUED

22	55	11-6-10	Hypertrophy	45	1.5–150–	4.0–150–	5.5 Complete retention. Bad condition. See text.
							Nov. 4—1450 cc urine in 24 hrs., urea 0.9%, much albumin.
		11-11-1		50	2.5–50–	5.5+–65–	8.0+ Nov. 11—3500 cc urine in 24 hrs., urea 1.1%. Suprapubic drainage, Nov. 8th.
		12-9-10		25	good trace–100–0.8	16.6–95–1.0	17.0+ Perineal prostatectomy Nov. 15th. Pt. at work 6 mos. later.
24	65	11-11-10	Hypertrophy	30	trace–36–?(½ hr.); trace–31–?(½ hr.)	trace–50–	traces Urine 1850 cc in 24 hours with 0.9% urea. Suprapubic drainage under cocaine before the test. Very feeble. Perineal prostatectomy under spinal anaesthesia after test. Died in 7 days. See text. No autopsy.
25	67	11-22-10	Hypertrophy	10	21.0–84–	8.3–34–	20.3 Median bar. Complete retention one wk. Urine 360 cc with 1.0% urea in 12 hours. Perineal drainage Nov. 23.
		11-29-10		20	?	?	? Specimens stood 3 days; then not measureable. Chetwood cautery operation without anaesthesia Dec. 2.
		12-3-10		11	14.7–35–?(½ hr.); 15.6–43–?(½ hr.)	16.1–62–	46.4 Satisfactory convalescence.
26	40	11-23-10	Hypertrophy	10	19.2–20–?(½ hr.); 7.4–12–?(½ hr.)	22.7–126–	49.3 Urinary symptoms 20 months. Perineal prostatectomy Nov. 23.
		12-3-10		8	33.8–65–?(½ hr.); 16.6–82–?(½ hr.)	9.0–130–	59.4 Easy convalescence.
46	65	1-4-11	Hypertrophy	10	R.U.–17.9–64–?(½ hr.); 3.1–9.0–?(½ hr.)		Residual urine six ounces; almost constant dribbling. No operation.
				10	L.U.–4.0–10–?(½ hr.); 7.1–18–?(½ hr.)		
					Bl.–?		
79	70	3 27-11	Hypertrophy	16	17.4–85–	12.4–65–	29.8 Catheter life for years. General condition good. Urine—900 cc with 1.6% urea in 24 hrs.; pus and hyaline casts. Suprapubic prostatectomy under spinal anaesthesia Mar. 29. Vomited 3 days thereafter; thence convalescence satisfactory. On April 6, 930 cc urine, 3.1% urea.
		5-13-11		9	22.7–46–	13.9–40–	36.6

TABLE VI—Concluded

Case No.	Age	Date	Diagnosis	Time of Appearance in Minutes.	First Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Second Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 2 hours.	Remarks
91	50	4-16-11	Hypertrophy	12	29.1–72–	13.2–50–	42.3	Urinary symptoms 6 years; now catheter life. Urine, 1012; trace alb.; blood, pus, and hyaline casts. Operation after test. Easy recovery; no sign of uraemia.
94	80	4-21-11	Hypertrophy	18	faint trace–50–	3.0–26–	3.0+	Urinary symptoms 17 years. Suprapubic prostatectomy and removal of bladder stone, under gas and ether, against advice, after test. Death on 5th day of uraemia and pneumonia. See text.
95	79	4-21-11	Hypertrophy	60	11.4–62–	19.5–78–	30.9	Perineal drainage 4 wks. ago. Perineal prostatectomy 3 wks. ago. Now in bad condition generally (toxic). Still large residual.
		4-30-11		90	8.9–58–1.8	13.6–70–2.2	22.5	Mentally clearer; tongue clean.
		5-4-11		85	10.4–80–	10.4–70–	20.8	Been worse since above; now better.
		5-8-11		90	25.5–122–	15.6–63–	41.1	Better.
		5-13-11		75	8.9–81–	17.4–80–	26.3	General condition much worse. Sp. Gv. 1004; urea 0.7%.
97	66	5-2-11	Hypertrophy	12	35.0–70–	28.4–76–	63.4	A few ounces of residual urine several years. Chetwood cautery operation 4 years ago, relieving complete retention. Urine infected. General health excellent.
98	65	5-3-11	Hypertrophy	11	47.6–90–	17.9–59–	65.5	Residual urine two ounces, infected. Perineal drainage after test. Voided 35 ounces before operation, 100 ounces (in 24 hrs.) after operation. Good recovery.

TABLE VII

COMPARISON OF PHENOLSULPHONEPHTHOLEIN AND UREA OUTPUTS

CASE NO.	DIAGNOSIS	% OF P. 1ST HR.	% OF P. 2ND HR.	UREA %	TOTAL UREA IN 24 HOURS IN GRAMS	REMARKS
49	Chr. Parenchym. Nephritis	37.3	7.4	1.8	17.6	
77	Cirrhosis Liver	3.1	8.3	1.2	12.6	Émaciated. Abdomen repeatedly tapped.
81	Chr. Interstitial Nephritis	8.3	7.0	1.0	15.0	
84	Cardiac	34.0	12.9	2.6	28.0	Bad condition. Died 5 days later.
85	Cardiac	14.5	8.0	1.8	18.9	In bad condition. Died next day.
22	Prostatic Hypertrophy	1.5 2.5	4.0 5.5	0.9 1.1	13.1 38.5	Tests 5 days apart. Suprapubic cystostomy between tests.
24	Prostatic Hypertrophy	trace	trace	0.9	16.6	Very poor condition. Perineal prostatectomy after test; death in 7 days.
79	Prostatic Hypertrophy	17.4	12.4	1.6	14.4	Good condition. Survived subsequent prostatectomy.
45	Pyonephrosis	38.4	16.6	1.0	16.0	Good condition. Subsequent nephrectomy. Death in 53 hours. See text.

TABLE VIII

RENAL TUBERCULOSIS

Case No.	Age	Date	Diagnosis. Organs Infected	Time of appearance in urine	First Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 1st hr.	Second Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 2 hours	Remarks
3	30	5-31-10	Bladder R. kidney (removed)	8	34 8–139–0.55	34.8	10.2–53–1.35	45.0	R. Nephrectomy April 14, 1910. Daily tem. to 100°. Voiding 40 ounces urine daily. In 3rd hour, 0.7% P.; 4th hour trace.
		6-7-10		10	14.7–53–1.5(½ hr.); 8.2–49–1.0(½ hr.)	22.9	2.8–45–0.9(½ hr.); 3.6–43–1.6	29.3	Readings 30 hours after collection. General condition apparently as good as May 31st. In 3rd hour, 3.0% P.
36	?	12-14-10	After nephrectomy	11	30.1–45–	30.1	10.4–106–	40.5	L. kidney removed July 14, 1910. Now few pus cells in urine. Has gained 26 pounds.
37	17	12-15-10	R. kidney Bladder	40 ?	R. U.–tr.–10–0.4 (½ hr.) Bl.–28.6–?–1.5 (70 m. fr. injection)				
		1-?-11		? 10	R. U. (no color in 20 min.) L. U. (not measured)				R. U.—urea 0.05%; pus, no casts. L. U.—urea 0.7%; hyaline and granular casts, few blood cells. Second test under ether anaesthesia.
41	32	12-21-10	Kidney? Testicle	10	38 5–170–	38.5	8.3–200–	46.8	Urine, 1009, 0.4% urea, trace albumin, pus, red blood cells.
42	?	12-21-10	R. kidney L. kidney (?) Prostate;	11	33.3–76–	33.3	11.9–52–	45.2	Urine (bladder)—0.8% albumin (bulk), pus, few red blood cells, no casts. Much pus from R.; little from L. kidney.
		4-11-11	vesicles;	0?	R. V. 0–				
			L. epididymis Elbow	15	L. V. 8.0–8–?(½ hr.); 8.3–20–?(½ hr.)	16.3	trace–12–? (both kidneys)	16.3+	
		4-13-11		15?	trace–46–	trace	14.2–50–	14.2+	15 min. delay allowed (not tested).
		5-16-11		?	41.7–96–	41.7	17.4–62–	59.1	R. Nephrectomy April 15, 1911. Satisfactory convalescence.
44	45	1-3-11	Remaining kidney. Genital and pulm. Tbc.	11	9.4–44–	9.4	10.4–51–	19.8	R. Nephrectomy 1 yr. ago. Urea, 1.1%.
66	36	2-16-11	L. kidney Bladder	7	R.U.–11.4 16–1.2(½ h.); 10.1–12–1.6(½ h.)	36.3	13.9–50 (both kidneys)	50.2	From R. kidney—no pus, cocci and bacilli (not acid-fast).
				12	Bl.–6.6–28–1.1(½ h.); 8.2–12–1.4(½ h.)				From L. kidney—pus.

TABLE VIII—Concluded

72	?	3-4-11	L. kidney ?		R.U.-ft.tr.-25-0.(½ h.); f.tr.-12-0.2(½ h.)	traces	good trace–36–0.3 { both kidneys }	traces	From R. kidney—no pus.
			Bladder		L.U.-ft.tr.-73.0(½ h.); f.tr.-34-0.25(½ h.)				From L. kidney—little pus + bacilli not acid fast.
					Bl.-0-59-0(½ hr.); f.tr.-12-0.2(½ h.)				From Bladder—pus + many acid-fast bacilli.
		3-5-11		8	44.6–80–1.2	44.6	6.6–84–0.8	51.2	Test under spinal anaesthesia. Guinea-pig killed by sediment of bladder urine.
74	35	3-6-11	Remaining kidney	10	16.1–52–1.4	16.1	10.2–50–1.5	26.3	L. Nephrectomy 18 mos. ago. Now pus, tubercle bacilli, and hyaline and granular casts from R. kidney. Voids q i h.
75	27	3-8-11	L. kidney	8	R.U.-3.1-8-?(½ h.); 5.6-11-?(½ h.)	10.4 +	10.4–40–? { both kidneys }	20.8 +	Delerium Tremens preceding test. Hematuria 3 mos. ago and for past 7 days.
				9	L.U.-trace-8-?(½ h.); 1.7-12-?(½ h.)				Urine from R. kidney – casts and few pus cells.
					Bl.-?				Urine from L. kidney—no pus.
		3-14-11		12	20.5–58–	20.5	8.9–77–	29.4	On Mar. 15, R. kidney explored, found hypertrophied; L., nephrectomy (large old focus; small active focus).
		4-8-11		16	32.9–70–	32.9	5.2–40–	38.1	Satisfactory convalescence.
76	36	3-14-11	Both kidneys Epididymis	17 8	Bl.-ft.tr.-15-?(½ hr.); ft.tr.;-20-?(½ h.) L.U.-5.3-12-?(½ hr.); 6.7-15-?(½ h.)	12.0 +	15.0–70–	27.0	R. testicle removed 5 yrs. ago. R. kidney and L. epidid. removed after test. No uremia. Infection of kidney wound. Primary union of scrotum. Recovery.
104	26	5-11-11	L. kidney Bladder	9– ?–	R.U.–15.0–10–?(½ h.) Bl.–31.0–23–?(½ h.)		11.1–22–? { 1½ hours; both kidneys }	57.1	L. Nephrectomy May 16. Easy convalescence.
		5-23-11		5					
		5-25-11		3 (intravenous)	52.3–105–	53.3	20.6–42–	73.9	Good condition.
					18.6–60–?; 31.1–42–?; 8.0–75–?; 3.8–135–? (quarter hour intervals)	61.5	3.0–105–?; trace–100–? (half hour intervals)	64.5	Good condition.

TABLE IX

SURGICAL RENAL DISEASE—NOT PROVED TUBERCULAR

Case No.	Age	Date	Diagnosis	Time of appearance in urine	First Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 1st hr.	Second Hour: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	Total % P. for 2 hrs.	Remarks
12	35	9-9-10	Bacilluria fr. R. kidney	18 18	R.U.-8.8-15-1.2(½ hr.); L.U.-1.5-5-1.4(½ hr.); Bl.-? (½ hr.); 14.0-60-? {at end of 1 hour}	24.3			No pus, but bacilli from R. kidney. L. kidney normal. Probably much extra-catheter flow from L. side.
13	52	9-9-10	Infect'n both kidn's; Tbc.?	16	22.7-410-	22.7	11.4-260-	34.1	Poor condition clinically.
14	28	9-10-10	R. renal infection; Tbc.?	0 20	R.U.-(no color in 45 min.) L.U.-2.8-5.5-? (25 min.) Bl.-?				Probably tubercular. Urinary frequency only symptom. In same interval of time, R. ureter gave 20 cc urine with 0.55% urea; L. ureter, 4 cc with 3.2% urea.
19	30	9-20-10	L. renal infection	17 19	R.U.-4.8-10-?(¼ hr.); 5.1-12-?(¼ hr.) L.U.-1.8-13-?(¼ hr.); 3.0-12-?(¼ hr.) Bl.-1.7-10-? (end of ½ hr.)				Pus and colon (?) bacilli from L. kidney; R. normal. In other specimens, in same interval of time, R. kidney gave 0.53 cgm. urea and L. kidney 0.33.
23	24	11-1-10	Stone and infection, R. kidney	6 6	Bl.-ft. trace-44-? (½ hr.) L.U.-18.9-195-? (½ hr.)		17.9-210-? {both kidneys; 1½ hours}	37.0 +	R. nephrectomy later. Good recovery.
27	33	12-2-10	L. acute pycloneph-rosis	30	5.0-60-? (½ hr.); 5.0-50-? (½ hr.)	10.0	10.0-105-?	20.0	Bladder stone removed 6 wks. ago. High temperature, sometimes reaching 106°, since operation. Much pus in urine. Voides 45 ounces urine with 1.0% urea in 24 hours.
		12-8-10		18	7.1-53-? (½ hr.); 8.3-55-? (½ hr.)	15.4	10.0-90-?	25.4	Temperature lower. Horse-shoe kidney found at operation Dec. 12; died Dec. 20, low temp., hiccoughs, vomiting.

TABLE IX—CONTINUED

30	36	12-8-10	Sl. infection both kidneys	9 9	R.U.-2.0-43-0.5(½ h.); 2.3-20-0.7 (½ h.) L.U.-2.2-52-0.4(½ h.); 4.0-25-0.4 (½ h.) Bl.- trace-25-? (end of 1 hr.)	10.6+			Little pus and colon bacilli from both kidneys.
		12-12-10		9	25.0-55-? (½ h.); 15.4-65-? (½ h.)	40.4	5.3–35–? (½ hr.); 3.3–65–? (½ hr.)	49.0	
31	25	12-8-10	Double renal infection	11	29.4-110-? (½ h.); 14.0-50-? (½ h.)	43.4	13.9–?–? (½ hr.); 5.7–92–? (½ hr.)	63.0	Pus and stophylococci from both kidneys.
		12-10-10		? ? ?	R.U.-16.2-28-? (½ h.) L.U.-5.9-15-? (½ h.) Bl.-?				Probably extra-catheter flow from L. side. Other specimens gave equal urea % from kidneys. No operation.
35	37	12-13-10 1-13-11	R. pyonephrosis (?)	11 45 12	12.5-23-? (½ h.); 13.4-42-? (½ h.) Bl.-5.2-40.0-0.3 L.U.-trace-7-0.7	25.9 5.2+	17.0–68–? 21.4–54–0.9 3.0–7–1.5	42.9 29.6+	Pus and blood in urine for 5 yrs. From behavior of catheter flow, most of bladder color thought to come from L. kidney.
45	50	1-13-11	R. pyonephrosis	13	38.4-74-	38.4	16.6–96–	55.0	Had had Rt. renal colic. Voided 1600 cc urine in 24 hrs.—1% urea, 0.5% (bulk) albumin, much pus. On Jan. 14, R. nephrectomy. Death 53 hrs. later (see text). At autopsy, marked vascular engorgement of remaining kidney.
48	35	1-5-11	Double renal infection	14 14	R.U.-4.8-35-0.8(½ h.); 2 9-17-1.4 (½ h.) Bl.-4.5-45-1.0 (½ h.); 7.1-55-0.9 (½ h.)	19.3	5.0–39–? 6.2–65–?	30 5	Frequency of urination; had haematuria. Tuberculosis suspected—marked improvement on tuberculin.
		2-9-11		11	32.5-92-	32.5	10.1–58–	42.6	Condition much better.
57	39	1-24-11	R. renal calculus	16 10	Bl.-1.1-50-0.15 (½ h.); 7.1-80-0.15 (½ h.) L.U.-3.8-85-0.15(½ h.); 5.0-31-1.0(½ h.)	17.0	12.0–50–1.4 (both kidneys)	29.0	Bladder urine—trace albumin and pus. No pus from L. kidney.
		3-18-11		?	43.1-202-	43.1	12.5-214-	55.6	Later pyelotomy, followed by renal sepsis, then R. nephrectomy. Thereafter few casts in urine.

TABLE IX—CONTINUED

SURGICAL RENAL DISEASE—NOT PROVED TUBERCULAR

CASE NO.	AGE	DATE	DIAGNOSIS	TIME OF APPEARANCE IN URINE	FIRST HOUR: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	TOTAL % P. FOR 1ST HR.	SECOND HOUR: {% of drug excreted} – {amt. urine collected in cc} – {% of urea}	TOTAL % P. FOR 2 HRS.	REMARKS
59	35	1-31-11	Rt. renal infection	0	R.U.-no color in ½ hr.	19.0 +			R. kidney—pus and colon (?) bacilli.
				10	L.U.-19-15-? (½ hr.)				L. kidney—bacilli but no pus.
					Bl.-trace-9-0.02 (end of ½ hr.)				Radiograph negative.
		2-10-11		11	R.U.-1.9-17-? (½ hr.); 0 9-27-? (½ hr.)				From other specimens, urea % of Rt. kidney 0.5; of L. kidney 1.5.
				5	L.U.-19.2-50-? (½ hr.); 10.6-100-? (½ hr.)	37.7	11.0-?-?	48.7	
					Bl.-5.1-44-? (end of 1 hr.)				
61		1-31-11	Infected polycystic kidney	0 in 30 min.	Bl.-tr.-20-				Pus from R. kidney; now from L.
				10	L.U.-tr.-20-	traces			Later R. nephrectomy; good recovery (see text).
67	43	2-21-11	L. Renal calculus	13	10.4-50-	10.4	11.4-75-	21.8	Has pulmonary tuberculosis. Very alcoholic. Urine contains much pus and mucus.
		2-23-11		7	R.U.-2.8-?-?; 2.0-6-1.7; 4.2-10-1.0; 3.8-9-1.2 (quarter hour intervals)	17.4	6.7-23-1.9	35.3	Two quarter-hour intervals of bladder specimen correspond in time to last two of R. U. specimens. Bladder specimens believed to have obtained color chiefly from R. kidney.
				35	Bl.-3.8-20-0.3; 0.8-3-0.5 (¼ hr.) (¼ hr.)		11.2-90-1.0 (1 hr.)		
		2-27-11		10	7.0-10-?	7.0	10.4-80-?	17.4	L. nephrectomy on Mar. 2.
		3-16-11		15	19.2-74-?	19.2			Patient weak from pulmonary tuberculosis. Died 16 days later from same (see text).
68	38	2-21-11	Infected R. moveable kidney	12	16.4-32-	16.4	32.3-428-	48.7	Catheterized at end of each hour by nurse; apparently bladder was not emptied at end of first hour. Patient stood subsequent nephropexy nicely. Doing well 4 mos. later.

TABLE IX—Concluded

73	33	3-5-11	R. renal focal suppuration	8	13.6-60-	13.6	18.0–60–	31.6	Chills past 10 days; temp. 105° past 48 hrs. Nephrectomy after test. Sepsis followed, but no evidence of renal insufficiency. Final result good.
86	31	4-8-11	L. renal infection Old cystitis	14 12	R.U.-2.7-3.5-3.6 (20 min.) L.U.-tr.-5.0-1.6 (20 min.) Bl.-2.8-7.0?- (20 min.)		32.0–60–? (both kidneys, 1 hr. 40 min.)	37.5 +	Recent acute L. renal pain and infection. Test made under chloroform.
		4-15-11		10	26.3-370-	26.3	17.9–131–?	44.2	Condition better. No fever. No anaesthesia.
		5-2-11		9-	R.U.-5.4-10-1.1; 5-12-0.9; 7.1-11-0.6				
				10- 10-	L.U.-3.2-6.2-0.6; 0.6-2-?; 0.7-1.5-? Bl.-21-9-0.3; 6.2-10.2-0.6; 6.5-13-0.3 (20 min. intervals)	36.8	19.2–?–? (both kidneys)	56.0	Chloroform anaesthesia. L. ureter catheter worked poorly. Acute symptoms entirely gone. Infection of L. kidney practically cleared up.
92	36	4-18-11	R. renal infection and stone	13 10-	R.U.-1.1-4.5-? (¼ h.); 1.7-9.5-? (¼ h.); L.U.-5.2-7.5-? (¼ h.); 13.9-22.-? (¼ h.); Bl.-16.1-60-? (at end of 1 h.)	38.0			Other specimens gave urea, 0.7% from R. kidney, 2.0% from L.
108	65	5-25-11	R. renal infection and stone	13	30.0-105-	30.0	23.3–138–	53.3	Excellent general condition. Refused operation.
110	45	5-29-11	Infection (?) remaining kidney	?	41.0-105-	41.0	15.6–50–	56.6	One kidney removed 7 yrs. ago. Now pyuria and pain over remaining kidney.

INFECTION FOLLOWING URETERAL CATHETERIZATION

By A. Nelken, M.D., New Orleans, La.

In trained hands, catheterization of the ureters is, ordinarily, a simple procedure, and it is indeed rare that any sequels more serious than some pain or bleeding follows the examination.

In the early days of catheterization of the ureters, great stress was laid upon the possibility of carrying infection up the ureter in the passage of the catheter through the septic bladder. One of the advantages claimed for the segregator was that it avoided this danger.

The perfecting of the catheterizing cystoscope has made catheterization of the ureters a routine procedure, and has shown this danger to be theoretical rather than real.

One who cares to consult the authorities on the subject will conclude that such infection never occurs, for each writer, while acknowledging the possibilities of such an accident, always ends with the remark that he has never had it occur in his own experience.

Some years back the opinions of many of the prominent genito-urinary specialists of this country as to the danger of infection following the use of the ureteral catheter were collected and published, and, without exception, they all disclaimed having ever seen it occur.

Indeed, so firmly fixed is the opinion among genito-urinary men that this operation is free from this risk, that I am afraid that sometimes we are careless in the application of ordinary surgical cleanliness. For one thing, asepsis during ureteral catheterization can be only relative. Neither the cystoscope nor the catheters stand boiling with any degree of safety to the instruments. And it is difficult to keep the hands sterile during the manipulation necessary to the introduction of the catheters.

But, granting all this, I believe that it is the common immunity from accidents that has led to the large degree of carelessness in the aseptic technique of this operation.

I report the following case to show that catheterization of the ureters is not necessarily the safe procedure that a perusal of the literature of the subject would lead us to infer, and that grave infection can, and sometimes does, occur.

I think that I can claim for myself at least the ordinary de-

gree of care in the use of the cystoscope. All parts of the instrument that stand heat well are boiled; the sheath and periscopes are sterilized with carbolic acid and alcohol; the catheters are kept in formaldehyde vapor, and before being used are immersed in bichloride solution (1-1000) for twenty to thirty minutes. The bladder is thoroughly washed before cystoscopy, both to clean the bladder and to get a clear field for examination.

I do not introduce the catheters more than three or four inches up the ureters unless there is some special reason for it, for then I am sure that that portion of the catheters within the ureters has not come in contact with the hands.

The case I am about to report has several points of interest, and I hope I may be excused if I go somewhat into detail.

Mrs. W., aged 31, one child 12 years ago.

Applied for treatment September, 1910. She gave a history of constantly recurring attacks of bladder disturbance since childhood. Trouble became worse after menstruation was established. She has consulted a number of physicians, but had never gotten any permanent relief. Nine years previously her abdomen had been opened for some pelvic trouble, but the operation gave no relief to her bladder trouble.

The spells with her bladder come on at irregular intervals, and last from a few hours to several weeks. They consist of frequency, pain and tenesmus, and are as bad at night while in bed as they are during the day.

Patient is a well nourished, healthy-appearing woman, with no neurotic element apparent. Pelvic examination was negative.

Her urine showed a heavy deposit of pus, and the sediment, stained, showed a Gram negative bacillus—probably the colon. The peculiar history of her case and the fact that her bladder was unusually intolerant to irrigations led to a careful search for the tubercle bacillus, but they have never been found. A guinea pig was inoculated, but the findings were negative.

Cystoscopy showed a diffused cystitis, with no ulceration.

After two weeks of irrigation with nitrate of silver solution, her urine was clear, showing microscopically only a few leucocytes. Symptoms relieved.

One week later, without any assignable cause, there was a return of all symptoms with a cloudy urine.

These relapses, following periods of complete relief from bladder irritation, were of regular occurrence. At times, urine

would be cloudy without irritation, and, again, she would complain of her bladder when the urine was microscopically clear. As a rule, however, when the bladder was troublesome the urine would show a large quantity of pus.

After treatment with all sorts of solutions without any permanent results, I decided to catheterize the ureters, thinking it posible that the bladder was being reinfected from above.

On January 17, her urine being clear, I went up both ureters without difficulty. The specimens were sent to the pathologist of the Touro, Dr. Gurd, for examination, and he reported that the urine from the left side was sterile, while that from the right showed a few colon bacilli.

Dr. Gurd made an autogenous vaccine from the bladder urine. To this vaccine, in doses of 350 million or more, she always gave a prompt constitutional reaction, temperature rising the evenings of the injections to 100F.-101F.

But a fair test of the vaccine showed no improvement in the local condition, and after a trial lasting over five weeks, it was discontinued.

I then decided to again catheterize the ureters, choosing a time when the urine was cloudy, so as to determine whether colon bacilli came from the right side or whether, as seemed more probable from the few found, they were an accidental contamination from the bladder.

On June 25, her ureters were again catheterized, the Brown-Buerger instrument being used. The ureters were entered without difficulty. The urine from the right kidney was watery, showing only a few flocculi, which, under the microscope, proved to be epithelium, probably brushed off by the catheter. The urine from the left side was watery and gave no deposit on centrifuging.

The examination was done at the office, and the patient suffered no immediate inconvenience of any sort.

On the fourth day following the examination, she complained of pain in the left side, distinctly referred to the left kidney and radiating down the left ureter. The following day pains were worse, being especially acute on deep pressure over the left kidney. She complained of pain at the waist line on deep inspiration, and the whole course of the left ureter was tender to pressure. Maximum temperature 101F.

Severe pain over the kidney and along the course of the ureter continued for six days. At times the pain was so extreme

that it was necessary to administer opiates so that she could get some sleep. Temperature ranged from 99½ to 102 4-5.

A careful examination of the base of the left lung showed it to be normal.

On the seventh day following the onset of the trouble, pains were better, but temperature rose to 102 4-5 that evening. The following day she was decidedly better, temperature not rising over 99½, with very much less pain.

On the tenth day her temperature remained normal for the first time, and there was only a slight soreness over the kidney on deep pressure.

During the entire course of the attack, her urine was highly cloudy, but it was only when she began to improve that her bladder began to trouble her again.

Her urine did not clear for a month after this attack.

Her subsequent history is a repetition of the past story. At present her urine shows only a few leucocytes, and she is more comfortable and for a longer period of time than usual. Catheterization to verify the diagnosis of infection of the renal pelvis was not done.

After her experience, the patient was not enthusiastic about going through it again.

But the clinical picture was so clear that I do not believe any reasonable doubt can be raised as to the diagnosis, and slight question as to the exciting factor of the trouble.

Perrin Building.

CAUSES OF FAILURE OF EXTERNAL URETHROTOMY

By H. A. Kraus, M.D., Chicago.

IT is a very noticeable fact that the most important urological operations are not as well defined, as to execution and to results, as most operations in other fields of surgery.

This fact is best exemplified when we consider external urethrotomy performed for the relief of strictures. A careful survey of the literature (which may be truthfully stated is meager enough) shows that there is no unanimity as to the course of operation and that also a dissensus of opinion prevails as to the after treatment.

While exact statistics are not available, still one cannot be misled from the conviction that the number of final good results is not any too large.

The failures of external urethrotomy should naturally divide themselves into two groups: (a) Relapse at the original seat of the stricture or strictures, (b) New formation of constriction in places that were normal before operation, such places being adjacent to the site of operation.

As to the degree these changes may vary is, from a slight improvement of the patulence of the urethra to a decided deterioration of the previous urethral status.

As one of the most striking instances I would like to quote the not infrequent occurrence, that at the distal end of the incision after the healing process is finished, there establishes itself a new resilient stricture, which would call for urethrotomy, provided one could guarantee for the result. It seems that this new formation, or constriction, is always due to an infection originating from the incision.

This is very probable, and, in my experience, I have never observed such an occurrence if subsequent suppuration had not developed around the primary incision. I am led to believe that the development of inflammatory changes at this spot is dependent on two conditions: the establishing of a soil favorable to the growth of pus producing germs and the subsequent infection by infectious urine penetrating this soil; this soil will be prepared by hemorrhage into the tissue at the distant pole of the incision, and by the urinary infiltration and infection due to the too early removal of the drainage tube inserted into the bladder.

The recurrence of the stricture at the place of the incision can be due to various factors.

The first one can be considered the incomplete severing of the stricturing bands, or the incomplete exsection of stricturing cicatricial tissue, that had practically supplanted the urethra.

Another cause may again be hemorrhage that teased apart the surrounding tissue, leading in due course of time to the organization of the hematoma and to subsequent cicatricial retraction.

This phenomenon is more likely to occur if infection of these hematomata has led to suppuration, extensive infiltration and finally to new formation of fibrous tissue around the urethra. The most frequent cause for these hemorrhages will be furnished by injuries to the bulbus. If the hemorrhage occurs packing has to be resorted to, which in turn may lead to infiltration and subsequent cicatrization.

Another factor that may lead to postoperative relapse can be furnished by the sutures applied, for closing part of the incision.

If these sutures approximate in a frontal sense the edges of the urethral wound too closely, the result of the operation will be jeopardized because the centrifugal tendency of the union by granulation is counteracted.

From these permanent relapses have to be differentiated those forms of apparent, or, more exactly speaking, temporary relapses which consist in temporary indurations around the seat of operation; these indurations will most frequently occur after extensive exsection of the cicatricial tissue and as a rule yield in a rather short time to antiphlogistic treatment; any attempt at sounding during the acute and subacute stage will increase the difficulty instead of bringing relief.

Review of Current Urologic Literature

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Volume XXIX, No. 15, August, 1911.

1. Six cases of Cystitis with Incomplete Retention of Urine. By M. Cealic and L. Strominger.
2. The Ejaculatory Ducts and the Sexual Function after Suprapubic Prostatectomy. By F. Legueu and E. Papin.
3. Ureterostomy as a Method of Functional Renal Diagnosis. By G. Key.

Volume XXIX, No. 16, August, 1911.

4. The Pathogenesis of Renal Tuberculosis. By P. Héresco, and M. Cealic.
5. Remote Results following the Incision of Prostatic Abscess. By M. Cealic and L. Strominger.

Volume XXIX, No. 17, September, 1911.

6. Syphilis of the Bladder and Upper Urinary Tract. By N. Mikhailoff.
7. Primary Tuberculous Cystitis. By Dr. G. La Virghi.

2. The Ejaculatory Ducts and the Sexual Function after Suprapubic Prostatectomy. In an exhaustive and painstaking paper which includes both the results of anatomical, post-mortem, and clinical research, the authors conclude: 1st, that the ejaculatory ducts in hypertrophy of the prostate are always situated behind the enlarged gland; and 2nd, that after the suprapubic method of prostatectomy, they should remain intact, the sexual function being ordinarily preserved.

The prostate may be regarded as composed periurethral or inter-sphincteric glandular tissue which does not extend beyond the smooth-muscle sphincter, and of prostatic glands proper that perforate this muscle to become distributed beyond its limits. In front of the ejaculatory ducts there are both nitra- and extra-sphincteric glands, but behind them we find only the extra-sphincteric type.

Taking only the adenomas and fibro-adenomas into consideration, the authors find that all specimens of hypertrophied prostate have three characteristics in common. 1st, They are all adherent to the urethra. 2nd, They are all situated in front of the ejaculatory ducts. And 3rd, they all lie above the summit of the verumontanum. Thus we never find an involvement of the middle of the prostate at some distance from the urethra, nor is it feasible to enucleate the growth without tearing the corresponding portion of the urethra. As the hypertrophic process advances, the ejaculatory ducts are pressed downward and backward, the verumontanum representing the lowermost boundary of the tumor mass.

If we assume that the hypertrophic prostate finds its origin in the region of the peri-urethral glands, we are accepting an hypothesis that adequately explains both the topography and the ease with which enucleation can be done.

Considerable confusion still exists concerning what structures are actually removed in a so-called suprapubic prostatectomy. In order to study this question the authors performed a series of post-mortem prostatectomies on cases with moderate and considerable enlargement of the prostatic gland, removed the gland, ejaculatory ducts, vesicles and bladder *in toto* directly afterwards, and conducted thorough anatomical investigations of the prostatic bed. The cavity left after extirpation is situated below the bladder so as to give to the specimen the appearance of a double sac, the smaller having contained the hypertrophic

prostatic. The upper limit of the bed is formed by the incision or tear in the vesical wall, which, in healed specimens, is represented by a transverse bar lying below the ureteral ostia. The lower boundary line of rupture in the prostatic urethra, and the tear, should here leave at least the lower half of the verumontanum intact, the latter resting as a sort of promontory on the inferior urethral wall. As a rule the ejaculatory ducts are intact. They can be traced in their common sheath under a thin layer of tissue that lies in the wall of the prostatic bed, and projects into it in the form of a median ridge. Histological examination reveals prostatic glandular tissue in the wall of the pouch, permitting of the conclusion (which had already been arrived at by Wallace, Motz, and others), that the prostate itself is left behind, the so-called prostatectomy being nothing more than the enucleation of an adenoma or fibro-adenoma.

As regards the condition of the sexual function after the operation, the authors find that exact data are lacking in the reports of most surgeons, for no special regard is taken of the fact that the following phases of the act may individually or conjointly suffer alteration, namely, the sexual desire, the erection, the ejaculation and the orgasm. Reviewing 9 of the cases whose subsequent histories could be carefully investigated together with reports of others, it was found that the sexual appetite does not seem to be suppressed except in the very feeble and aged. Ejaculation probably occurs into the bladder in most cases and retention in the spermatic tract only takes place when the ejaculatory ducts are torn. The orgasm is usually retained which also points to the view that ejaculation into the prostatic bed and bladder occurs.

5. Remote Results following Incision of Prostatic Abscess. The authors have studied 71 cases operated on in the service of Héresco in Bucharest. The patients had been either recently examined or their replies to letters of inquiry were recorded.

As regards the indications for operation, the weight of opinion expressed at the XI Meeting of the Urological Society of France, seemed to favor intervention in gonorrhoeal prostatitis, whenever there is a distinct abscess, when there is a suppurative periprostatitis, or if small foci in the prostate give alarming symptoms. The authors' cases were all operated on by the

perineal route, and the remote results were very gratifying.

After incision of a prostatic abscess we may expect healing in 18 to 35 days, and a cure of the gonorrhoea in 15-40 days, the proper local treatment having been given. As for post-operative complications, untoward sequelae, and mortality, the following have often been cited: perineal fistulae, sexual complications, atrophy of the prostate, epididymitis, funiculitis, retention and incontinence of urine.

The frequency of the occurrence, and the dangers of perineal fistulae have been exaggerated. Although the observations of Segond, who records 10 cases of fistula in 114 operations, would seem to speak for the frequency of their occurrence, more recent reports and the last twenty cases of the authors seem to disprove this. If the rectum or urethra be injured, or if there already exists a potential communication due to perforation of the urethra by the prostatic pus, a post-operative tract leading into the urethra and bladder may become established. Even should this occur, the persistence would be unusual. Thus in 22 cases, fistulae occurred but twice. One of these was due to perforation of the rectum by a probe during dressing, the other occurred also secondarily because of neglect in post-operative treatment.

Lesions of the adnexa ought not to occur if the incision is properly made. A carelessly executed transverse incision may easily cut the ejaculatory ducts, so that a longitudinal direction is to be preferred. Sexual complications could be of the following types: Sexual impotence, total absence of ejaculation, painful ejaculation, and interrupted ejaculation. Such sequelae may be the result of a uni- or bi-lateral lesion of the ejaculatory ducts. Although slight temporary disturbances of the above nature are seen in some instances, on the whole permanent sexual changes are rare.

Atrophy of the prostate is encountered rather in the form of a moderate diminution in the size of the gland, than in a total or very marked degeneration of the organ. In one case there was precipitate ejaculation, in two patients the act was retarded; slight pains were felt by three patients, a symptom which lasted for some six months.

As regards epididymitis and funiculitis, we have no reason to suppose that this is directly brought about by the operation, except where a lesion of the ejaculatory ducts has taken place.

In all the post-operative cases of epididymitis, the prostate was very large and the symptoms were so severe that this complication was to be expected even without intervention.

Retention or incontinence of urine did not take place in any of the cases observed by the authors, although reports of high mortality are recorded. There were but two fatalities in the 71 cases. One of these patients had already a general infection, the other succumbed to an extension of the suppurative process from the pelvis into the peritoneum.

There is no doubt but that an infected prostate is often responsible for the persistence of the disease; and particularly is this true when the gland has become the seat of collections of pus. But it is concerning the question as to whether massage or incision gives the best final results that genito-urinary surgeons are still at variance. When we consider that, even in the so-called mild cases of prostatic suppuration, the lesion consists in a number of miliary abscesses, which do not always become confluent to form "surgical" abscesses, but which may become encysted and remain as latent foci, ready to light up an acute process, the *rationale* of a thorough operative cure becomes apparent. Héresco considers prostatotomy indicated whenever repeated attacks of suppurative prostatitis have occurred; further in certain cases, that prove refractory to massage and treatment of the urethra, even if the gland be small, and finally where there is a frank abscess.

As to whether incision is superior to spontaneous evacuation of the pus, the authors are emphatic in their opinion that the former is incomparably better than the latter. In all of the cases operated upon, the gonorrhea was completely cured. Rupture of the abscess either into the rectum or urethra, is usually followed by conditions that make for a persistence of the inflammatory foci, leading most frequently to a chronic, often incurable gonorrhea.

6. Syphilis of the Bladder and Upper Urinary Tract. By means of cytoscopic examination confirmed by the Wasserman test and by the results of therapy, the author was able to diagnosticate a case of syphilis of the bladder and kidneys. The patient, a female 39 years of age, complained of a feeling of pressure in both renal regions, of occasional hematuria during a period of about five years. The kidneys were not palpable,

tenderness was absent, and the total quantity of urine voided in 24 hours did not exceed 600 c.cm. Peculiar lesions were found with the cystoscope. Surrounding the ureteral ostia, as well as scattered over the superior and lateral walls, there were collections of small papules arranged in circular groups. They were covered by grayish yellow clots, and each circle was surrounded by a red annular band that formed a striking contrast to the neighboring normal mucosa. Some of these areas were suggestive of a cutaneous areola.

Catheterization of the ureters gave evidence of disease of the left kidney, the ureteral orifice bing hyperaemic and excreting cloudy urine with many pus cells.

The Wasserman reaction was positive, and, after the administration of mercury and iodide of potash, the improvement in both the general and local condition of the patient was striking. Thus the total quantity of urine soon increased to 1500 c.cm., and after one month the aspect of the bladder had completely changed. The lesions over the superior wall had disappeared and there only remained slight indication of disease over the trigone and lateral walls in the form of rose colored spots. The hematuria had ceased shortly after the anti-leutic treatment had been administered and had not recurred.

ZEITSCHRIFT FÜR GYNAEKOLOGISCHE UROLOGIE

Vol. III, No. 1, July, 1911.

1. Bacteriological Studies of the Value of Myrmalyd as a Urinary Antiseptic. By P. Tsch.
2. Foreign Bodies in the Female Bladder. By O. Hoehne.
3. Ligature—Stones of the Female Bladder. By R. Know.
4. Pyelonephritis of Pregnancy. By E. Kehrer.
5. Tuberculosis of a Cystic Kidney. By A. Sitzenfrey.

4. Pyelonephritis of Pregnancy. From a study of the literature and of six cases, Kehrer concludes as follows:

1. Pyelonephritis of pregnancy is rather common and often follows exposure to cold. The case under consideration may have originated during a previous pregnancy. About 70% of the cases occur on the right side at about the middle of the term.

2. The colon bacillus in the infecting organism is 79% of cases, probably reaching the pelvis of the kidney by the ascending

route. Frequently cystitis of long standing precedes the pyelitis.

3. The hyperemia of the pelvic organs during pregnancy leads to swelling of the ureteral orifices and a consequent atony of the ureteral musculature. A tendency to antiperistalsis and retention results. The antiperistaltic movements are elicited by virtue of the irritation of the infected contents of the bladder, by the pressure of the uterus, and possibly also by an increased vesical pressure.

4. The early treatment of the cystitis is an important prophylactic measure.

5. Energetic conservative therapy gives good results. A cure from the bacteriological standpoint cannot be expected to occur until a considerable time has elapsed. The disappearance of subjective symptoms is the rule shortly after labor.

6. Nephrotomy should be avoided.

7. In the severest cases only, when there is a bilateral affection, when a general infection is threatened, is the interruption of the pregnancy to be considered.

5. Tuberculosis of a Cystic Kidney. A rather remarkable specimen of cystic kidney completely converted into a cavernous type of renal tuberculosis was obtained in the case of a woman 40 years of age, who clinically represented the picture of a large tense fluctuating lumbar tumor extending almost to the umbilicus. The examination of the tumor showed a typical cystic kidney plus an extensive tubercular process. The ureter was completely stenosed as it passed through the bladder wall, but, according to the author, because of congenital anomaly, and not due to the inflammatory process.

Radiography in Urinary Lithiasis. *(Sur quelques Particularities de la Lithiase Urinaire, etc.)* L. Bazy and Desternes, *La Presse Médicale,* June 24, 1911.

The necessity for a thorough X-ray examination of the urinary tract is dwelt upon by the authors, and some striking clinical examples illustrating its importance in diagnosis are cited. The salient features of their paper may be summed up as follows:

1. Pain may be the only symptom of urinary calculi, urinary symptoms being absent. Thus a young woman 28 years of age had an attack of severe abdominal pain for a long time without a single functional sign pointing to the urinary tract. Roentgen

examination revealed a small calculus in one of the calices of the left kidney.

2. Urinary calculi may present paradoxical phenomena. A female patient 40 years of age had experienced pain in the right flank for a long time, the diagnosis of appendicitis having been made. There was a calculus in the *left* kidney. In another case of a young woman who gave all the usual symptoms of *cystitis colli* and did not improve under treatment, the X-ray examination revealed that the pelvis of one of the kidneys was filled with urinary sand.

3. Urinary calculi may be present without symptoms. In a boy 7 years of age who had developed a stone behind a congenital stricture of the urethra, a radiogram showed an immense calculus in the lower part of the left ureter, without there being any symptoms pointing to an affection of the ureter or kidney.

4. Urinary lithiasis may show multiplicity in its localization. The case of a man in whom a calculus had formed behind a traumatic stricture of the urethra, proved to have also a stone in the right kidney.

5. Urinary calculi may be associated with other lesions. Thus after the removal of a stone from the right kidney of a young woman, convalescence was interrupted by fever and a persistence of the preëxisting pyuria. The kidney was the seat of a cheesy tuberculous process.

THE AMERICAN
JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII NOVEMBER, 1911 NO. 11

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

AN EXPERIMENTAL AND CLINICAL STUDY OF COLON BACILLUS INFECTIONS OF THE URINARY TRACT*

By IRVIN S. KOLL, B.S., M.D., Chicago.

(From the Laboratory of the Michael Reese Hospital.)

THE pathogenicity of the colon bacillus in its attack upon the urinary tract has placed these infections among the most interesting and provoking that the urologist encounters.

Without pausing to consider the origin of colon bacillus infections of the urinary passages I will briefly review some of the cultural characteristics of the organism in question, so that we may have some foundation for the working basis leading up to the experimental portions of this paper. Thriving as this organism does in the intestinal tract, its medium is under normal conditions of a strong alkaline reaction. Artifically grown, it curdles milk, which process probably depends on the fermentation of the lactose of the milk and the throwing down of the casein by the resulting lactic acid. Litmus bouillon or gelatin will soon give a slight acid reaction, when inoculated with the colon bacillus. In short, the organism grows equally well on media slightly acid and on those of an alkaline reaction. The question arose, if it were possible to increase the acidity of the habitat, what would be the effect upon the resistance and multiplying powers of the bacteria?

To increase the alkalinity was not considered because of the fact that the usual habitat, namely, the intestinal tract, where the colon bacillus best thrives is strongly alkaline.

Reviewing the literature on chemical therapeutics, it was

* Read at the Twenty-seventh Annual Meeting of the American Urological Association held in Chicago, Sept. 26 and 27, 1911.

found that aluminum acetate had been very satisfactorily used in surgical dressings for many years. Dreuw[1] also used the drug by internal administration for the reduction of excessive intestinal fermentation, and he claims to have ameliorated the strangury of posterior gonorrheal urethritis by the same means.

BACTERIOLOGICAL EXPERIMENTS

Accordingly, the following series of bacteriological experiments was undertaken: First, two sets of twenty-four hour cultures of four different strains of bacilli were taken, one in bouillon and one in urine. To each tube, which contained 5 c. c. of the culture, was added 5 c.c. of a 2% suspension of the subacetate of aluminum. One urine and one bouillon culture of each strain were incubated respectively for 2, 5, 7, 10, 20, 30, 40, 50, and 60 minutes: then agar plates inoculated with one loop full of the culture. At the end of 24 hours the entire four sets had a countless number of colonies, thus showing the inertness of the insoluble subacetate of aluminum. Next, the same technique was used, substituting liquor aluminum acetate (N. F.)[2] for the insoluble subacetate. Beginning with full strength, which is nearly 80%, the experiments were carried down to a dilution of 1%, each set 1% lower than the previous, with a result which showed that it required a 2% dilution 50 minutes to completely destroy 5 c.c. of a 24 hour bouillon or urine culture.

Attenuation of the number of the colonies was constant in proportion to the strength of the solution added, and the time of incubation. Thus was proven the germicidal power of the liquor upon the colon bacillus.

I was now curious to know what the effect would be upon the other members of the colon group and upon the staphylococci. Accordingly a series of experiments was gone through as above, using different strains of para-colon, typhoid, and staphylococcus pyogenes albus and aureus. The experiments, several times repeated using controls, were uniform in their results, namely, a 2% dilution destroyed 5 c.c. of a 24 hour culture of para-colon and typhoid in 50 minutes, but that at full strength the staphylococci were unaffected.

Having established the germicidal effect, the antiseptic power of the drug was next tried. To two sets of tubes of bouillon and sterile urine were added sufficient quantities of the liquor to make the correct percentage dilutions from 8 to 1; each tube was inoculated with 1/10 c.c. of a 24 hour bouillon culture of the different strains and different bacteria, as in the foregoing.

These were then incubated 48 hours, plated and again incubated. There were no growths on any of the colon, para-colon, or typhoid plates, but all the staphylococci plates an infinite number. Thus a 1% dilution was sufficient to prevent the growth of the different members of the colon family, but the full strength did not influence the staphylococci.

Acetic acid in the same percentage strength gave the same results upon the colon group, and in 3% dilution completely destroyed and prevented the growth of the staphylococci. The acid reduced to the same degree of acidity as the 2% liquor aluminum acetate expressed in terms of n/10 NaOH again gave the germicidal and antiseptic action upon the colon group but not upon the staphylococci.

CHEMICAL EXPERIMENTS

Chemically, some of my results were inconstant, namely, I first tried to ascertain whether the internal administration of the subacetate of aluminum would raise the total acidity of the normal urine. Three grams per day were given to three individuals living about the same routine and upon the same diet. Taking an A.M., noon, and P.M. specimen I titrated them with n/10 NaOH, using phenolphthalein as an indicator. For the seven days following the administration of the drug, compared with the seven days previous to it, there was a total increase in the 24 hour specimen of 18 calculated in terms of NaOH. This is so small that I don't think we can attach much importance to it. There was no appreciable difference in the resisting power of the urine with the increased acidity when inoculated with a colon culture. However, urine that contained the higher acidity did not become infected as rapidly when allowed to remain exposed to the air as a specimen from the same individual previous to his taking the subacetate.

What is the effect of the liquor aluminum acetate upon the healthy mucosa of the urinary tract was the next question to be solved before putting the results obtained to clinical use?

ANIMAL EXPERIMENTS

To determine this a series of rabbits was used. A good sized animal was prepared for operation, anaesthetized, both kidneys exposed and brought up into the incision. The right ureter—control—was clamped about 5 cm below the kidney pelvis and then the organ was replaced into the abdominal cavity. The left ureter was injected proximally with a 2% dilution of the liquor aluminum acetate until the pelvis was distended. A clamp was

then placed distal to the point of injection. Then 10 c.c. of the 2% solution was injected downward through the ureter into the bladder and the left kidney dropped back into the abdominal cavity.

After the lapse of one hour, the animal being kept under the anaesthetic for the entire period, the clamps were removed and the incisions closed. Rabbit I was killed at the end of 24 hours; rabbit II at the end of 48 hours. The pelves of both kidneys, portions of the ureters and the urinary bladder were then examined macroscopically and histologically. There was no change whatever in any of the cellular structures except a certain amount of hyperemia produced by pressure upon the ureteral vessels. Great care was taken to find some evidence of necrosis or edema of the epithelium, but none could be found in any of the tissues. Increasing strengths were then used, and as soon as a greater concentration than 4% was reached, changes began to manifest themselves in the epithelial structures in the nature of a cellular destruction, which reached a true state of marked general necrosis at a concentration of 7%.

From these animal experiments we may conclude that a 2% dilution of the liquor has no harmful effects upon the mucosa of the urinary tract. Whether or not the same degree of acidity in terms of NaOH of acetic acid will act in a like manner is now being determined. The penetration power of both the liquor aluminum acetate and the acetic acid in addition to the histological study of experimental pyelitis and cystitis will be reported in a subsequent communication.

CLINICAL OBSERVATIONS

The clinical application of these results was now undertaken, and with such uniform and excellent results that I will report somewhat in detail a few of the more interesting cases. The cases are divided into three groups: First, those having unilateral pyelitis; second, those having cystitis, and third, those having urethritis—a total of 27 cases. In each case a bacteriological examination by culture was made of the urine before the treatment was instituted, and the colon bacillus found in every instance except one in pure culture. In the urethritis cases the discharge was examined bacteriologically and in every instance cited the organism found in pure culture.

The pyelitis cases, 7 in number, were treated by lavage with the 2% liquor aluminum acetate and three grams of the aluminum subacetate made into one-half gram tablets, two tablets given

after meals. The lavage was carried out in the usual way, washing until the return fluid came away clear, then injecting about 10 c.c. of the solution and withdrawing the catheter. The treatments were repeated at intervals varying from 2 to 5 days, depending upon the reaction produced by the introduction of the cystoscope. The longest period of treatment was 3 months, the shortest two weeks. In every case a culture from the urine was sterile and the leucocytes either entirely gone or reduced to very few before the treatment was stopped.

Previous to the treatment the duration of the infection, judging from the patients' histories, varied from 1 to 8 months. No unpleasant symptoms from the lavage developed in any case. The usual pain associated with these infections disappeared after the second or third washing. Only one patient was confined to the hospital, on account of difficulty in urinating after the cystosocopy.

Up to date there has been no recurrence, as I am in constant touch with all of the patients. The first case was treated 13 months ago. Two cases permit me to report to you more in detail:

1. Male, 27 years of age. Three years ago had a left nephrolithotomy. Uneventful recovery. Two years later, following an attack of influenza, a severe pain developed over the left lumbar region. Temperature 101°. Urine very turbid, slightly alkaline, loaded with pus, and a pure culture of colon bacilli obtained. Patient was sent to the Michael Reese Hospital. Hot fomentations applied, urotropin grs. v., given three times a day. Auto-vaccines made and large doses given. No improvement at the end of one week. Then left pelvis irrigated with 2% liquor aluminum acetate, vaccines and urotropin stopped and the tablets of subacetate substituted. Two days later a second irrigation given. At the end of 5 days the pain and tenderness had entirely disappeared, the urine was much clearer, though the colon bacilli were still present. The patient left the hospital at the end of the fourth week, having had 10 irrigations. Urine sterile and showing only an occasional leucocyte. No recurrence at the end of 12 months.

II. Male aged 47. Five years ago an attack of acute nephritis following a lobar pneumonia. Eight months previous to consulting me patient had a constant pain over the right lumbar region, and occasionally had chilly sensations. He thought this was due to his "run down" condition from overwork and did not

consult a physician. When first seen he had distinct rigidity and tenderness over the right kidney. Temperature 100°. Urine very turbid; contained large casts of pus and a vigorous colon bacillus culture was obtained. Pelvic lavage was at once advised but the patient would not consent. So he was put on urotropin and autovaccines and kept on the treatment for 6 weeks, with little or no improvement "which could in any way be attributed to the vaccine therapy," to use the words of Geraghty.[3] The patient was finally induced to submit to the pelvic lavage and there was a most remarkable change in the urine in 10 days. It took 9 treatments, however, extending over 4 weeks time, before the urine became sterile. Eight months have elapsed and the patient has remained quite free from any urinary disturbance.

The cystitis cases 8 in all, varied in age from 24 to 84 years. Duration of the infection previous to the treatment, judged from the patients' histories, extended over a period varying from one week to several years. The shortest time required to give a sterile urine and complete cessation from symptoms was 10 days.

The treatment consists in irrigating the bladder with either sterile water or boracic acid solution until the return washings were perfectly clear. This was followed by an instillation of from 60 to 120 c.c. of the 2% liquor, which was left in the bladder until expelled by the succeeding urinary act. These irrigations are carried out from 2 to 4 times in the 24 hours, according to the severity of the inflammation, whether it is acute or chronic, and in accordance with the length of time the patient can retain the liquor. In addition to these irrigations the aluminum subacetate is administered by mouth. Rectal suppositories of opium, belladonna, and ichthyol are used for tenesmus and frequency. The Sitz bath and other measures commonly adopted in vesical inflammations are employed. In the most severe cases there was a marked relief in 36 to 48 hours, and the urine showed very rapid changes going back to normal appearance in a very few days.

Two cases follow more in detail:

I. Male, aged 84. Had never had any urinary disturbance up to about two weeks before I saw him, when he suddenly developed marked frequency and very severe tenesmus. The urine was very foul smelling, strongly alkaline, full of pus and pure culture of colon bacilli obtained. There was about 60 c.c.

PYELITIS CASES

No.	Age.	Sex.	Duration of Symptoms before treatment was started.	Kidney Affected.	Duration of Treatment.	Urinalysis before Treatment.	Urinalysis when Treatment was Stopped.	Remarks.
1.	27	Male	About four weeks.	Left	Four weeks.	Pure culture B. coli. Very many leucocytes.	Culture sterile. Occasional leucocyte.	Nephrolithotomy three years ago.
2.	47	Male	About eight months.	Right	Two and a half months.	Pure Culture B. coli. Very many leucocytes.	Culture sterile. No leucocytes.	Urotropin and vaccines tried unsuccessfully.
3.	40	Male	Several months.	Right	Six weeks.	Pure culture B. coli. Leucocytes 20 to 40 to low power field.	Culture sterile. Occasional leucocyte.	Right nephrolithotomy, 6 months previously.
4.	20	Male	Several weeks.	Right	Three and a half weeks.	Pure culture B. coli. Leucocytes 20 to 40 to low power field.	Culture sterile. Occasional leucocyte.	Urotropin and vaccines used ineffectually.
5.	35	Female	Ten months.	Right	Two months.	Leucocytes. Culture of colon and staphylococci.	Pure culture staphylococci. Leucocytes, 15 to 20 to field.	Advised nephrotomy.
6.	29	Female	Six months.	Right	Two weeks.	Pure culture B. coli. Leucocytes.	Culture sterile. Leucoctyes 6 to 8 to field.	Pain entirely gone.
7.	25	Female	Few weeks.	Right	One month.	Pure culture B. coli. Leucocytes.	Sterile culture. No leucocytes.	Urotropin and vaccines used unsuccessfully.

CYSTITIS CASES

No.	Age.	Sex.	Duration of Symptoms before Treatment was Started.	Duration of Treatment.	Urinalysis before Treatment.	Urinalysis when Treatment was Stopped.	Remarks.
1.	40	Female	Several years.	Four months.	Many red and white corpuscles. Pure culture B. Coli.	Sterile. No red or white cells.	Chronic ulcerative cystitis.
2.	84	Male	Eight weeks.	Four weeks.	Leucocytes. Pure culture B. Coli.	Occasional leucocyte. Culture sterile.	In good condition.
3.	24	Female	Intermittently for ten years.	Four and a half weeks.	Leucocytes. Pure culture B. Coli.	Sterile and clear.	Feels entirely well.
4.	74	Male	Three years.	Two and a half months.	Full of clumps of pus. Many red cells. Pure culture B. Coli.	Sterile. Still 10 to 20 leucocytes to the field.	Very large prostate. Complete retention when first seen.
5.	45	Female	Several months.	Six weeks.	Pure culture B. Coli. Leucocytes.	Sterile and no leucocytes.	Diabetes insipidus. Bladder capacity, 3200 c.c. Median simple ulcer in base of bond.
6.	32	Female	Three months.	Two months.	Pure culture B. Coli. Many leucocytes and erythrocytes.	Sterile and clear.	Traumatic ulcerative post-operative cystitis.
7.	62	Male	Several years.	Nineteen days.	Pure culture B. Coli. Many leucocytes.	Sterile. Cystoscopic showed mucous membrane normal. Urine clear.	Prostatectomy for obstruction. Recovery uneventful.
8.	78	Female	One week.	Twenty days.		Sterile. Occasional leucocyte.	Symptoms ceased in 48 hours. Culture sterile at end of twenty days.

residual. The median lobe of the prostate was encountered by the prostatic catheter. Rectal examination negative. Suppositories, Sitz baths, urotropin and irrigation with 1:10,000 oxycyanide of mercury (this was before I began the use of the aluminum acetate) relieved the condition after about two weeks. The urine still gave a pure culture of colon bacilli. The patient was discharged and told to notify me on the least sign of the return of any symptoms, which he failed to do until several days after an acute exacerbation. The other irrigations were then started and in about three and one-half weeks the urine became sterile and has remained so since.

II. Virgin, aged 24. Claims that she has had bladder symptoms since she was 14 years old, in the nature of frequency and tenesmus more or less pronounced. During the day she urinates every hour, sometimes every half-hour, and must get up from one to three times during the night. The urine was very turbid, full of pus and shreds of mucosa. Pure culture of colon isolated. Cystoscopy had to be done under nitrous oxid anaesthesia, because the bladder would not hold more than 30 or 40 c.c., without producing tenesmus. The picture was that of a chronically inflamed, contracted bladder with numerous punctate erosions. After 2 weeks of irrigations and general treatment, the patient would go one and a half to two hours without urinating. At the end of four and a half weeks the urine was sterile, micturition not more often than two and a half hours and seldom during the night was she disturbed at all. No recurrence at the end of six and a half months.

Not less interesting is the group of 12 cases of urethritis. The ages ranged from 19 to 38. Duration of discharge previous to acetate treatment varied from 4 days to 8 years. In 4 of the cases there was no history of gonorrhoea. One patient presented himself with a profuse waterly discharge 4 days after coitus. Microscopic examination and culture showed the colon bacilli in great abundance, which disappeared in 36 hours following the injections.

The treatments consist in giving an anterior and posterior instillation with either the Guyon or Ultzman syringe every other day, and giving the patient a 1 to 2% solution to inject twice daily, with the ordinary glass urethal syringe, instructing him to retain the injection 15 to 20 minutes. If the case is stubborn, any enlarged glands or inflammed points with full strength liquor through the Vallentine urethroscope. As soon as the discharge fails to show the presence of the bacilli, an astringent is

substituted for the liquor. If the discharge is only the "morning drop" the patient is given a couple of slides to make a smear which is examined the next time he presents himself for treatment.

I. Eight years ago contracted gonorrhoea. Following the disappearance of the gonococci there was intermittently a discharge, sometimes profuse, sometimes only present in the morning. Frequently it was thick but white in color. First glass of urine turbid and full of "tripper-faeden." Bacteriological examination showed the colon bacilli in abundance. Seventeen days after the instillations were begun the patient was entirely free from the discharge. Two weeks later no shreds appeared in the urine and culture was negative. No recurrence after 6 months.

II. Eight months ago had slight attack of gonorrhoea which lasted only 2 weeks. Discharge recommenced in a few days, continuing constantly up to the time that the patient came to me. Repeated examinations of the discharge taken at various hours of the day showed only the colon bacilli, proven by culture. Twenty-seven days of treatment were necessary to produce a sterile urine, with no shreds and no discharge. No recurrence at the end of 4 months.

SUMMARY

From the experimental work described, we may conclude that:

1. Liquor aluminum acetate in a dilution of 2% is an active germicidal and antiseptic agent to the colon bacillus and the colon group of bacteria.

2. Liquor aluminum acetate in 2% dilution has no deleterious effects upon the mucous membrane of the urinary tract.

3. The germicidal and antiseptic properties are due to the acid radical of the drug, as proven with the experiments with acetic acid.

4. Whether or not the acetic acid produces any untoward action upon the mucous membrane of the urinary tract will be reported upon in a subsequent communication.

5. The internal administration of the subacetate of aluminum raises the total acidity of the urine, which is desirable in dealing with the colon bacillus infections of the urinary tract.

The clinical observations lead us to believe that:

1. Colon bacillus infections of the kidney pelvis, urinary bladder and male urethra are more promtply ameliorated by the 2%

URETHRITIS CASES

No.	Age.	Duration of Infection before Treatment was Started.	Duration of Treatment.	Examination of Urethral Discharge.	Condition when Treatment was Stopped.	Remarks.
1.	38	2½ years.	5 weeks.	B. coli and many leucocytes.	Few shreds in urine. Occasional moisture at meatus.	Meatotomy. Two soft strictures dilated.
2.	27	Over 2 years.	2½ months.	B. coli and staphylococci. Many pus corpuscles.	Perfectly cured.	Staphylococci disappeared under vaccines and irrigations with the oxycyanide of mercury.
3.	33	Several months.	15 days.	Great number of B. coli. Pus; casts.	Urine clear. Occasional moisture at meatus in morning.	Several tight strictures which were dilated.
4.	26	20 months.	2 months.	B. coli and leucocytes.	No discharge. Few shreds in first glass.	Very small meatus. Would not consent to meatotomy.
5.	25	Intermittently for 8 years.	17 days.	Few B. coli. Culture pure. Many leucocytes.	No discharge. Urine clear.	----------
6.	21	9 months.	27 days.	Great number of B. coli and leucocytes.	No discharge. Few specks in first glass.	----------
7.	19	2 weeks.	18 days.	Great number of B. coli and leucocytes.	No discharge. Urine clear.	----------
8.	37	1 year.	24 days.	Great number of B. coli and leucocytes.	Slight moisture at meatus occasionally in morning.	Meatotomy.
9.	28	Four days following coitus.	10 days.	Enormous number of B. coli and many leucocytes.	Urine clear. Slight discharge of clear substance.	All the bacilli disappeared in thirty-six hours.
10.	25	17 days.	3 days.	Enormous number of B. coli and many leucocytes.	Very watery discharge that contained a few leucocytes. Few shreds in first glass.	One week later patient developed an acute gonorrhea.
11.	34	4 days.	4 days.	Enormous number of B. coli and many leucocytes.	Urine clear. No discharge.	----------
12.	41	7 weeks.	10 days.	Enormous number of B. coli and many leucocytes.	Urine clear. No discharge.	----------

liquor aluminum acetate than by any therapeutic measure previously used.

2. The bacteria in the urethral discharge disappear in from 36 to 48 hours following the instillation with the liquor, but other astringents may be necessary to "dry up" the discharge.

3. Care must be exercised in the preparation of the liquor aluminum acetate as an excess of free acetic acid will produce unpleasant subjective symptoms. The solution must not be more than a week to ten days old when used.

4. The liquor aluminum acetate is of value only in those cases where the presence of the colon bacillus is proven by cultivation under the most careful aseptic precautions.

CONCLUSIONS

We all well know that in medicine more than in any other branch of science facts, to be of value, must be based upon a greater number of successfully treated cases than herein cited. So I appreciate keenly, that 27 cases do not solve a problem that has perplexed modern urology. I present the results of my experimental work and clinical observations for what they are worth and ask those of you who are interested in this subject to coöperate with me in the attempt to further prove or disprove the value of the foregoing treatment in combating colon bacillus infections of the urinary tract.

In concluding, I wish to express my gratitude to Dr. J. W. Jobling, Pathologist to the Michael Reese Hospital, for his untiring assistance; and to Dr. Sol Strouse, his associate, for his many valuable suggestions.

In addition, I want to thank Drs. L. A. Greensfelder and I. A. Abt for the privilege of utilizing their clinical material at the Michael Reese Hospital.

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UNILATERAL CHYLURIA DUE TO FILARIA BANCROFTI INFECTION.

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INVASION of the blood of man by the *filaria bancrofti* is of especial interest to the genito-urinary surgeon on account of the frequency with which patients affected with this nematode show lesions of and symptoms referable to the organs of the genito-urinary apparatus.

Chyluria, chylocele, lymph-scrotum, elephantiasis of the scrotum and varicose inguinal and femoral glands are more or less common in tropical regions where filariasis is endemic, and are occasionally encountered in temperate climates in natives of the tropics who have emigrated. A few cases are on record as occurring in Europeans who have never visited the regions where infection with this nematode is common. In the past five years the writer has seen five cases of *filaria bancrofti* infection accompanied by more or less grave involvement of one or more of the genito-urinary organs.

A brief review of the life-cycle of *filaria bancrofti* will render the pathogenesis of the various lesions more intelligible. The adult worms inhabit the lymphatics of the trunk and extremities. The sexes are usually found in conjunction, and the embryos, termed by Manson the microfilaria, are born in the lymph that bathes the parents. The embryos find their way into the blood stream via lymphatics, traversing the lymph nodes and thoracic duct. It is only at night that the microfilaria circulate freely, those born during the day presumably finding lodgement in the lungs and larger blood vessels of the thorax. The microfilaria commence to appear in the blood at dusk, increase in numbers up to midnight, diminish in numbers in the early morning hours, gradually disappearing from the circulation before the individual arises. The embryos can readily be found in a drop of blood from a needle-prick if examined with an objective of moderate power. The blood is prevented from clotting by adding a drop of normal salt solution or one per cent. sodium citrate in normal salt solution. In individuals who sleep during the daytime this periodicity is usually reversed. In the case detailed below the microfilaria were found at night when the patient slept at night, and on a number of occasions when in the alternation of his work as elevator-runner he worked

at night and slept during the day, the embryos were found during the day.

If a person harboring the parasite is bitten at night by any of a number of species of mosquitoes, the microfilaria are imbibed by the insect, and undergo further metamorphosis in the body of the female. This process takes from six to twenty days according to the observations of Manson, when the parasite is ready for transfer to the human host by the insect. The further development after it reaches this host through the bite of the mosquito has never been described.

The microfilaria may circulate in the blood of a person for years without giving rise to any appreciable symptoms, and apparently without harm to the host. However, in a certain percentage of cases* " by an intertwining of a number of the parent worms in the lymphatics or due to the stenosis caused by their presence," in say, the thoracic duct, the latter becomes occluded, and there occurs a rise of pressure and a stasis of lymph in the lymphatics below this point. Relief is obtained by anastomosis with the thoracic lymph vessels in a recurrent course by way of the pelvic lymphatics, through the inguinal and upper femoral vessels, and over the dorsal and abdominal regions of the body. This dilation, combined with rise of pressure in the lymphatics may cause rupture. If it involves the renal or vesical vessels chyluria results, while if the lymphatics of the inguinal or femoral region, tunica vaginalis or scrotum are involved, varicose inguinal or femoral nodes, chylocele or lymph-scrotum respectively ensues.

Elephantiasis is explained by Manson as due to premature birth of the embryo due to an injury to the part harboring the adult worms. Instead of motile slender fully-grown embryos, non-motile broader ova pass into the lymph stream, block up the vessels and nodes in all directions, and combined with attacks of local inflammation give rise to the condition of elephantiasis.

Chyluria occurs in both sexes following strain or injury and in women occasionally comes on after pregnancy. The urine is turbid and milky in color. It is sometimes salmon-colored or distinctly bloody (hemato-chyluria), and from time to time contains smaller and larger clots of coagulated urine with or without an admixture of blood. In the passage of these clots from the kidney or bladder the patient may experience all

* Manson in Allbutt and Rolleston's System of Med.

the painful sensations of an attack of renal or vesical colic. Otherwise the only subjective symptoms are dragging and aching pain in the back, pubic region and loins, and these are only very occasionally complained of. Spontaneous coagulation of the entire bulk of urine in the bladder has occurred with complete retention of urine. The urine may be turbid in the morning and clear up in the course of the day or the reverse. The condition may persist for days, months or years. It may disappear after months or years probably due to a closing of the fistula between the organ and the lymph varix or on account of the opening of collaterals, frequently reappearing from the incidence of causes that originally brought about the rupture. The daily fluctuation of chyluria and clear urine has been explained by Magnus-Levy on a mechanical basis. In about a third of the cases cited by him the urine was turbid for the greater part of the day, and in a majority of the remainder the urine was turbid only at night or when the patient was in a reclining posture. A few presented chyluria only when in an upright posture. This may be attributed to an insufficiency of the valves of the vessels when the body is reclining or to a closure of the communication between the varix and the urinary organ involved.

The point of opening of the chyle-fistula into the urinary tract has been demonstrated during life by cystoscopic examination and ureteral catheterization and rarely by autopsy. Havelberg found a communication between the bladder and a lymph varix at autopsy and Lückes demonstrated a similar communication by means of cystoscopy. A number of observers have shown by cystoscopy that the bladder was normal, the chyle finding its way into the kidney pelvis or ureter on one or both sides. In my case the communication was between the right kidney as in the cases of Magnus-Levy and of Heuk. The break probably takes place into the pelvis of the kidney rather than into the ureter which is thicker-walled than the pelvis. In Port's case the pelvis at autopsy was filled with chylous fluid. In most of the cases of chyluria no renal involvement was made out so that it is unlikely that the fistula enters into this organ. At no time was I able to find renal elements or casts in the urine of my case.

Chylous urine may contain as high as 3 to 3½% of albumin, and on being voided may clot spontaneously. The fat content depends to a certain extent upon the diet, usually being

about one to two per cent., occasionally as high as 10 or 14% as in a case of Gallois. It also to a certain extent upon the size of the fistual into the urinary tract and the hydrostatic pressure causing the emptying into the urinary tract of lymph from the lymphatics, rather than the damming back of chyle from the thoracic duct. Besides these elements, the chylous urine contains salts, especially NaCl, cholestearin and lecithin, and occasionally some blood. On centrifugalization of the chylous fluid numerous microfilaria are usually found in the sediment, and finely granular lymph corpuscles or fine droplets of fat. The total amount of chyle voided in twenty-four hours varies greatly; reaching as high as one litre in a case of Franz and Steyskal, or about one-third of the total amount passing through the thoracic duct in a day (Magnus-Levy). Thus it is apparent that the condition in persistent cases is apt to cause marked debility and inanition, rendering the patient particularly susceptible to invasion of an intercurrent infection as in my case.

Most cases of chyluria are due to the presence of the *filaria bancrofti*, but rarely cases are found due to the presence in the kidney or lymphatics in this region of the Eustrongylas gigas. Casper reported such a case in which the eggs of this parasite were found in the urine, and the chyle found issuing from one ureter. In some of the cases of European chyluria in which the filaria could not be found either before or after death, the communication was attributed to mechanical causes. In lipuria due to dietetic causes fat is found in the urine, but the other elements of true chyle are lacking, especially the albumin, and the fat droplets are larger than the finely granular lymph corpuscles.

In lymph scrotum the part is enlarged and swollen, and on the surface are found larger and smaller vesicles filled with lymph in which the microfilaria may be found. Attacks of local inflammation and fever often accompany the condition which may subside or frequently recur, elephantiasis of the scrotum eventually ensuing. The above condition may coexist with varicose inguinal and femoral lymph nodes on one or both sides. These doughy, lobulated masses may be mistaken for herniae. Differential points are the following: the masses are flat on percussion and never tympanitic, they are not reducible on pressure, there is usually no impulse on coughing, and finally aspiration reveals the presence of lymph and often the microfilaria.

The fluid may coagulate spontaneously and under the microscope the finely granular fat globules are found and occasionally the microfilaria.

Chylocele is simply a chylous hydrocele, the tunica vaginalis being filled with the fluid frequently referred to above. The tumor is opaque and doughy, and frequently coexists with varicose inguinal or femoral nodes.

Before entering into a discussion of the therapy of these conditions, I shall briefly recite the history of a case of *filaria bancrofti* infection in which persistent chyluria was the dominant factor.

The patient was 34 years old, a native of the West Indies, living in this city for about four years. The past history was negative, excepting an attack of measles in childhood. About eight years ago he noticed that his urine was milky and occasionally slightly bloody. While resident in the tropics there were periods of three to four months at a time when the urine was normal in color. For the past four years while living in this city the urine was milky the greater part of the time and frequently was bloody and contained small clots. The patient occasionally experienced aching pain in the lumbar region radiating down into the pubic region and thighs. On a number of occasions during the past few years he underwent severe attacks of pain in the back and lower abdomen, radiating down the thighs and into the penis, simulating renal colic. He felt chilly frequently and often feverish. For the past year he was slowly losing strength and weight.

An examination of the patient revealed an individual in fairly good health, with a hemaglobin of 80%, 4,000,000 red blood cells and 7,500 leucocytes. A differential count of the leucocytes showed a normal relationship between the types of cells with three per cent. of eosinophiles. On a number of occasions I was able to demonstrate in the blood between the hours of six P. M. and midnight the *microfilaria nocturna*, the embryo of the *filaria bancrofti*. On a few occasions in which the patient retired at noon, the microfilaria were found in the morning after eight o'clock. The urine voided was usually quite turbid and often distinctly blood-tinged and contained yellowish and reddish clots up to the size of small pea. The milky urine usually cleared up on shaking with ether. It contained a varying amount of albumin and usually a large amount of fat. The urinary sediment contained besides the usual urinary elements,

lymph corpuscles, a smaller or larger number of red blood cells, and occasionally the *microfilaria nocturna* still actively motile if the urine was examined soon after it was voided or motionless if the urine was preserved for some time.

Cystoscopic examination of the bladder revealed a normal bladder mucous membrane. The trigone region and ureter mouths showed nothing abnormal. The efflux from the left ureter showed clear urine. The efflux from the right ureter can best be likened to a sudden puff of cigarette smoke blown from between the tightly-pressed lips. The ureter opening was visible for a few moments only, since the ejaculated turbid urine soon rendered obscure the landmarks in the bladder. Two or three spurts from the ureter were sufficient to cause this. On catheterization of the left ureter I obtained a clear slightly acid, light amber urine of a specific gravity of 1010 which was normal on chemical and microscopical examination. Catheterization of the right ureter showed a typical chylous urine, free from macroscopic blood, slightly alkaline in reaction, a part of which coagulated spontaneously. No sugar was found. There were a few red cells and leucocytes and a few microfilaria. In three minutes about five cubic centimeters of milky urine were obtained from the right kidney. The catheter was introduced as far as the pelvis of the kidney, thus proving that the communication was into the pelvis of the kidney or kidney proper.

In an attempt to control or modify the course of the invasion of the blood stream by the parasite, I injected the patient with 0.6 gram. of salvarsan intravenously. Through the courtesy of Dr. Goldenberg, the attending dermatologist of Mt. Sinai Hospital, I was permitted to admit the patient for a day to the dermatological service, for this purpose. Following the injection there was a severe chill and rise of temperature to 103°, but within a few hours the patient was as well as before the injection. Within a few days after the exhibition of the drug the embryos were found in the blood in about the same numbers as before the injection. The urine cleared up, however, and was free from all trace of chyle for about six weeks.

About one month after this procedure the patient was suddenly taken with a severe chill combined with fever and pain in the right chest following exposure to cold. An examination of the chest revealed a dry pleurisy which, in the course of a week, developed into a full-blown sero-fibrinous pleurisy. About five hundred cubic centimeters of a clear, straw-colored fluid was

aspirated from the chest. The effusion reaccumulated within a few days, and the patient was admitted to the first medical service of the Mount Sinai Hospital. I am grateful to Dr. Rudisch, the head of this service, for permission to use the hospital notes of the subsequent course of the case.

On admission to the hospital the physical examination revealed a fluid exudate in the right chest. Except for a general enlargement of all the palpable glands and of the prostate, the remainder of the examination was negative. The temperature showed irregular slight elevations between 99° and 100°. A marked Pirquet reaction was obtained. A litre of fluid was aspirated from the chest. Neither on this or the previous aspiration could the microfilaria be found in the chest fluid. After a stay of ten days in the hospital the patient was discharged with no trace of the fluid exudate in the chest. For a period of about two months, although free from all active symptoms, the patient complained of a progressive loss of strength. The chyluria returned soon after his discharge from the hospital and was as bad as ever. He was readmitted to the hospital complaining of progressive asthenia, night sweats and hemato-chyluria. Examinations revealed the signs of a small amount of fluid at the right base and disseminated signs suspicious of tuberculosis throughout the entire upper right chest. The temperature was irregular and remittent in type, ranging between 100° and 103.6°. The hemoglobin had dropped to 54°. The blood culture was negative, aerobically and anaerobically. The patient declined very rapidly in strength, and died of asthenia two weeks later. On numerous occasions during both stays in the hospital the microfilaria were demonstrated in the urine and in the blood.

A partial and unsatisfactory post mortem examination was made, and unfortunately it was not possible to make an effort to trace the communication between the urinary tract and the lymphatics.

A general, disseminated miliary tuberculosis was found, all the organs being riddled with small miliary abscesses. In one of the small abscesses of the kidney tubercle bacilli were demonstrated. No macroscopic or microscopic evidence of a chronic nephritis was obtained. The bladder mucous membrane was normal. The prostate contained a large caseous mass in the left lobe.

As to the prognosis of the disease much depends upon the severity of the complicating factors. It was stated above that

the embryos may circulate in the blood for years without harm to the host. The occurrence of any of the complications of the disease puts a different aspect of the case before us for consideration. Chyluria causes a severe drain on the system, and eventually the sufferer may succumb to some intercurrent infection, *e. g.*, tuberculosis, as in the case recited above. Chylocele and varicose lymph glands may disappear spontaneously, especially if the "milky hydrocele" is tapped. Lymph scrotum is usually a distressing condition lasting for years, rarely benefitted even by radical surgical removal of the organ, which may be followed by elephantiasis of the leg and chyluria.

The treatment of this disease is very unsatisfactory. It was hoped that salvarsan might prove a useful weapon to destroy the parent worms in their nidus in the lymphatics. A preliminary favorable report by Pilcher in a case in which the filaria was not demonstrated in the blood (a condition of chylous-like pleurisy with effusion), led me to use this drug in my case. The results were unsatisfactory. More than one injection could not be given on account of the extreme weak condition of the patient. In robust individuals two or three injections each of 0.6 gram may be tried. A warning should here be sounded against drawing definite conclusions from the clearing up of the urine after the injection of the drug. In my case the urine remained clear for more than a month, but the patient had known similar periods of clear urine in the absence of all treatment. The only definite proof of the cure of the condition by the exhibition of this or any other drug would be the continued freedom from symptoms or signs of the disease and the absence of the *microfilaria* from the blood for an extended period.

The recumbent position with the hips raised, as recommended by Manson, for a long space of time, until the urine is clear of chyle and free from albumin, even after giving large amount of milk in the diet, may bring about a cure of the condition. Many drugs have been used without any beneficial effect upon the disease. In the Indies turpentine is a favorite remedy; also thymol, salicylic acid and the salts of iron. The condition of varicose lymph glands and lymph scrotum are best treated by rest and general support of the part by a firm bandage. Surgical intervention is rarely of any benefit. Chylocele may be treated like hydrocele. These points in the treatment of the disease from the work of Manson might as well be applied to the cases of European chyluria in which the condition differs

only in the causative factor from tropical chyluria. The condition is more apt to disappear spontaneously and less likely to recur. Operative interference is almost useless on account of the slight chance of finding the opening into the urinary tract of the chyle-fistula. Konig performed a nephrotomy for the removal of a Eustrongylus gigas from the kidney of a case of chyluria in which the eggs were found in the urine. The parasite was not found and the condition was uninfluenced for the better by the procedure.

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PSEUDO-HEMAPHRODITISM—REPORT OF A CASE*

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THE members of this association will, no doubt, be interested in the accompanying photograph and description of the genitals of an individual who was brought to my attention through the courtesy of Dr. Thomas A. Hopkins of St. Louis.

The case is of such extreme interest to me that I feel certain that a brief report of the result of my examination will prove a sufficient excuse for reporting it. He announced himself as a Miss (?) X., age 41; nativity, United States. The individual since childhood has always been healthy and has suffered only from the ordinary diseases of childhood. At 13 he claims to have menstruated through the vagina, this continuing until he arrived at the age of 18 years; since that time he has seen no sign of menstruation.

* Read before the American Urological Association, Chicago, September, 1911.

He acknowledges having masturbated quite a great deal for a number of years, and says that he has a distinct organ at the sexual climax, discharging a quantity of " sticky " substance from the meatus at that time. I have had the opportunity of examining this discharge and find it free of spermatozoa.

He has always believed himself to be a female—his life has been spent in those duties which are usually associated with the female sex. This individual is about 5 feet 11 inches tall, rather strong, though feminine; hair on head iron gray; no hair on face; his arms and legs are not distinctly feminine in conformation; on the contrary, they are rather inclined to the masculine type; his hands and feet, very large. The conformation of the

pelvis is neither markedly masculine nor feminine. The breasts are flat and masculine in appearance, though devoid of hair. He states that one breast was for a time considerably larger than the other, but that it has gradually shrunken until there is now no marked difference between them. Beyond these points there is nothing noteworthy in his conformation except what is

developed in the genital examination, which reveals the following:

The pubis is well covered with hair; the upper margin is horizontal and does not incline upward in the middle line, the female type. In place of the clitoris is a well-marked penis, two and one-half inches in length when in a flaccid condition: on erection he states that it doubles in length; the glans is well-developed and the corona distinct, there is a marked hypospadias of the glandular portion of the penis. The labia minora extend downward only about two inches and cover the penis above, resembling in appearance the normal prepuce. Below the penis for $1\frac{1}{2}$ inches is a space which leads to a rudimentary vagina above and close to the opening of which is the urethral opening. The vagina is only three inches deep and ends in a blind pouch — no cervix can be felt — the rugae are well marked throughout this rudimentary vagina. A rectal examination was then made to determine the presence of a uterus, but I could not determine any, though anterior to the lower portion of the rectum a small body fixed in position about the size of a chestnut could be felt which in every way answers the description of the prostate.

The anus and rectum are normal. As the labia majora descend on either side they appear loose, resembling, when brought together in the median line over the underlying vagina, an ordinary scrotum. They contain testes of normal size and shape, the right being larger than the left. The feeling of these two organs is identical to the normal testicles. The vasa can be distinctly felt running upward to the ring. On the posterior surface of these two ovoid bodies in the labia majora can be felt what resembles in every particular an epididymis. On the right side he tells me that at one time it became very much swollen and a modular epididymis can now be felt on that side.

He claims never to have undertaken or allowed sexual intercourse with either male or female.

The case is one which judged from the sexual organs, demonstrates the person a male, though this is doubted by a competent observer in our city, who takes the position that the bodies in the labia majora are ovaries, but we have yet to learn how he explains the other definitely male development.

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Genito-Urinary Pathology

Pathology of Hydronephrosis. *Joest, Lauritzen, Deger* and *Bruecklmayer*: (Beiträge zur Vergleichenden Pathologie der Niere), *Frankfurter Zeitschr. f. Pathol.*, 1911, p. 35. As part of a comparative series of studies of the pathology of the kidney, the authors give the results of a thorough investigation of the subject of hydronephrosis in swine. Occurring not infrequently in these animals owing to certain anatomical peculiarities in the disposition of the neck of the bladder, ureters and symphysis pubis, it was possible to collect quite a goodly number of specimens at the Dresden slaughter house. Casts of the renal pelvis and of the vascular distribution were made by injection, and corrosion specimens were obtained. A careful microscopical examination of both pelvis and parenchyma was also part of their work. Moderate dilatation manifests itself first in a flattening of the papilla, and in a broadening of the secondary calices (calices minores). Later follow the changes in the primary calices and pelvis. Thus the smaller calices become elliptical and then spheroidal hand in hand with the expansive phenomena in the pelvis. The compression of the papillae, so that they even recede behind the columns of Bertin, and later their excavation, are the most important primary changes. The columns of Bertin tend to remain intact much longer than the papillae and adjacent cortex, and in the higher degrees of hydronephrosis, form the connective tissue septa separating the spheroidal cavernous or cyst-like spaces.

Microscopic examination reveals the fact that a chronic inflammatory process goes on in the parenchyma *pari passu* with the mechanical pressure effects due to stasis. As a result, the compression of the vessels (that is in part responsible for the atrophy of the kidney substance) is thereby enhanced by a new factor, resulting in a more rapid atrophy of the tissues, so that finally a dense connective tissue envelope, representing a fusion of the fibrous kidney capsules, and sclerotic fibrous parenchyma, is all that remains to cover the expanded pelvis and calices.

Excellent plates of casts taken from specimens of varying degrees of hydronephrosis accompany the author's paper. They are worthy of careful attention since they give us valuable hints in the interpretation of the pictures obtained by pyelo-

radiography, a method that is already regarded as one of the most important aids in the diagnosis of renal lesions.

Nephrolithiasis in Infants. *Joseph, H: Virchow's Archiv. 1911, CCV, p. 335.* Although many pediatrists agree that urinary concretions are not infrequent in very young infants, and Comby reports the finding of 100 cases in 600 autopsies, the author, stimulated by Ponfick (who has done such excellent work on renal pathology), examined the kidneys of all the infants under two years of age, in the post-mortem room of the Breslau Pathological Institute during a period of one year. Joseph found that 40 cases contained concretions. For the most part these were yellow or yellowish brown granules or clumps varying from a pin-head to hemp-seed in size. Their surface was rough, their consistency not very hard, there often being masses composed of loosely aggregated granules resembling sand. The uric acid reaction was regularly obtainable. Microscopically the kidneys showed no change nor did the clinical histories give any reason to suspect that profound renal lesions were to be expected. The microscopic examination revealed almost constantly the presence of an exudative process in the capsules of Bowman and in the convoluted tubules. An albuminous substance giving a tinctorial reaction allied to that obtainable with fibrin, was found in the above-mentioned places. Supported by the work of Ponfick and Kumita who detected renal changes in many cases of lithiasis in infants, the author concludes that the urinary concretions are in some way responsible for the exudative process in the parenchyma.

Polycystic Rudimentary Kidney. *Resenow, G: (Polyzystisches Nierenrudiment etc.) Virchow's Archiv, 1911, ccv, p. 318.* The author describes an interesting pathological condition that was found in an autopsy on a foetus of 8 mos. Besides absence of the anus, but slight indication of a scrotum, undescended testes, and total absence of the right kidney and ureter, the left kidney was remarkable. It was composed of a grape-like mass of cysts measuring 2 cm. long, and $\frac{3}{4}$ of an inch in the other two diameters. The individual cysts were, transparent, closely packed, and, for the most part, no larger than a lentil. The bladder was represented by a strand of the thickness of a lead pencil, and fused with the rectum, the ureter being absent.

Histological examination of the rudimentary kidney revealed elements that indicated renal parenchyma, and the cysts

must therefore be regarded as composing a degenerate kidney *anlage*, or as a congenital rudimentary cystic kidney. The lesson that can be drawn from this specimen is of considerable interest from the embryological standpoint, for it is evident that we have here a strong argument in favor of the view that the kidney develops from two distinctly separate components. When these fail to unite (as was the case here, since there was a total aplasia of the lower component, the ureter being absent) then the condition favorable for the development of a rudimentary cystic kidney obtains.

Anomaly of the Urinary Tract. *Wooley, G.*, and *Brown, H.—John Hopkins Bull. July 1911 p. 221.* The authors describe in detail a specimen of unusual interest that was obtained at a post-mortem examination. Extending from the antero-mesial aspect of the upper pole of the right kidney, at the normal site of the right adrenal, there was a distended tortuous, sacculated tube which ran parallel with the right ureter, finally entering the prostate and emptying into the posterior urethra at the site of the sinus pocularis. Its average diameter was about 2cm., measuring 5 cm. at the widest part. The upper part of this distended duct ended in a mass of tissue which was taken (upon gross inspection), to be the remains of an atrophic adrenal. There was no connection between the tubular structure and the kidney, ureter or bladder. Microscopic examination of sections from the sac showed that the wall was composed of fibrous tissue with a minimal number of smooth muscle fibres, and that there was a lining of low columnar or cuboidal epithelium.

As to the explanation of the origin of this structure several possibilities could be entertained. Usually we may have three large openings in the posterior urethra, two belonging to the ejaculatory ducts and a third being the opening of the united Müllerian ducts. According to Pohlman the ureter may open into the prostatic urethra. If this be true, then the mass of tissue attached to the upper part of the tube may be considered as the remnant of an atrophic or hypoplastic kidney, or, as the remains of the Wolffian body. We would have to assume a multiplicity of kidneys, each with its ureter, one leading into the posterior urethra. According to another assumption, the duct-like structure may be the result of the persistence of the united Wolffian duct and ureter. That we may be dealing with an accessory ureter, is another view that deserves consideration.

Current Urologic Literature

ZEITSCHRIFT FÜR GYNAEKOLOGISCHE UROLOGIE

Vol. III, No. 2, September, 1911.

1. Modern Therapy in Diseases of the Uropoetic System. By O. Kneise.
2. The Treatment of the Injured and Non-Injured Ureter After Gynecological Operations. By W. Stoeckel.
3. Removal of Hair-pins from the Female Bladder. By P. Hüssy.
4. Notes on the above article of Dr. Paul Hüssy. By W. Stoeckel.

2. The Treatment of the Injured and Non-Injured Ureter After Gynecological Operations. In an exhaustive and interesting paper, Stoeckel arrives at conclusions that may be summed up as follows:

1. The so-called obstetrical ureteral fistulæ are practically unheard of at the present day. 2. Gynecological ureteral fistulæ are becoming more common. 3. In benign conditions in the pelvis, injury to the ureters can be avoided with the use of proper technic. 4. When we are dealing with malignant tumors. injuries cannot always be avoided. 5. A healthy ureter may be isolated for a considerable distance without injury; it may undergo compression or kinking after such a treatment, but it does not become obliterated. 6. The dissection of the ureter out of carcinomatous tissue is not advisable, for either secondary infection and the establishment of a fistula results, or a recurrence of carcinoma in the ureter is to be feared. 7. To overlook injury to the ureter during an operation must be regarded as a grave error in technic. 8. A diagnosis can easily be made after the operation by means of ureteral catheterization. 9. A fistula should be recognized in the same way. 10. All partial ureteral fistulæ show marked tendency to spontaneous closure. 11. The further course of cases of spontaneous healing warrants careful investigation to determine whether the patency of the ureter remains permanently unimpaired. 12. As long as we are not certain of the functional results of spontaneous healing, we should not take the position of ultra-conservatism in treatment. 13. The methods of vaginal plastic, of the extra peritoneal implantation, as well

as implantation into the gut, should be given up. 14. Intraperitoneal implantation is the best procedure for all recent ureteral injuries that are not situated too far from the bladder. 15. It is important to make the hole in the bladder for the reception of the ureter sufficiently large for implantation. Not a slit but a veritable hole must be made, the bladder mucosa and bladder serosa whipped over with suture, and the adventitia of the invaginated ureter secured by two simple stitches to the peritoneal coat of the bladder. Such a procedure prevents the occurrence of stenosis, a consequence that is to be feared most. 16. Quite as important as the preceding is the proper selection of the site of implantation, the attainment of sufficient redundancy of that portion of the ureter which enters the bladder, and the employment of a catheter *à demeure*. In selecting the site of implantation we must do this with a view to bringing a part of the bladder wall over and a part under the ureter. 17. Ureterorrhaphy is recommended only when a small area is injured because extensive suture is liable to be followed by stenosis. 18. An operative result is to be judged as a success only from the standpoint of permanency. 19. A good result is one in which cystoscopy undertaken three years after operation demonstrates a patent ureter and normal urine. 20. Nephrectomy is indicated when infection of the kidney has taken place. 21. The exclusion of the kidney with ligature of the ureter and implantation of the latter into the abdominal wall (where it can be opened if the ligature does not hold, establishing a fistula) is the operation of choice when implantation into the bladder is impossible owing to extensive resection of the ureter.

3. Removal of Hair-pins from the Female Bladder. A simple method for the removal of these foreign bodies is the use of a blunt hook which is introduced into the bladder without general anesthesia and manipulated until the operator succeeds in engaging the hair-pin at its closed end. The author thinks that in most instances this procedure is to be preferred to the more complicated one in which a cystoscope or Kelly tube is employed.

(It may be permissible to add that this method is not a new one, having been mentioned in the *Handbuch der Urologie* v. Frisch and Zuckerkandl, vol. II, p. 689, and that it is best carried out under the guidance of an observation cystoscope which can be used in conjunction with the hook. L. B.)

Specific Therapy of Renal Tuberculosis. *(Weitere Erfahrungen uber die specifische Therapie der Nierentuberkulose)*. W. Karo, *Mediz. Klinik*, June 25, 1911.

Karo makes a strong plea for conservatism in the treatment of tuberculosis of the kidney.. The end-results of nephrectomy are not always gratifying, for an infection of the second kidney is seen in many cases, and, further, the tendency to a repetition of the tuberculosis process through the hematogenous route is not prevented by the removal of a single focus. He therefore recommends extirpation of the kidney only when cavernous abscesses have already developed. The tuberculin treatment combined with the administration of quinine lactate has given him good results in the early cases. Of the 12 cases so treated, 11 were either completely cured, or much improved as far as the subjective and objective signs are concerned.

FOLIA UROLOGICA

Volume, VI, No. 2, July, 1911.

1. Interesting Renal Tcmors. By A. Cahn.
2. Function of the Kidneys. By F. Cathelin.
3. Heminephrectomy for Horseshoe Kidney. By Th. L. Koblinski.

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4. Tubogonal and "Combination" Therapy in Modern Urology. By A. Grave.
5. Pathology of Malignant Renal Neoplasms. By I. Scalone.
6. Technic of Posterior Urethroscopy. By H. Wossidlo.
7. Remarks on the Article of Prof. English on Urethral Fever. By Bertelsman.

1. Interesting Renal Tumors. Three unusual cases of renal tumor from the Israel Clinic (Berlin) are described by the author. The first of these was a hypernephroma with metastases of carcinoma in the ureter and the lung. The gross appearance presented nothing extraordinary, but the localization of secondary growth in the ureter is worthy of note. Although the question as to the origin of these tumors has been a mooted one, (having been described by Grawitz and Bergstrands as hy-

pernephroma, and by Lubarsch as hypernephroid tumors), since Neuhäuser was successful in producing typical tumors by inoculation of the kidneys of rabbits with young adrenals, there can be little doubt but that they owe their inception to aberrant adrenal rests. As a rule they partake of one or more of three types: 1st. small, benign often multiple growths whose structure resembles that of either the *zona glomerulosa*, *fasciculata*, or *reticularis* of the suprarenal body: 2nd, a group that deviates from the maternal type in that the characteristic cells are arranged in an irregular manner: and 3d, a very malignant form, still farther removed from the type, in which there is either an alveolar, carcinoma-like growth or such a proliferation of the stroma that a sarcoma is simulated. The transition of hypernephroma into carcinoma in certain portions of a tumor has been observed by Neuhäuser. The case in point is interesting in that it shows the close relationship between this, really epithelial tumor, and carcinoma.

Case 2 was a large round and spindle-celled sarcoma of the capsule of the kidney, occurring in a man 59 years of age, whose symptoms were the following: an increase in size of the abdomen and oedema of the left leg. Upon extirpation the tumor weighed 10.5 kgm., measuring 40 cm. × 29 cm. × 15 cm. On section it was composed of a large cystic portion and a smaller solid fatty part enclosing small tumor nodules. The kidney itself could be recognized as a small compressed organ, not involved in the process. Tumors of the capsule are extremely rare. Albarran and Imbert collected 72 cases in the literature, but of 150 tumors of the kidney removed by Israel, this is the only one that arose from the capsule. The following types are recorded: lipomas and their derivatives, fibromas (fibromyxoma etc.), sarcomas, and mixed growths. Rather interesting is the fact that symptoms are usually absent, a papable tumor with possible increase in size of the abdomen being often the first indication of their presence.

Case 3 was an endothelioma of the kidney in a boy, 3 yrs. of age. Hematuria, emaciation, abdominal pain and fever were the clinical signs. A tumor, of the size of a child's head, of soft, spongy consistency, hemorrhagic and cystic was removed by Israel, although not without rupture during the operation. Histological examination showed a very cellular stroma in which there were nests, alveoli or tubules of various shapes, made up of deeply staining cells. The presence of stellate cells in the

stroma and of numerous fine, partly degenerate capillaries throughout, speaks for the assumption that the tumor was either an endothelioma or perithelioma. Most of the so-called peritheliomas reported were probably various forms of hypernephroma: a true angioblastic tumor must be regarded as a rarity.

2. Function of the Kidneys. In his hospital service, Cathelin proceeds to the examination of suspected renal cases as follows: 1st. unilateral ureteral catheterization when this is possible: 2nd. If not feasible, (a) the endovesical segregation of the urines with the Cathelin apparatus in the male, and, in the female, if the bladder is small: (b) the extra-vesical separation of the urines in the female (Harris-Downes), if the bladder is large. He finds the different types of examination represented in the following percentages in his own practice: Ureteral catheterization in 50% of cases, Cathelin segregation in 20%, Harris-Downes method in 20%, exploration not absolutely necessary in 5%, and 5% in which the urgency of the cases makes it permissible to dispense with all of these procedures. The view elsewhere expressed that endovesical segregation of urines is often successful when catheterization of the ureters fails, is again emphasized by the author.

As to the value of cryoscopy, the methylene blue test of Albarran, experimental polyuria, and chromocystoscopy (Voelcker-Joseph), the author has scant praise for any of them, characterizing them all as unreliable.

The importance of the excretion of urea and its proper estimation is discussed at length. Varying from 2gm. to 50 gm. per diem, an average of 20 gm. may be regarded as good. Operation may, however, be performed even if the figures are as low as 15 gm. or even 10 gm. The experience of the last 10 years has led to the formulation of certain physiological laws that are of surgical value.

1st. The law of the value of the absolute quantity of urea (per litre). The quantity of urea secreted by each kidney, as estimated per litre, gives us valuable information regarding function.

2nd. The law of the excretion of the quantity of urea. The excretion of urea is performed by the convoluted tubules and in part by the loops of Henle. The quantity excreted is an indication of the integrity of these parts.

3rd. The law of the constancy of the quantity of urea. This is exhibited with great regularity so that we can say that whatever amount is excreted in 10 minutes will be a constant secretory quotient, the same amount being delivered during all subsequent periods of 10 minutes each. The quantity collected in this time represents the maximum function of the parenchyma of the kidney.

4th. The law of the immutability of the quantity of urea. The quantity of urea collected over a given time remains the same for the diseased kidney over a period of several weeks, as shown by experiments in at least 16 cases.

5th. The law of the elimination of chlorides. Their quantity depends upon the activity of the glomeruli. There need be no relation between the amount of urea and chlorides.

In renal tuberculosis where there are miliary tubercles or small discrete or conglomerate nodules, particularly if these do not communicate with the pelvis, there may be no marked diminution of urea. If, however, the amount of urea is diminished by one half, we may affirm that the kidney is about diseased or destroyed to that extent, and that it may be of the cavernous type. In extreme cases, where the suspected kidney excretes say 3 gm. against 25 gm. delivered by the intact organ, a dead kidney or pyonephrosis is probably present.

Carcinoma of the kidney, even if extensive, may be attended by but slight or no deficiency in urea output. On the other hand, a calculus kidney will often show a marked inadequacy in its ability to excrete urea, although a subsequent nephrectomy may show plenty of good renal parenchyma. The author assumes that the diseased portion exerts an inhibitory action on the healthy part of the kidney, thus reducing its functional activity.

3. Heminephrectomy for Horseshoe Kidney. Although horse-shoe kidneys have not infrequently been seen as interesting post-mortem findings, relatively few instances of operations on such organs are recorded. Anatomically one of their peculiarities is the presence of an isthmus that lies across the vertebral column, bearing posteriorly the impression of the aorta and vena cava. The isthmus contains either cortical substance and pyramids, which may functionate as a third kidney, or, more commonly, it is simply a bridge of parenchymatous tissue varying in thickness, at times being only represented by a fibrous strand. Another characteristic is the site of the hilus, which lies further anteriorly than in the normal, the pelvis lying in front of the vessels.

Usually there are two single pelves and two ureters. A third anomaly which is of clinical significance, is the emergence of the ureter from the anterior wall, sometimes even from the upper part of the pelvis. Thus the ureter passes over the anterior surface of the kidney, even making a furrow across the isthmus. These anatomical considerations explain the tendency to hydronephrosis often exhibited by such kidneys.

In the author's case the diagnosis of intermittent hydronephrosis was made. The patient, a male twenty-seven years of age, complained of periodic attacks of abdominal pain for three years. During the paroxysms the patient himself felt a tumor in the left hypochondrium. The associated symptoms were vomiting, constipation and meteorism. After three or four days he would again feel perfectly well. Shortly after the patient was admitted to the hospital, an attack was observed during which a tumor on the left side became palpable. The indigo carmine test showed that the right kidney was functionating normal, whereas no urine was obtained from the left. Operation revealed a large hydronephrotic sac involving the left half of the horse-shoe kidney, the ureter lying anteriorly and arising from a point considerably higher than the bottom of the sac. The isthmus was divided and the diseased organ removed. The technic differs from the ordinary nephrectomy only in so far as there may be more vessels to divide and in the section of the isthmus. It is well to cut this after clamping, although some surgeons have used the cautery. Albarran advises a cuneiform incision so as to permit of easier suture. All in all, some 16 cases of heminephrectomy for diseased horse-shoe kidney are recorded.

5. Pathology of Malignant Renal Neoplasms. In a study of seven tumors of the kidney, Scalone makes observations that may be summed up as follows: Carcinomata with cells of the type belonging to the Malphighian layer of the epidermis occur in the kidney. The origin of the growth in the author's specimen is to be sought in the pelvis which had undergone metaplasia, or "leukoplakia," as the author calls it. A comprehensive resumé of metaplasia in the urinary tract is given, and the possible etiological relationship between calculus, infection and leukoplakia of the pelvis is discussed. The 4 cases of hypernephroma do not seem to have brought out any strikingly new facts. A specimen of hemangio- and lymphangio-endothelioma deserves mention because of its rarity. A remarkable example of papillary adenoma is described in which the presence of giant cells is unusual.

6. Technic of Posterior Urethroscopy. Referring to his modification of the Goldsmith urethroscope already described in a previous publication, Wossidlo claims certain advantages for his instrument. Because of the peculiar situation of the fenestra and the angulation of the beak (in which it slightly resembles the "convex" type or Brenner type of sheath), the scope of the telescope is enlarged. The illumination is supposed to be superior in that its source lies further forward. But it is especially in the case with which applications can be made that the author claims to have improved upon the Goldschmidt models.

ANNALES DES MALADIES DES ORGANES GÉNITO-URINAIRES

Supplement for the Year 1911

1. The Estimation of the Amount of Hydremia in Cardiac and Bright's Disease. By F. Widal, R. Bénard and E. Vaucher.
2. Contribution to Functional Diagnosis of the Kidneys. By M. Heitz-Boyer.
3. Resistance of Nephrectomized Patients to Traumatism and to Operations. By Pousson.
4. Pathology and Pathogenesis of Cysts of the Kidney. By F. Legueu and Verliac.
5. Partial Nephrectomy for Tuberculosis of a Horse-shoe Kidney. By Carlier.
6. Clinical Notes on Renal Calculi. By Rafin.
7. Prolapse of the Ureter into the Bladder. By P. Bazy.
8. Cystoscopic Diagnosis of Tumors of the Bladder. By Marion.
9. Early Prostatectomy in Cancer of the Prostatic. By E. Desnos.
10. Tertiary Syphilis of the Urethra and Urethral Fistulae. By E. Michon.
11. The Gonococcus. By J. Janet.
12. Spinal Anesthesia with Novocain in Urology. By E. Jeanbrau.

1. The Estimation of the Amount of Hydremia in Cardiac and Bright's Disease.—In a comparative study of the body weight and the colloid content of the blood in the hydremic state of cardiac and Bright's disease, the authors have sought to determine the value of refractrometry. Bartels was the first to

recognize that water is retained in the blood before it can find its way into the tissues; or, that edema is preceded by an hydremic plethora. In this, both Conheim and Senator have concurred. In a search for methods to measure the hydremic state, several procedures have found favor at different times. Since the number of red blood cells diminishes proportionately with the augmentation of the volume of the blood, the blood count could be expected to give valuable information. However, this is not always reliable, for vaso-motor disturbances may cause a temporary variation in the number of erythrocytes in a particular region of the body. Opposed to the variability of the cristalloids, is the constancy of the total quantity of colloids in the blood. If there is an increase of water, that is, if hydremia occur, there is a diminution in the relation of the albumin to the total quantity of blood. The serum becomes diluted. And conversely the concentration of the serum may increase.

The amount of colloid in terms of the weight of albumin gives us a notion as to the degree of dilution or concentration of the blood. Although the gravimetric method is exact, its execution is laborious, necessitating the use of at least 5 to 10 ccm. of blood for each estimation.

A more simple method is one based upon the degree of refraction that a ray of light must suffer in traversing a given sample of serum. This procedure, known as refractrometry, permits us to obtain a rapid reading of the amount of albumin in the plasma, and can be carried out with but a drop of blood taken from a finger. The authors used the immersion refractrometer of Pulfrich modified by Reiss.

The reliability of this method had already been attested by the investigation of Grober, Strubell, Tuffier and Mauté, for in the experiments of the last two workers, the difference between the refractrometric and gravimetric procedures did not exceed 0, 023 in 100. Normally the albumin content of the blood varies only from 76 to 84 grams per litre.

The scope of the author's study included a systematic investigation with the refractrometer of different types of the hydropic state amongst which were cases of interstitial and parenchymatous nephritis, cardiac cases and those in which both heart and kidneys gave symptoms. The curve of the body weight and the curve of the readings given by the refractrometer were compared.

The conclusions of the authors may be summed up as fol-

lows:—The refractometric method is a reliable one, giving us data as to the dilution of blood. Simultaneous use of scales giving us readings as to the infiltration of the tissues, is an important method of investigation. Edema of the tissues goes hand in hand with increased dilution of the blood, but, as a rule, a fall in weight precedes the rise of the refractrometric index. Therefore, weighing is the superior method as far as the rapidity with which data are obtained, and as regards its simplicity. Refractrometry, however, supplies information which simple weighing does not furnish. Thus the former shows us that the process of dehydration takes place in two stages: first water is eliminated, the serum remaining diluted; and later the serum becomes concentrated whilst dethydration continues. If the body be taking water, the weight rising and the refractrometric curve falling, it is wise to restrict the salt-content of the food. If the latter curve retain an equilibrium, a normal diet may again be resumed. Although an estimation of the balance of chloride daily gives us similar information, the readings of the refractrometer is a much simpler method.

2. Functional Diagnosis of the Kidneys.—According to Heitz-Boyer our notions as to the methods of determining the functional activity of the kidneys have undergone such change during the last decade, that he wishes to record his own experiences during three years at the Necker Hospital in Paris. What concerns us most in the pathology of the kidney is alteration of the functions of the organ, *i. e.*, the pathological physiology. As regards renal inadequacy, we deal with two phases: the "chloruremic" syndrome, characterized by poor elimination of sodium chloride, and the syndrome in which there is a disturbance of the excretion of urea (azotemic). The former is seen in acute or subacute renal disease, and corresponds to the "hydropigenic" nephritis of Castaigne. The latter type is the final stage in the history of renal lesions of long standing and of slow development. The two may be clinically associated in many cases.

Regarding the indirect methods for estimating the renal working capacity, namely those based on the provocative elimination of either coloring matter or phloridzin, these, although simple of execution, can only give presumptive data. All the substances used in the past, including methylene blue, indigocarmin, or phenolsulphonephthalein may lead to erroneous con-

clusions. According to the work of Castaigne, their employment is only justified insofar as they give us a clue as to function and stimulates us to investigating further with more reliable methods.

Cryoscopy may be regarded as grossly inferior to chemical tests, since it can only give us data regarding totals, being quite unable to segregate urea and chlorides, a disassociation which is indispensable for correct estimations. This method may therefore be discarded at the present day.

Of the two conditions, the *azotemic* and the *chloruremic*, the author discusses only the procedures applicable in the study of the former. The *azotemic* (azotum=nitrogen) syndrome is characterized primarily by poor excretion of urea, indicating a retention of urea in the blood, and secondarily by the absence of edema and by but slight albuminuria. Albarran had already made mention of the small amount of albumin excreted by cases with sclerotic kidneys in 1889. Large amounts of albumin usually mean the presence of lesions regularly associated with the edemas. But it is the poor elimination of urea that constitutes the most important feature of this syndrome. Widal has shown that the amount of urea in the urine is no reliable index as to the adequacy of renal function. The urea of the urine varies according to the quantity of proteid ingested, and its estimation is only of value insofar as it is compared with the amount of urea in the blood. Expressed in a formula, the excretion of urea in the urine varies as the square of the urea of the blood, or, inversely, the urea of the blood varies as the square root of the urea in the urine.

Thus: $\left(\frac{\text{Quantity of urea in the blood}}{\sqrt{\text{Output}^*\text{ of urea in the urine}}}\right)$ is the *constant K* of Ambard, a quotient which rises in accordance with the degree of renal disease.

In actual practice, for the genito-urinary surgeon, this method of computing the ureapoetic function is valuable since the separated urines can be tested. In addition to an estimation of the kidneys work under normal stress, we may, in the manner proposed by Albarran, impose additional labor on the organ, by virtue of the action of an increased fluid intake, producing thereby a so-called experimental polyuria.

It was found that three general laws are maintained after the induction of the polyuria. 1st. The two kidneys, if

* In twenty-four hours.

healthy, do not excrete continuously in a constant qualitative and quantitative manner. Therefore a duration of 2 hours for examination is advisable, and the sum total of the work during this time must be taken into account, the individual temporary aberrations of function being neglected. 2nd. The diseased kidney functionates in a more constant fashion than the normal. 3d. The exaggerated activity produced by stimulation manifests itself more markedly in the healthy than in the diseased kidney. Thus the healthy will respond more readily to the test of *experimental polyuria.*

The author's technic is as follows: — Precautions having been taken to obviate the occurrence of polyuria at the outset of the examination, and the patient having fasted for at least 5 hours, two ureter catheters of large calibre (preferably No. 8 Fr.) are inserted, the cystoscope withdrawn and a catheter is put into the bladder. It is advisable to wait 15 or 20 minutes before collecting specimens for functional tests, since the mere presence of the catheters frequently provokes temporary reflex inhibition or even polyuria. An injection of 4 cm. of a one-half per cent. phloridzin solution is then given. Two specimens (left and right) are collected during the first ½ hour and then three glasses of water are given, the three following specimens from each kidney belonging to the period of experimental polyuria.

During the first ½ hour 30-40 gm. of blood are drawn off and the urea estimated. The samples of urine are examined separately and the quotient K, which is normally about 0,040, is determined; 0,600 is not being incompatible with life, although 0,100 indicates profound functional derangement.

Besides the *constant K*, the concentration of urea in the urine is of value. Thus we expect a healthy kidney to deliver 10-20 gm. of urea per litre. When the concentration falls to 3-6 gm., the kidney is probably the seat of old lesions of "uremigenic" nature (that is of the type interfering with the secretion of urea). The diseased organ furnishes urine in which the concentration is distinctly diminished. When we calculate from the total urea eliminated in 2 hours, both the average output, and increased secretion of urea during the period of polyuria, give still further valuable information.

4. Pathology and Pathogenesis of Cysts of the Kidney.—The author's study includes specimens of the following: bilateral polycystic kidney of the adult type, partial polycystic

kidney (infantile), large serous cysts, cysts of nephritis and tuberculous cysts.

As regards the nephritic cysts, authors are almost unanimous in the opinion that by virtue of an interstitial sclerosis, certain uriniferous tubules are compressed, retrodilatation occurs, resulting in the formation of cysts. However certain objections to this view merit consideration. Thus ligatures placed so as to cause interference with the outflow of secretions from a gland, lead to atrophy, although this may be preceded by a temporary dilatation of the gland. In hydronephrosis, we fail to see the production of cysts in spite of an evident obstruction. The renal papillae have been experimentally cauterized by Tollens, without the formation of cysts in the corresponding renal parenchyna.

There are two types of cysts that may be associated with nephritis. (a) Those which frequently accompany adenomatous formations. They are believed to originate in tubules that are probably fœtal remnants of the Wolffian body. (b) Glomerular cysts represent a second variety, and are produced by dilatation of the capsule of Bowman due to some obstacle to the outflow of urine occurring during the course of an interstitial nephritis. (c) Cysts derived from dilated renal tubules may owe their formation to the isolation of certain portions of the tubules through some unknown process, the epithelium retaining its secretory function.

Of the two large serous cysts of the kidney studied by the authors, one occupied the outer border of the organ making a globular prominence antero-externally, and forming a hemispherical cavity that almost extended to the pelvis of the kidney. A congenital origin must be assumed for this specimen. The polycystic kidneys too are the result of some congenital malformation.

Two types of false cysts may be confused with those just discussed. One of these probably results from an extravasation of blood, and the other is a psuedo-cyst of tuberculous origin.

The tuberculous cysts appear macroscopically to be simple cysts, microscopically they are healed caverns. The study of three cases has led the authors to conclude as follows:

1. The caseous type of renal tuberculosis may result in the formation of cysts.

2. Tuberculous cavities may be evacuated, their pelvic out-

let may become obliterated and their walls converted into connective tissue, producing thin-walled cysts.

3. Such a process is usually accompanied by other evidently tuberculous lesions, which may show no such tendency to cicatrization.

4. When the psuedo-cysts are not associated with other evidences of tuberculosis, they may be confounded with serous cysts of the kidney.

10. Tertiary Syphilis of the Urethra and Urethral Fistulae.—Perforation of the urethra as a complication of lues usually necessitates a plastic operation even after energetic medical treatment is instituted. Tertiary syphilis of the urethra is rare, as shown by the statistics of Fournier who found the urethra involved in but 19 out of 151 cases in which the lesion was located in the penis: and even in most of these instances, there was a gumma in the immediate vicinity of the urethra implicating the latter secondarily. As a rule, a point near the external meatus or the distal end of the pendulous urethra is the seat of the gummatous process. We may divide these lesions of the urethra into the following:

1st. Extensive destruction of the pendulous urethra due to tertiary phagedemic process. These are not of great surgical interest since operative restoration is impossible.

2d. Involvement of the inferior wall of the balanic portion of the urethra. There may either occur a total disintegration of the lower wall of the *fossa navicularis* with the establishment of a veritable pathological and acquired hypospadias, or a band of tissue limiting the meatus may remain producing a fistula. When the hiatus is not too large, closure may be obtained by paring of the edges and suture.

3d. Fistulae of the anterior urethra may occur, the site of predilection being just behind the corona or in the first few centimeters of the penile urethra. Michon had the opportunity of studying two such cases. In one patient there was an ulcer near the corona inferiorly, communicating with the urethra and lasting for a year and one-half. The induration about the ulcer disappeared rapidly under anti-luetic treatment.

4th. Perineal fistulae are rather rare. Fevrier has reported such a case and M. Renault has recorded the occurrence of a gumma near the bulb, that was followed by perforation of the skin.

Genito-Urinary Suggestions

When complications are imminent in acute gonorrhea, the administration of atropine in the form of suppositories tends to counteract the tendency to spasmodic reflex muscular contractions of the sphincters and other urinary muscles, and is often of great service in ameliorating the course of the disease.

Alypin and Novocain in 2 per cent. solutions are the safest anesthetics for use in the urethra. As a rule at least ten minutes are necessary for the production of a good local effect.

* * *

In cases of subacute anterior gonorrhea that fail to respond to treatment, we should suspect that the patient is not holding the fluid injections properly. Lubrichondrin (tube form) in which protargol or albargin is incorporated, will often give excellent results, since the semisolid nature of this form of medication permits of long and thorough contact with the urethral mucous membrane.

* * *

Medicated bougies are often useless in the treatment of anterior urethritis because the vehicle, when softened and liquefied, prevents the absorption of the silver salts. When they are made up of starch, sugar, dextrin, and glycerin, however, they are readily soluble, and the medication can act for a prolonged period. As a rule, however, medicated bougies are disappointing, and do not yield the results which one would expect of them—*a priori*.

* * *

Lesser thinks that in using salvarsan the aim should be, not to kill all the spirochetes at one stroke, but to tone up the organs and enable them to manufacture the necessary antibodies. Therefore he gives small doses. He uses salvarsan just as the insoluble mercurial salts are employed, giving injections of 0.1 gm. once a week, in suspension in oil of sweet almonds. After the sixth injection the Wassermann test is applied. If positive the treatment is continued. When permanently negative the disease may be regarded as inactive or cured.

* * *

Concealed chancres of the male urethra are not very rare. Failing to bear this fact in mind may lead to grave errors in diagnosis.

Casper's Lubricant (Katheterpurin) has the following composition:

Hydrargyri oxycyanidi	0.246
S Glycerin	20.0
Tragacanthae	3.0
Aquae dest. steriliz	100.0

To be put up in collapsible tin tubes. This lubricant remains sterile eight days after being exposed to the air; catheters and sterilizers smeared with it will therefore remain perfectly aseptic.

* * *

It is well to bear in mind that exanthemata occurring in the course of a gonorrhea to the drugs which have been administered, namely, copaiba, cubebs or oil of santol: but they may also be due directly to the gonotoxin; for they occur also in cases in which no drugs have been administered.

* * *

Strictures of the urethra are met with much more rarely nowadays than was the case three or four decades ago. This may be safely ascribed to improvement in the treatment of gonorrheal urethritis.

* * *

Calcium sulphide (1 grain) and arsenic iodide (1/60 grain), 3 to 6 times daily are extremely useful in gonorrheal arthritis.

* * *

The symptoms of stricture are: 1. Gleet; 2. Changes in the urinary stream—in form, size and force; 3. Premature ejaculations and imperfect erections; 4. Increased frequency of micturition. When all four symptoms are present, stricture is pretty sure to be present. But any of these symptoms may be absent; and there are strictures which give practically no symptoms and are discovered only on passing a sound.

* * *

Oil of sandalwood is a valuable but not an indifferent remedy. Well marked renal congestion may follow daily doses of one dram. As a rule 10 min. 3 to 4 times is sufficient. And the oil must be the purest obtainable.

THE AMERICAN JOURNAL OF UROLOGY

WILLIAM J. ROBINSON, M.D., EDITOR

VOL. VII DECEMBER, 1911 NO. 12

Contributed by the Author to THE AMERICAN JOURNAL OF UROLOGY.

TUBERCULAR EPIDIDYMITIS; AN ANALYSIS OF 153 CASES*

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THE cases on which this investigation is based occurred at the Massachusetts General Hospital. Although the patients numbered 120, they offer for consideration 153 tubercular epididymes.

The subject is of importance for two reasons: First, we do not, as yet, know the genesis of epididymal tuberculosis; second, healthy testicles are daily being removed under the impression that cure is more likely to follow. It is believed that the study of so large a number of cases will throw further light on the subject.

The patient with tubercular epididymitis is generally young, between twenty-five and thirty-five years in 45% of cases. But that every rule has its exception is shown by the fact that the age of occurrence tapers off on the one hand to a baby of eighteen months and on the other to a seventy-three-year-old iceman.

Incidentally, 60% were married. Not that this is strange, for matrimony usually claims this number. But as it has been stated that the disease may be conveyed by coitus, I note that in not one of this number was there anything to suggest that marital relations were the cause of contagion.

As the left side is usually guilty when it is a question of

* Read at the tenth annual meeting of the American Urological Association, Chicago, Ill., Sept. 27, 1911. Appears simultaneously in *The Boston Med. and Surg. Jour.*

varicocele or gonorrheal inflammation, it is noteworthy that in tuberculosis its fellow is involved in exactly the same number (36%) of cases, while both were diseased at the time of entrance to the hospital in nearly 30%.

As to the duration of his trouble, the patient can give no definite answer. In this respect it is strikingly different, with rare exceptions, from the epididymitis of gonorrhea, with its sudden onslaught. The tubercular process builds slowly, often without arousing suspicion of its presence, till finally the victim awakes to find himself hopelessly entangled in its meshes. The answer to our question of "when" is, therefore, to be taken, not as the time of actual onset, but as the moment when considerable advance has been made.

Fifty-three per cent noted the presence of the disease within the six months preceding their appearance at the hospital; in a few it was only a matter of days. Thence the time lengthens till five or six years have elapsed since the process began, and during which the smoldering fire has more than once broken into flame, only to be quenched with a poultice or a bag of ice. Moreover, out of 95 patients, 43 acknowledged the performance of more or less minor surgery in a vain effort to stamp out the disease. This interference was usually the tapping, often repeatedly, of a hydrocele, which so frequently accompanies the tubercular process. In a larger number than one would like to see, the family doctor had merely lanced the abscess, thus prematurely giving birth to the sinus which is so common.

As possible exciting causes, gonorrhea and trauma were inquired for. Of the former, out of a possible 95, only 34 (35%) confessed infection. This percentage would undoubtedly be greater were it not for deception and ignorance. With one exception, no case showed definite evidence that the tubercular invasion of the epididymis followed a gonorrheal inflammation. This, together with the fact that most of these patients had never had venereal disease, inclines us more strongly than ever to the belief that there is little if any connection between the two.

Trauma also is of small import, as a history was obtained in only 18 out of a possible 92.

Coming now to the results of the disease, subjective and objective, what do we find? Firstly, that 80% of those questioned on the subject had lost weight, an indication of the insidious and far-reaching nature of the disease. In some the de-

pletion of flesh and strength was extreme, even in the absence of demonstrable lesions other than those in prostate and epididymis. On the other hand, one is struck by the fact that a few (5) men had put on weight in spite of their affliction.

Pain was a symptom in 60%. In striking contrast to the agony of a gonorrheal process in the same location, it is usually mild, often trifling. During one of the characteristic "flare-ups," pain is intense, abating with rupture of the abscess and the establishment of fistula, or by absorption of its products. Its usually mild character may be explained perhaps by the slowly progressive nature of the inflammation, with simultaneous softening and absorption.

As an accompaniment we find tenderness, not intense, barring always the very acute cases, but, generally speaking, of only a moderate degree, its intensity doubtless regulated by the same factors which produce pain.

An adherent scrotum, with or without fistula, was noted in 67% of the epididymes, while sinuses were observed in 53%. These, then, are important factors in diagnosis and may be considered true "earmarks" of tuberculosis in this region. More often than not the fistulæ were active; in others, the sinuses showed a volcanic intermittency. We have seen scars of old sinuses healed for years, and found under them an epididymis containing pus and likely to erupt at any moment.

Conspicuous by its absence is fever. In only 10 cases was the temperature over 100° F. before operation, the epididymes in these being in the stage of acute exacerbation. Tubercular epididymitis, as commonly seen, and uncomplicated, does not, therefore, produce temperature.

Whence the epididymal infection? Is it primary, is it secondary to tuberculosis of the prostate, or is it one of the points of exit of a general genito-urinary tuberculosis? It is the writer's belief that the disease is secondary to prostatic tuberculosis, and that a concomitant general infection of the genito-urinary tract is rare, at least at the outset. The evidence embodied in the material at hand seems to justify this belief.

In 112 cases definite data are at hand on the question of past or present tuberculosis in other organs than prostate or epididymis. In 72, or 64%, there was no demonstrable evidence of its presence at time of entrance elsewhere than in the organs mentioned.

Tubercular infection in the past, and presumably cured, was found in only 7, or 6%. Its distribution was lung 3 cases, bone 2 cases, larynx and kidney (nephrectomy six years previously) each 1 case. In these patients either the fire was still smoldering, enough at least to light up the epididymis or prostate, or else these organs became involved at the outset and remained quiescent for years.

Active tuberculosis was noted in 29%, its distribution being as follows: Lung, 20 cases; bone, 8 cases; kidney, 3 cases; larynx, 2 cases; cervical or inguinal glands, 2 cases; peritoneum, 1 case; meninges, 1 case; ischio-rectal fossa, 1 case. In the majority the disease had "staid put" in the organ in which it began, whereas, in the cases analyzed by Keyes [1] it was always "flitting between bone and lung and urinary tract" as that writer so poetically describes it.

In Keyes' series renal tuberculosis occurred eleven times, whereas it was demonstrated before or at the time of entrance of our cases in only three.

Thus it is clear that the majority of patients do not have demonstrable tuberculosis in organs other than those for whose treatment they present themselves, and it is equally clear that epididymal tuberculosis is not an index of a general genito-urinary infection.

As evidence that the prostate is responsible for most of the epididymal infections, we find that in two-thirds of the cases (67%) this gland is clearly tubercular, with the probability that at least a portion of the remaining prostates are more or less so. Examination of the seminal vesicles tells the same story, for here also 63% are unquestionably tubercular, and the condition of the remainder may well be regarded with suspicion.

Now if the prostate is to be considered the guilty party it should produce vesical symptoms and an abnormal urine. This is found to be the case, for in as many as 38% of a possible 76, vesical irritability of varying intensity was observed. Running parallel to this it is found that out of 104 urines, 43% contained blood or pus, sometimes both, and that in 7 out of 8 cases, the guinea-pig test showed the presence of the tubercle bacillus.

An inquiry into the sexual life of these patients was made in 22. In 15 there was no diminution of appetite or potency; the others had yielded to the enemy more or less completely. In his

[1] Ann. Surg., June, 1907.

admirable paper, Keyes has intimated that azoospermia will be found in men with one tubercular epididymis, indicating a similar process in the prostate. The evidence that we can furnish, together with that which Keyes submits, forms a firm foundation on which this theory can rest. In 4 cases, each with one tubercular epididymis and with a prostate that could only be classed as doubtful, the semen was sterile. On the other hand, one patient, a physician, writes me that since the removal of his afflicted member he has become a proud father, while our friend the iceman mentioned elsewhere, and now in his seventy-third year, claims to have become a father four years previously, even though his disease began four years before that happy event.

Again, the prostate is indicated on the evidence furnished by the well-known tendency to involvement of the second epididymis, after removal of the first. In this group it had become so infected nineteen times, the patient returning for operation on the second side. In 10 of these the infection had occurred within a year of the first operation, the others hanging fire for periods of time up to four and one-half years in one case.

A more intimate view of the prostate was obtained in 3 cases dying after operation of a general miliary tuberculosis, and coming to autopsy. In 2 there was an invasion of practically every organ, including prostate and vesicles. In the third the infection was as general, but, strangely enough, it skipped bladder, prostate, vesicles and remaining epididymis in its haste to complete the task. This case is to be regarded as important and will doubtless be seized upon with avidity by those who believe that the epididymal process is primary. None the less, no absolute proof is at hand, nor is it likely to be, but, taken as a whole, the case against the prostate is bad. If the epididymal process is primary, then its extension to the prostate is so early that no clinical means can detect it.

In the hope that microscopic examination of the epididymes would shed some light, our clinical pathologist, Dr. Milliam F. Whitney, kindly looked over a large number of sections for us. Generally speaking, the tubercular process was intertubular, involving only the surrounding connective tissue and leaving the tubules intact. This would suggest that whether the primary process is prostatic or epididymal its extension in either direction is by the lymphatics or blood vessels and not by the vas deferens. This opinion is not to be taken as final, and further work in this direction is contemplated.

Two patients died in the hospital within a month of operation, of general miliary tuberculosis. That the scalpel served as a torch there can be no question, the situation being comparable to the fatalities sometimes seen after excision of tubercular cervical glands.

The fly in this ointment lies in the operative treatment. Let me take the plunge and say at once that from 114 patients there were extracted 92 testicles, 4 of them double. As if to justify this useless slaughter of essentially innocent organs, the records state that the testicle itself appeared to be involved in 60%. So be it. Pathological and clinical experience do not, however, bear out this statement. In 71 cases in which a pathological report was given, 21 were definitely free from tuberculosis; 50 were described as tubercular, but as the records make no distinction between epididymis and testicle, it is impossible to draw any conclusions from them. The writer's experience and that of others has been that a very small percentage of testicles in such cases are invaded by the tubercle bacillus to such an extent that orchidectomy is indicated. It is a fact, to which most will agree, that even when the testicle is affected, and that to a considerable degree, the fire burns itself out when the fuel furnished by the epididymis is removed. As proof of this we offer the records of 50 epididymectomies, single and double, with and without vasectomy. Of this number, not one has returned for subsequent orchidectomy, and in an investigation of the end results of these cases, to be published later, no relapse in the testicle itself has been found. We have recently seen a case which seemed to be the exception. A tubercular epididymis had been removed some months previously. The patient reappeared at our clinic recently with an acutely inflamed scrotum, and every evidence of orchitis. Operation showed the testicle itself to be perfectly intact, the seat of the trouble lying in the tunica and peritesticular tissues. We recognize the possibility of an invasion of the testis, especially in the later cases, and do not deny that the removal of an organ which the patient, at least, regards as ornamental, if not useful, may be necessary. But such an event is rare, and even a partial orchidectomy generally serves the purpose, as shown in 5 of our cases.

That epididymectomy may cause the tubercle bacillus to hasten its step toward the other side we do not deny, but that the march is rapid in any event is equally true. Of 33 un-

operated double infections of the epididymis, the second side became involved in 18 (55%) within one year of the time of invasion of the first side. Among the operated cases, as stated elsewhere, 10 out of 19 (52%) returned for operation on the second epididymis within one year after removal of the first. In the case of the second epididymis it seems to be "Heads I win, tails you lose."

We have all seen the serious mental derangements which have followed the old operation of castration for the relief of prostatic hypertrophy. We all recognize the importance and power of the internal secretion of the testicle. If the influence of this secretion is essential for a grown man, how much more is it for a baby or growing boy. In the face of these indisputable facts, and knowing that the invasion of the second epididymis is more than likely, no surgeon is justified, with rare exceptions, in removing a testicle.

Epididymectomy, with vasectomy, when properly done, is so simple a procedure, so devoid of risk and reaction (in only 24 cases did the temperature exceed 100° F. after operation), and so much a source of satisfaction to the patient, who, as it were, has his cake and eats it too, that its performance is amply justified. Furthermore, knowing the life history of the disease, and finding the patient already sterile, as we shall in a very large majority of cases, we feel justified in advocating the removal of both epididymis and vasa at one sitting.

Contributed by the Author to The American Journal of Urology.

PREPUTIAL REDUNDANCY: AN OPERATIVE TECHNIQUE FOR ITS CORRECTION.

By William Warren Townsend, M.D., Rutland, Vermont.

IT is not the purpose of this paper to discuss the subject of Phimosis, nor is the technique to be described recommended in congenital or acquired Phimosis.

A review of the works on surgery relative to pathologic conditions of the prepuce discloses the fact that little reference is made to a class of cases in which there is marked redundancy of tissue and wherein, owing to the size of the preputial orifice, it is perfectly possible to retract the foreskin over the glans into the coronal sulcus. This type of case is well shown in Fig. 1, and aside from cases of congenital phimosis, it is this type that comes most frequently to operation.

Where reference is made to this condition the orthodox operation of circumcision, with its usual technique consisting of the removal of both layers of the prepuce, is advised; and it is recommended by most authors to ablate the inner layer to within a fraction of an inch of the corona. When as little

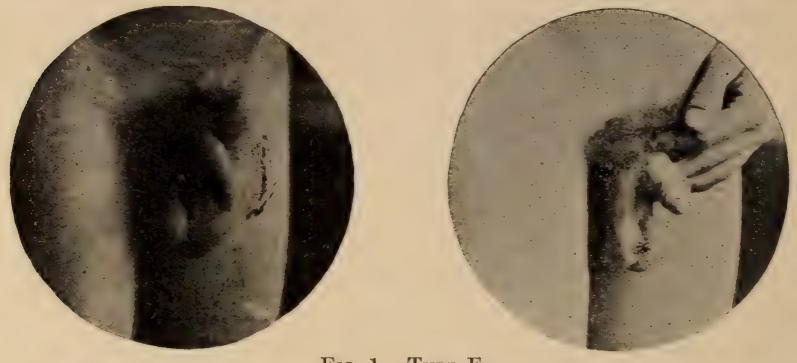

FIG. 1.—TYPE E.

Showing a long puckered prepuce, but with an orifice large enough to allow of its retraction into the coronal sulcus, forming a muco-cutaneous roll therein: "a misfit."

FIG. 2.

Showing the position of the artery clamps after picking up an esthetized area of skin in the midline of the upper and lower sides of the muco cutaneous roll with the prepuce drawn forward so as to cover the glans.

tissue as that is left the contraction following healing leaves the corona and the glans without protection,—which is contrary to what nature apparently intended.

Some authors sound a note of warning regarding the removal of too much foreskin, but only in connection with its interfering with erection; hence in the operation of circumcision for phimosis and in performing it for redundancy, the question naturally suggesting itself is: How much foreskin is it anatomically correct to remove? Each individual operator decides this point arbitrarily. This is not to be wondered at, as there is no anatomical standard that governs the length of a normal prepuce. Anatomists describing it are brief and

Fig. 3.

Showing the artery clamps drawn forward invaginating the preputial orifice. The circumcision clamp when applied is in front of the orificial ring.

ambiguous, for example to quote from Gerrish. He says: "Just behind the cervix the integument leaves the surface of the penis and is continued forward for a varying distance, forming the outer layer of the prepuce; then it turns backward within itself, forming the inner layer and rejoins the surface at the level of the cervix." From this quotation and other descriptions reviewed and from our observations, it evident that nature intended that some covering should protect the sensitive nerve papillae in the mucuous covering of the glans and corona.

Just how much of the glans nature intended to protect we have tried to determine, and it was with a view of gaining some definite knowledge as to the average length of the prepuce that we inaugurated a practice of observing, in the course of the

FIG. 4.

Showing the cutaneous collar attached to the under layer, which remains uncut when the section of skin is resected.

routine physical examinations of prisoners, in a penitentiary in which I have a service, the length of the foreskins of the uncircumcised, and classified them as follows:

FIG. 5.

Showing the eversion of the mucous membrane that occurs when the collar is drawn back to be sutured to the retracted skin of the sheath.

TYPE A.

Those in which the skin of the shaft of the penis joined the mucous membrane at the cervix, thus affording no covering whatsoever to the glans: *Cervical.*

TYPE B.

Those in which the prepuce covered the corona and part of the glans when the organ was in the flaccid state: *Semi-Protective.*

TYPE C.

Those in which the prepuce covered all of the glans, but allowed a view of the meatus and tip of the summit through the preputial orifice, which was large and distensible enough to permit of a retraction of it into the coronal sulcus; as *Protective.*

TYPE D.

Those cases in which there was a quarter of an inch or more of puckered, redundant tissue projecting beyond the tip of the glans and a preputial orifice sufficiently large to slip over the glans into the coronal sulcus, but when retracted would bunch up into a muco-cutaneous collar: *Redundant.*

TYPE E.

Those cases in which conditions were as described in Types C and D, but in which retraction was impossible, typical cases of congenital phimosis: *Phimotic.*

We made these observations in a series of two thousand adult examinations with the following results:

Type A, 163 cases, 8.15 per cent.

Type B, 510 cases, 25.5 per cent.

Type C, 880 cases, 44.0 per cent.

Type D, 420 cases, 21.0 per cent.

Type E, 27 cases, 1.35 per cent.

Or 1810 instances in the 2000 observations in which the glans was protected when the penis was flaccid.

From these observations our conclusions were that nature in her effort to protect the sensitive nerve endings in the mucous membrane of the glans, provided a covering, which when the penis was flaccid afforded full protection, and when the organ became erect and the glans engorged, slipped back into the coronal sulcus and was on a plane with the skin covering the shaft of the organ, leaving the sensitive nerve terminals of the glans exposed and open to receive the stimulus necessary to consummate the sexual act.

This supposition is rather strengthened when the anatomy of the prepuce and penis of the lower animals is studied. It would also seem that the coronal sulcus was by nature placed so as to receive, during the turgidity of the penis, the foreskin which had so well protected the highly elaborated nerve terminii from friction of the wearing apparel when the penis was in the flaccid state.

Hutchinson long ago pointed out the fact that in circumcised individuals "the integument of the glans became of a horny character." From the standpoint of prophylaxis we can appreciate that the hornified epithelium offers resistance to the spirochetae and pyogenic organisms and in that way affords a

Fig. 6.
Showing the suture line.

certain amount of protection to the promiscuous; but does not the hornified and less sensitized epithelium bear some relation to the complaints of individuals who come to us for relief from feeble erections and the inability to complete the sexual act by orgasm?

We have no records to prove or disprove this hypothesis, but offer it simply as a possible etiological factor to be studied in cases of this description.

Why should we inaugurate a change in the epithelium of the glans which nature provided, by removing all of its covering in the operation of circumcision?

It is not within the scope of this paper to discuss the indications for circumcision, but in conditions of redundancy our technique has proven a most satisfactory method of correction, when correction was indicated.

Von Zeissl in 1883, suggested and published an operation for paraphimosis; and Klotz in 1902, published a method of circumcision applicable to cases of congenital and acquired phimo-

FIG. 7.

Showing suture line fifteen days after operation. The prepuce is retracted into the coronal sulcus where it "fits." It will also be noted that the suture line is away from possible chance of urinary wetting or contamination.

sis. Both advised in their publications the preservation of the inner layer of the prepuce and as far as I can ascertain, these gentlemen are the only ones who have published techniques which serve to shorten the sheath of the penis by resecting rather than by amputation, as is done in the method I beg to present here and which is as follows:

TECHNIQUE.

The patient is prepared as for any ordinary circumcision; a constrictor is applied at the root of the shaft and an estimation of the amount of superfluous prepuce is made, and the amount it is to be shortened is determined by retracting it so that the preputial orifice lies anterior to and midway between the tip of the glans and corona. This manipulation will cause the redundancy of prepuce to roll up behind the corona.

Into the middle of this roll inject the selected local anesthetic and repeat the injection at a point corresponding to the superior injection, on the inferior side at the raphe, which is usually in the midline. The object of anesthetising these two areas

being, that when they are picked up by the artery clamps (Fig. 2) there will be no pain experienced. The clamps are then drawn forward and thus invaginate the preputial orificial ring.

An ordinary circumcision clamp or medium seized pedicle clamp is then applied so that the invaginated ring is behind it (Fig. 3). The cutaneous tissue lying in front of the clamp is infiltrated with the anesthetic in the usual way and the redundancy amputated with a scalpel or scissors, close to the clamp. When the clamp is removed it will at once be observed that a section of integument has been resected, leaving the under layer of mucous membrane, the loose areola tissue and blood vessels that lie between the layers, and a collar of skin uncut (Fig. 4).

The skin retracts on the shaft and the collar is drawn back so that the cut edges of it and the retracted skin are brought into apposition and held there by long guy sutures, which are later used to hold on the turban gauze dressing.

It will be found necessary to hold the edges in closer apposition than is done in a muco-cutaneous suture line, as the skin shows a tendency to retract and pucker so that more interrupted sutures are necessary than is customary.

When the collar is drawn back it turns on itself and the mucous membrane becomes everted and later passes through a transitional state, whereby it becomes like the stratum corium of the true skin.

The advantages of the method we believe to be:

First, it accomplishes the purpose of shortening the prepuce by resecting a section of integument, preserves the normal preputial orifice, leaves a covering for the glans and removes the redundant tissue;

Second, it does not interfere with the frenum,—its blood or nerve supply;

Third, the line of union is so far removed from the meatus (Fig. 7) that it does not become soiled during urination, thus favoring an aseptic wound. The line of union being on the shaft, the post operative pain is nil, and patients suffer no inconvenience whatsoever in walking about immediately after operation.

The line of union shows well in Figure 7. The photograph was taken fifteen days after the operation and in a short time the cicatrix becomes absorbed and lost in the normal folds of the integument.

We have had no patients complain of constriction caused by the cicatrix during erection, after the first month, and all have been satisfied with the results.

Contributed by the Author to The American Journal of Urology.

SUPRAPUBIC OR PERINEAL PROSTATECTOMY

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THE purpose of this paper is to arouse an expression of opinion from the members of this Association as to the method most commonly used by them for the removal of the prostate gland. You are all familiar with the ordinary arguments for and against both methods; a few of these arguments, however, I wish to review. Personally, I have done about as many operations by the suprapubic as by the perineal route; employing the Goodfellow and Albarran-Young procedures when taking the vesical route, and using the Belfield-Ayer method when approaching by way of the perineum.

(1) We entirely abandoned the Goodfellow method because we could not see enough, for in eleven operations performed in this manner, I was not sure that we had removed the obstructing portion in any case. At about this time we happened to meet three cases in which the Goodfellow operation had been performed, but in which the cystoscope showed the presence of obstructing prostatic tissue. If one could be sure of entirely removing the prostate by this medium, this operation would offer the advantage of a minimum of dissection, a minimum of post-operative shock, and of the largest percentage of operative recoveries. Yet, despite the fact that Ferguson, May, Watson and other most excellent surgeons perform this operation by means of the so-called intra-urethral perineal operation, our experience points to a certain rather large percentage of cases in which the prostate is not entirely removed, the real obstruction remaining or returning after the operation. It is not true that the eye in the end of the finger is as accurate as the eye in the head in distinguishing kinds of tissue. We have long held to the principle in surgery that "blind" surgery is bad surgery, and we see no reason why an exception should be made in the surgery of the prostate gland. The enthusiasm of surgeons for their particular method of operation often carries them beyond the point of conservative statement and careful observation regarding their methods and their results. Men whose ability gives them phenomenal results are apt to leave the impression that it is the particular operation which yields such wonderful results rather than the skill and knowledge of the operator.

We believe it impossible to tell exactly the point at which separation of tissue is taking place in a dissection made at the end of the index finger, and within the urethra. To remove a gland whose anatomical definition at best is not clearly discernible from the adjacent tissue must necessarily be fraught with danger. There seems to me to be no good rule to prevent one from removing parts of the sphincter, the trigone of the bladder, the seminal vesicles or the ejaculatory ducts rather than the prostate under such circumstances. In our experience this operation cannot be recommended, either from the standpoint of thoroughness of removal of the gland nor can it be regarded as being free from the chances of injury to adjacent organs. Certainly the method is inadequate when we are brought face to face with complications such as vesical stones or a carcinoma of the prostate. The prostatic urethra is often badly torn and, therefore, the operation possesses no advantages so far as conservation of the posterior urethra is concerned. A minimum of post-operative shock and the infliction of a comparatively small amount of traumatism in the perineal dissection, these seem to be the only arguments in favor of this method of procedure over the open methods.

(2) After reading the reports of Dr. Young, we made larger incisions and more complete dissections, finding thus that a very much better approach to the prostate could be obtained. By the aid of the tractor we were able, in most cases, to bring the prostate well up into the perineal wound. We cannot but believe, however, that the diagramatic sketches found in the fourteenth volume of the *Johns Hopkins Hospital Report* are somewhat overdawn in this particular, and leave an impression that the bringing of the prostatic gland into the wound is more simple than our experience justifies or than I have ever seen any other operator succeed in doing. In some cases we have been unable to raise the prostate into the perineal incision at all, even with the most extensive dissection, which the anatomical area justifies, and with the most expert use of the tractor which we were able to command.

In a certain number of cases we have found the perineum so deep and the space between the tuber ischii so narrow, that we have had considerable difficulty in dissecting down to and around the prostate without injuring the surrounding tissue. We were never quite sure that the entire obstructing lobe of the

prostate was removed, for the tractors often slip about and away from the obstructing lobe in a manner which is misleading and confusing. They do not always sink into the center of the intra-vesical projection so beautifully as the illustrations show. The enucleation is, therefore, often very difficult because of our inability to hold the prostate in position and at times we have been compelled to remove the retractor entirely before we were able to determine the exact position of the remaining fragments or lobe of the gland.

We believe the traumatism to the cut-off muscle cannot help but be great, and, as shown by Ruggles (*Annals of Surgery*, April, 1905), this is an important factor in determining the degree of vesical control. This muscle is certainly severely injured in a number of cases. The nerve supply of this muscle, the perineal nerves and vessels are doubtless injured in a certain number of cases, resulting in incontinence.

We have never been quite sure just what has happened to the urethra at the time of operation, especially when the prostatic bar had developed up into the bladder. In some cases we are sure the prostatic urethra was torn and considerable portions of it removed. In one case, at least, a portion of the trigone was also removed. We have not been quite sure that the ejaculatory ducts on both sides were intact even when we have attempted to do the conservative perineal operation of Young. Examination of the prostate gland made after removal shows portions of the urethra in nearly every case, and in six of twenty-three, we have found portions of the ducts.

The position of the patient as described by Dr. Young is a difficult position to obtain in most of our ordinary hospitals and unless one has a rest constructed especially for this operation it is often difficult to obtain such a sharp angle in the back of the patient so that the perineum is parallel with the plane of the floor. If the Trendelenburg position is used, the weight of the intra-abdominal organs draws the prostate, if anything, deeper into the perineum.

We are advised to be careful to pass the instrument of cleavage into the correct layer of the capsule. We have never been able to choose the correct layer and we have always been compelled to follow the path of least resistance, whether this was the correct layer or not. We were often compelled to remove a number of small fibrous adenomata which were in the prostatic struma and practically none of the prostate itself.

In the removal of the median bar we have been compelled to tear the urethra often low down toward the vesico-rectal fascia and were unable to remove the lobe with the skill which some of the more dexterous operators describe with such eloquent and attractive diagramatic sketches. The use of the finger as a tractor has been found, in most cases, impossible. We have nearly always been compelled to divide the recto-vesical fascia in a rather wide manner and to leave large pockets behind the same. These must necessarily interfere with sexual relations and form acceptable areas for the formation of localized abscesses.

Our results on twenty-three operations on the prostate by the perineal route have been as follows:

One case died two days after operation. In the same case we perforated the rectum in the dissection. These cases have extended over a period of six years, and I am only able to find seventeen of them alive. One case had a fistula two years after the operation and at the time of his death. The cause of his death was pneumonia. We have had no cases of incontinence, and none of dribbling or stricture, as far as I know.

Despite all the above named technical difficulties I believe this operation offers the following points of advantage:

1. It is the operation which so far offers the nearest approach to an "open operation" for prostatectomy.

2. The sexual apparatus may be preserved.

3. Less of the urethra is destroyed than in the suprapubic operation. The part injured, if any, is farther from the bladder, lies nearer to the posterior layer of triangular ligament and is less liable to be followed by untoward results.

4. It offers the best possible drainage for the bladder.

5. It is particularly applicable in cases of small fibrous prostate, in which this organ obstructs rather by contraction of the vesical orifice than by enlarging the prostatic mass.

6. It is best adapted when the obstructing neoplasm projects down into the perineum or against the rectum.

7. The mortality is less than in the suprapubic operation.

In addition to the technical objections elaborated above one may add:

1. It requires more experience and a better understanding of the anatomy and physiology of this region than does any other operation for removal of the prostate.

2. It opens a large number of blood vessels and lymphatics

in the dissection. It necessitates a great deal of traumatism, possibly in some cases affecting the perineal nerves and leaving the external sphincter paralyzed.

The suprapubic method is recommended and done by Moinyhan, Mikulicz, Freyer, Israel and many others.

We have done fourteen operations all told in this way with one death. The technical difficulties of this method have been comparatively few in our cases. Once I opened the peritoneal cavity and this case died, but not until about three weeks after the operation. Whether this had anything to do with the death or not I do not know. There were no signs of peritonitis. In these fourteen cases we have not met with dangerous hemorrhage. The recoveries have been as rapid as the perineal, and, as I believe, the results as good. In one case I found that the patient had trouble after removal of the prostate, the principal complaint being pain in the urethra. In two cases it was necessary for the patient to use the catheter after the entire prostate had been removed. These were both men over seventy-five years of age, and in both an atonic bladder was present. I do not feel that the removal of a portion of the tortuous and elongated prostatic urethra is a very serious matter, and in no case was I able to find any urethral obstruction caused by the injury to the urethra.

Old cases of chronic cystitis, which had existed several years, usually continued to have pus in their urine even when the kidneys were healthy; in one case it was observed for five years. The presence or disappearance of pus does not depend upon either the suprapubic or perineal operation. It followed both operations equally so far as I am able to judge. It did not disappear in the old cases following either the suprapubic or perineal method. My experience in this regard may be unique and differs from many of the reports in the literature.

The technical difficulties are few, but other more dangerous difficulties more than offset this advantage.

A large cavity is left in the region of the neck of the bladder. The drainage must necessarily be up-hill for some two or three inches and the large pocket from which the prostate was removed forms an ideal position for the deposit of micro-organisms and urinary debris. Many advocate a boutonnière in the perineum as not adding much shock and it seems to be a rational procedure. Ranshoff's trocar should in all cases be condemned

as dangerous and unscientific. The opening into the bladder should be made well up into the fundus and not under the symphysis. The same point is made by Squier (*Surgery, Gynecology and Obstetrics,* September, 1911).

Drainage tubing in the bladder whether large or small, single or double, is, in my opinion, contra-indicated. The large hole in the base of the bladder is packed with iodide of bismuth gauze at the close of the operation and the serum and urine allowed to drain through this gauze. This prevents hemorrhage and infection, drains the serum rapidly from the wound and when it is removed it leaves a clean granulating surface.

After removal of the prostate, and before the bladder is packed with gauze, normal salt solution at a temperature of 120° is passed through the urethra by hydrostatic pressure without a catheter until the bleeding ceases. The bladder is then packed and the patient returned to bed, and in three days the pack is removed. No cases of secondary hemorrhage have appeared in our fourteen cases.

The following are extracts from a discussion on this subject in the American Surgical Association for 1909.

Dr. A. H. Ferguson, of Chicago. (Perineal Prostatectomy.)

This is one of the most interesting subjects in the field of surgery. At the present time surgeons are divided in their opinions as to the best method of removing the prostate gland.

My first work was done suprapubically in 25 cases. (I must explain that at least 4 of these should not have been operated upon by any method.) I lost 8 out of the 25, one from hemorrhage. After this experience I determined to attack the prostate through the perineum. In over 125 cases operated upon by this route, my mortality has been less than three per cent. I prefer the median perineal incision. The rest of the operation I carry out as I described it at the American Medical Association meeting in Boston, in 1906.

The prostate, which is most adherent at the neck of the bladder, must not be torn any when resistance to enucleation is met with; but the gross mass should be cut away with knife or scissors, leaving a layer of prostatic tissue, which is removed bit by bit with my prostatic biting forceps. Since the prostate is also more or less firmly adherent to the prostatic urethra, the same precautions must be taken to prevent injury to the latter.

Even supposing you have to destroy two-thirds of the prostatic urethra, in nearly all cases you can preserve the anterior portion. I

think the prostatic urethra can be more conserved by the perineal route, and, in fact, I know it. The finishing up of the operation is important. I sew up the perineum and prostatic urethra in all cases where the urine is not septic; and in about 25 per cent of these I get union by first intention without any leakage through the perineum at all. It is difficult to do this close to the neck of the bladder. A small drain should be placed at the lower angle of the wound, and a catheter though the penis. Experienced men who have followed the improvements of perineal prostatectomy do not injure the bladder, nor have they a fistulous tract, except possibly in septic cases, and not always in these. If there are stones and diverticuli present, the condition of the bladder can be found out through the perineum and the bladder by the subpubic route. Better drainage is thus obtained. The mortality, moreover, is twice as high by the suprapubic route.

Dr. Maurice H. Richardson, of Boston. (Perineal Prostatectomy.)

I, like most of the members of the Association, come here to learn the experience of others, and I, therefore, welcome this discussion. I have seen a good many operate upon the prostate but never yet a man who knew exactly what he was doing with reference to the uretha. My training has been that of an anatomist. I have never been able yet, by the suprapubic or the perineal route, to be sure whether in prostatectomy I was injuring the urethra or not. I have asked other operators, and they acknowledge that they do not know either. When I take out the prostate from above, I cannot believe that there is much left of the prostatic urethra.

As an anatomist I prefer vastly, in suitable cases, the perineal route. As Dr. Moore has said, the case is to be treated from above or from below, according to the results of the digital examination. Sometimes the suprapubic route has proved of the greatest possible ease, and the operation has been one of great rapility, and has been followed by little if any shock.

What appeals to me and what interests me in these discussions is the experience of the different Fellows of the Association, and what interests me still more is the frank admission that these operations do have their drawbacks, and that patients seventy or eighty years of age occasionally die. I look upon this operation as an abdominal one, and it becomes, therefore, a considerable part of my work. I select methods and routes according to the case in hand; I am not bound in every instance to follow a certain method or a certain route.

Dr. John B. Murphy, of Chicago. (Both Methods.)

The operation of prostatectomy was approached by me first by the perineal route, and then by the suprapubic route, the reverse of

Dr. Ferguson. The difficulties that I encountered in some of the perineal cases caused me great anxiety, so I changed to the suprapubic. Finally, after I had felt fairly secure in the suprapubic route, I encountered more difficulties, and then I concluded that both routes had advantages. Finally, after an experience of 123 cases, I have come to the conclusion that the small, firm, hard prostate can be taken out easily and more accurately from below. The large, thick, juicy prostate I can take out with greater ease and safety from above. Whether you make a little larger incision in the perineum makes little or no difference, because the deep excavation, if you take out the same amount of tissue, must be the same by both routes, and it is the deep structures which are the important ones. It is essential in operations from both positions to keep within the capsule.

A number of malignant cases can be recognized before the operation by the hard, ligneous nodules palpable by procteal examination. However, if all specimens are put through the microscopic examination, one will often find, to his great surprise, malignancy in a case in which he has not suspected it. To your gratification, a year or two later you will find your patient doing very nicely, and then, as is but to be expected, in another year or two he succumbs. But where the malignant disease has penetrated the capsule and invaded the connective tissue, the patient is worse from the day of the operation, and continues the downward course until he dies. The circumscribed carcinomata cases do very well after the operation, and the surgeon feels repaid for doing them.

Deaths in prostatectomy result from causes independent of the operation oftentimes, as sepsis, pneumonia, renal insufficiency, and sudden collapse in an old person from lowering the arterial tension; but if you are ready in such cases to at once fill the patient's veins with salt solution, you will be surprised how quickly he will rally. It should be administered, however, before the patient leaves the operating table. Experience aids one in selecting the time for operation and in guiding one to the proper preparation of the patient before operation, materially lessening the mortality.

Dr. Moore.

As I stated, my paper was only suggestive to bring out discussion, and it has certainly had the desired effect. Dr. Bevan, as we all know, is a man of positive convictions, and has the courage to back them, so I expect in five years he will come in and read a paper before this Association on the complication and sequels of suprapubic prostatectomy. He is very positive in his statements as to the superiority of the upper operation, but you will notice that there are a goodly number who are equally positive and have equally good reason for the lower operations. You will agree with me that Dr.

Murphy stands on solid ground, fitting the operation to the case in hand.

Dr. Richardson asks how we are going to tell when the urethra is injured, and I say examine the specimens after operation.

Dr. Bevan. (Perineal Prostatectomy).

I think the situation can be summed up as follows: That the evidence is quite conclusively in favor of the suprapubic operation from the standpoint of the completeness of cure and freedom from complications. That would be the opinion of the majority of surgeons. Then I think that probably the majority of surgeons would feel that the suprapubic operation was one that carried greater mortality than the perineal. Is it not possible to reduce the mortality rate of the suprapubic operation until it is as low, or lower, than that of the perineal? I think it is, and that the point brought out by Stillman has been well exemplified in some of my own recent work, that is, in an infected case making first a suprapubic drainage under nitrous oxide gas. Nothing has been more satisfactory than the secondary prostatectomy ten days, two weeks, or three weeks later, when the patient was in good condition, the operation being performed without any instruments whatever, simply through the fistulous tract with a gloved finger, with the patient under nitrous oxide gas. If that method is adopted and the badly infected cases first drained and prepared for prostatectomy, the suprapubic operation will have as little or less mortality than any other case, and the resulting cure will be more satisfactory and more complete.

RESUMÉ

Age seems to be the reason for the greatest dangers in prostatectomy. The mortality relation of different operations shows in perineal prostatectomy six to eight per cent, in the suprapubic between nine and eleven. With the constant increase in knowledge of the technique of this operation and the widening experience, the mortality suffers gradual reduction. Freyer reports 644 suprapubic prostatectomies with 39 mortality, about six per cent, and Young 238 perineal prostatectomies with a mortality of 2.9. His last 128 operations showed no mortality.

Each of the operative methods has its advantages. The suprapubic possesses the superiority of easier technique and greater rapidity. It is astonishing how often very large prostates can be removed by the suprapubic way in a few moments, particularly if one can shell out the prostate by starting in the right layer. The perineal method has the advantage, that each step is more perfectly under the control of the operator, but the

technique is more difficult. The chief drawbacks of suprapubic prostatectomy are bad drainage and a large round wound hole in the deepest part of the bladder, which assists in causing retention of the wound secretion and tends to the production of dangerous after effects. This is doubtless responsible for the higher mortality.

Most patients lose their potency after a total prostatectomy. This appears to be much less frequent in the case of the suprapubic prostatectomy than in the perineal. It may be mentioned that Young and Fuller have both observed an increase in the potency after suprapubic operations.

Many operators prefer one method at one time and one method at another, depending on whether the prostate is enlarged down towards the rectum or whether the tumor mass extends up against the bladder. I believe that this is the proper position to take and it is better that the operation be made to fit the case rather than the case to fit the operation. The suprapubic is for me the easiest to perform. The short time of the operation, the rare appearance of complications, the ability to deal with complications, such as stone, and the short period of wound healing, are the deciding factors. The healing of the perineal prostatectomy requires from six to eight weeks. When a fistula occurs it may last several months. Fistulae after suprapubic prostatectomy, in my experience, close about a week sooner. In one of my last cases the suprapubic wound was entirely healed in three weeks.

My first suprapubic operation was done because I was unable to pass any guide whatever into the urethra, fearing it would require considerable time to find the urethra by the perineal route. I decided to do the suprapubic operation and was pleased with its results.

In spite of the many opinions to the contrary given in this paper I believe the suprapubic operation is slowly gaining ground among the American surgeons. In Germany and England it is, now, almost the only operation done, while in France, I understand, Albarran and Legueu are also doing the suprapubic more commonly than the perineal.

We are now using a retractor for suprapubic operation upon the end of which an electric light is placed in such a manner as to illuminate the entire base of the bladder. By the use of this instrument the steps in the enucleation are more clearly seen.

In certain cases the two step suprapubic operation has proved advantageous. I believe, however, it is but rarely necessary.

I have attempted to summarize the present situation in the surgery of the prostate as I see it in America. I have laid stress on the difficulties and complications met with rather than upon the simplicities and successes, for I feel that already in American literature the operation of prostatectomy is too lightly regarded, and, therefore, often attempted by those whose training has not fitted them for this work, with disaster to the patient, to themselves and to the discredit of a very valuable surgical procedure in proper cases.

EDITORIAL ANNOUNCEMENT

Enlargement of the Scope of The American Journal of Urology.

A publication like The American Journal of Urology is not, and, as those familiar with *special* medical journalism know, cannot be a money-making venture. That the journal may pay for itself, leaving perhaps a margin for further improvement, is all that can be expected. The editor's and collaborators' work is generally a labor of love.

When we took charge of The American Journal of Urology four years ago—how time does fly—it was, considered from every point of view, in a deplorable condition. Financially it was ruined, its subscription list was meager and its text pages did not shed any glory on American Urology.

We had uphill work, and while we have not achieved all we hoped to achieve, there has been considerable improvement. At any rate, we have succeeded in building up a subscription list, which now justifies us in attempting to realize our original intention, that is, to make The American Journal of Urology the best Urologic Journal in existence; if not the superior, at least the equal of any Journal published in any foreign language.

There is a field for such a Journal. Neither in this country, nor in Great Britain or any of its dependencies, is there a single Journal, with the exception of The American Journal of Urology, devoted to the important branch of genito-urinary and venereal diseases.

Beginning with the New Year the scope of this Journal will be so enlarged that it will become indispensable to the genito-urinary specialist, as well as to the general practitioner treating venereal diseases. It will comprise the following features:

1. A comprehensive review of *all* the foreign Urological Journals. Every Urologic Journal: *Folia Urologica, Zeitschrift für Urologie, Annales des Maladies Génito-Urinaries, Annales des Maladies Veneriennes, Rivista Urologica,* will be fully and comprehensively reviewed, so that subscribers to The American Journal of Urology will practically have no need to subscribe for any other Urologic Journal.

2. Comprehensive abstracts of all the important Urologic

and Venereal articles appearing in the general medical Journals, English and foreign.

3. Reports of the meetings of all national, foreign and international Urologic and Venereal Congresses.

4. Original articles from representative Urologists in this country and abroad.

5. A special department of genito-urinary pathology.

6. Diagnostic and therapeutic points for the general practitioner.

7. And probably a special Department dealing with the vast problems of our sexual life.

Without in any way encroaching on the domain of the genito-urinary specialist, additional space will be set aside for contributions which will be of interest and value to the general practitioner. We have many general practitioners on our subscription list, and it is in compliance with their oft-repeated requests, that we institute a general department, incorporating brief clinical cases, the treatment of gonorrhea and syphilis, diagnostic and therapeutic suggestions, etc.

Dr. Leo Buerger of New York will be actively associated with us in the editorial management of the JOURNAL and it is confidently expected that henceforth the JOURNAL will be a credit to American Medical Journalism and to the Urologists of the country.

We look forward to the co-operation of all genito-urinary specialists, and we trust that in the near future our hope to make the JOURNAL so good that there will be "No Urologist without THE AMERICAN JOURNAL OF UROLOGY," will have become a reality.

W. J. R.

Of the Original Articles which are to appear in early issues of THE AMERICAN JOURNAL OF UROLOGY, we will mention the following:

"Pyelitis Exfoliativa" . . . . . HOWARD A. KELLY, Baltimore, Md.

Common Sources of Error in the Diagnosis of Renal and Ureteral Calculi . . . . . HUGH CABOT, Boston, Mass.

The Value of the Irrigating Cystoscope for the Electric Illumination of the Bladder, with the Presentation of a New Instrument
WILLY MEYER, New York

Mucous Cysts of the Bladder Producing Symptoms of Obstruction
WILLY MEYER, New York

Distention of the Renal Pelvis for Purposes of Diagnosis
O. S. Fowler, Denver, Col.
A Case of Fracture of the Pelvis with Extraperitoneal Laceration of the Bladder . . . . . J. F. McCarthy, New York
The Bladder during Pregnancy . . . . Samuel Brickner, New York
Traumatism of the Bladder During Delivery . H. N. Vineberg, New York
Echinococcus of the Kidney . . . . Bransford Lewis, St. Louis, Mo.
Carcinoma of the Prostate Removed Through a Suprapubic Incision. Longquiescence . . Howard Lilienthal and W. Leighton, New York
The Medical Aspect of Hematuria . . . . H. Elsner, Syracuse, N. Y.
The Diagnosis and Treatment of Pyelitis . . Arthur Stein, New York
Roentgen Rays in Urology . . . . . Leopold Jaches, New York
The Present Day Diagnosis of Acquired Cutaneous Syphilis . . . . . Walter Heimann, New York
A Neglected Principle in Cystoscopy . W. F. Braasch, Rochester, Minn.
Renal Calculus . . . . . W. Wayne Babcock, Philadelphia, Pa.
Report of Bladder Tumors Treated by Fulguration . . . . . D. A. Sinclair, New York
The Treatment of Sexual Disorders in the Male . . . . . William J. Robinson, New York
Gonorrhoeal Arthritis in Children . . . . . Sarah Welt, New York
Bladder Diverticula . . . . . G. Warren, New York
Observations on Disturbances of the Bladder Function in Diseases of the Brain and Spinal Cord . . . . . C. A. Elsberg, New York
A Two Way Catheter . . . . . Robert L. Dickinson, New York
Diagnosis of Urinary Lithiasis . . . . . H. Bugbee, New York
Surgery of Urinary Lithiasis . . . . . J. B. Squier, New York
Urinary Lithiasis: Etiology and Chemistry . . F. E. Sondern, New York
The Modern Therapy of Syphilis . . . . Walter Heimann, New York
Litholapaxy . . . . . J. R. Hayden, New York
The Kidney in Syphilis . . . . . W. B. Brouner, New York
Mixed Tumors of the Kidney . . . . . V. C. Pedersen, New York
Cystitis and Pyelitis in Children . . . . . Dr. H. Schwarz, New York
Phosphaturia and Oxaluria . . . . . F. E. Sondern, New York
Clinical Studies of the Prostatic Urethra . John A. Hawkins, Pittsburg, Pa.
Vesical Calculus with Multiple Recurrences . . . A. Hyman, New York
Renal Functional Diagnosis . . . . . Victor Blum, Vienna, Austria
Operative Treatment of Gonorrhoeal Epididymitis . . . . . Louis Schmidt, Chicago, Ill.
An Operating Cystoscope . . . . . Leo Buerger, New York
Obscure Fever of Renal Origin . . . . D. N. Eisendrath, Chicago, Ill.
Analysis of 62 Cases of Lues Treated with Salvarsan . . . . . Louis Gross, San Francisco, Cal.
The Clinical Significance of Horseshoe Kidney . Arthur Stein, New York
Special Problems in Cystoscopy . . . . . Leo Buerger, New York
The Unrecognized Influence of the Prostate on Man's Physical and Mental Condition . . . . . William J. Robinson, New York
Lectures on Diagnosis of Renal Disease . . Victor Blum, Vienna, Austria

Review of Current Urologic Literature

FOLIA UROLOGICA

Vol. VI, September, 1911

1. The End-Results of Nephrectomy for Renal Tuberculosis. By J. Israel.
2. Calcification in the Pelvis Simulating Ureteral Calculi in the Radiogram. By B. Alexander.
3. Contribution to Renal Surgery. By G. Bonzani.

1. The End-Results of Nephrectomy for Renal Tuberculosis.—The indications for the operative treatment of renal tuberculosis have completely changed during the last ten years. Whereas, years ago, retention of pus, pain, emaciation or perinephritic abscess, and hematuria were the usual signs for intervention, we now take the view that *early* nephrectomy, done when the process is in its incipiency, gives the best results, regardless of the extent of the pathological process.

The question naturally arises as to whether spontaneous healing is possible. Thus far no anatomical proof of this has been forthcoming. As for the effects of tuberculin, we have also failed to have obtained thus far definite evidence pointing to its value in causing a disappearance of the lesions of the kidney. In spite of temporary improvement in subjective symptoms, the pathological changes progress, so that we are not justified in the present state of our knowledge to procrastinate, immediate surgical intervention being the only proper procedure.

Israel's experience is based on 170 operated cases, and his conclusions are drawn from a consideration of his own cases and of data furnished by quite a number of surgeons whose opinions on this subject had been requested and given. By late results the author means the condition of the patient after 6 months have elapsed. Thus in 1023 cases (170 his own), there was a mortality (occurring after 6 months) of 10 to 15%, and an early mortality (in first 6 months) of 12.9%, meaning that about 25% of the patients are saved by operation. The mortality in males is considerably greater than in females, usually because of chronic tuberculosis of the lung in the late mortality, and because of an acute miliary process when death occurs early.

The most important causes of late death are pulmonary tuberculosis and disease of the second kidney. Acute miliary tuberculosis occurs twice as often during the first post-operative year as in all the other years, being in most cases a direct sequela of the operation.

More than one-half of the late mortality ocurs before the end of the second year, including as causes, pulmonary tuberculosis (45.2%), renal disease (35.9%) and acute miliary tuberculosis (14%).

Of the renal diseases responsible for late mortality, the author distinguishes two varieties, the non-tuberculous and the tuberculous. To nephritis may be attributed the greater part of the deaths, kidney lesions being at fault in almost a third of those who succumb late.

After nephrectomy, we expect as a rule, to find an improvement in the second kidney, which, before operation, may have been the seat of a toxic process. From the standpoint of indications, it is important to be able to distinguish between a true chronic nephritis of the second kidney and a transitory toxic lesion. Save for increased arterial tension in Bright's disease, we have no reliable data upon which to base a differential diagnosis. Nephrectomy is only permissible in the presence of Bright's disease, if we estimate that the effect of the presence of the tubercular process is more dangerous than would be the removal of the functioning parenchyma contained in the affected kidney.

Tuberculosis of the second kidney usually causes death within two years after operation; later mortality of renal origin signifies that the second kidney was already diseased at the time of operation. Of all the cases of nephrectomy only 1.6% develop renal tuberculosis.

Nephrectomy is only allowable in bilateral affections, if there be severe hematuria and ungovernable pain and colic, and provided that the process in the other kidney be in its incipiency.

The removal of the tuberculous organ diminishes considerably the chances of involvement of the healthy second organ, since infection from an extravesical source is rare.

The tubercle bacilli disappears from the urine after nephrectomy in three-quarters of all cases, and their persistence depends upon the extent of the involvement of the bladder before operation. The absence of the bacilli in smears must be con-

trolled by animal inoculation. The presence of the bacilli is not incompatible with the enjoyment of good health, there being records showing that 17 years may elapse where tubercle "bacillus carriers" (in urinary tract) are apparently well and without having an affection of the second kidney. The bacilli may be present even though the urine contains no albumin. Of those cases in which bacteria disappear, the great majority become free from pain, and in 75% of cases the frequency of micturition become normal.

There is also an improvement in weight even where the urine contains bacilli, and some patients become "bacillus carriers" (as do typhoid cases) without symptoms.

The urine fails to become absolutely normal in more than 75% of cases; albumin remains in 53.4%, usually only in traces; red blood cells in 48.8%; leucocytes in 46.5%; and casts, usually hyaline, in 23.2%.

The cystoscope reveals a cure of the bladder in 43.5%, partial involution in 45.1%; either no change or progression of the pathological lesions in 9%. The bacilli disappears before the visible alterations of the bladder mucosa, although a large part of the apparent lesions are no longer of tuberculous nature. As a rule, the amelioration of urinary symptoms takes place *pari passu* with the improvement in the condition of the bladder, as attested by the cystoscopic findings. When the frequency of micturition becomes worse after operation, having previously been normal, the assumption of disease of the second kidney is admissible and usually correct.

The more extensive the bladder lesions, the less often does the pain disappear. The absence of painful micturition after nephrectomy occurs oftener than a complete cure of the bladder.

The ureter usually heals spontaneously; although there may be ureteral fistulae in 11.5%, even these heal within 4 years. The operative treatment of the stump does not seem to influence the final result appreciably.

The body weight increases in 93.9%. Pregnancy does not affect the second kidney after nephrectomy in any different manner than the kidneys of healthy people. Consent to marry should be given only after permanent disappearance of the bacilli.

All in all, the conclusions of the author speak in favor of early nephrectomy for unilateral renal tuberculosis.

ZEITSCHRIFT FÜR UROLOGIE

Vol. V, No. 6, 1911

1. Endourethral Operative Work in Chronic Proliferative Urethritis. By H. Lohnstein.
2. The Inadequacy of the Indigo-Carmine Test. By Max Roth.
3. The Regeneration of the Prostatic Urethra after Prostatectomy. By A. Wischnewsky.
4. Double Renal Pelvis, One Infected, the Other Normal. By W. Stark.

Vol. V, No. 7, 1911

5. One Hundred and Forty-five Litholapaxies. By M. Kreps.
6. Syphilitic Disease of the Bladder. By P. Asch.
7. Hemorrhage after Nephrectomy. By H. G. Pleschner.

1. Endourethral Operative Work in Chronic Proliferative Urethritis. Lohnstein feels convinced of the fact that the superficial proliferations of the mucous membrane are often responsible for the failures of cases of chronic gonorrhea to respond to treatment. When the lesions are confined to the anterior urethra, subjective symptoms may be entirely absent. A recurring discharge containing a preponderance of epithelial elements makes it probable that hypertrophic changes are present. In the posterior urethra, however, such lesions are usually accompanied by some of the following symptoms:—dull pain in the perineum, rectum, in the cords or testicles, peculiar sensations in the pelvis or lumbar region, associated at times with alterations in potency, premature ejaculation, phosphaturia, sexual neuroses and even neurasthenia. Even recurring epididymitis seems to depend in a casual relationship, on the presence of papillomata of the verumontanum; for, the author has observed three cases in which the destruction of these growths was followed by cure. The roof of the prostatic urethra often harbors glands in which thick secretion is retained. Expression of these by means of the endoscopic curette results in a disappearance of urinary shreds.

Lohnstein has constructed several ingenious devices that can be manipulated through the Goldschmidt urethroscope, for the operative treatment of the urethra. Four of these are used in routine work: a curette, a flat cautery, a cautery loop and a

Bottini knife. The curette is applicable in the case of the sessile type of epithelial hypertrophies, in the polypoid excrescences and in occluded glands of the posterior urethra. Papillomata are destroyed by means of the cautery instruments. Such operative treatments tax the patience of both physician and patient at times, because a number of séances may be necessary. Thus a cure may not be effected until months have elapsed, because the sittings cannot be carried out at short intervals. The author's Bottini incisor enables exact work under control of the eye.

Lohnstein does not proceed to operative measures through the irrigation urethroscope until the usual methods, including dilatation, have failed. In 10 cases the use of the curette was indicated. Two varieties of urethral affection call for the application of this instrument; 1st, circumscribed lesions in the bulb, that are difficult to attack with the dilators, and 2d, the catarrhal processes in glands lying in roof of the prostatic urethra. Seven of the ten cases belonging to the latter type were cured by curettement. The three failures are attributed by the author to neglect on the part of the patient to come regularly for treatment.

In the author's series of observations, there were 12 cases in which villi or polypoid growths were regarded as being responsible for the chronic gonorrheal process. Cauterization was followed by marked improvement in all of the 8 patients who applied regularly for treatment.

The papillomatous growth showed a marked tendency to recur in four of the cases, but even here complete cure may be the result of assiduous work and perseverance.

6. Syphilitic Disease of the Bladder. In a thorough paper on the symptomalogy and the diagnosis of syphilis of the bladder, the author calls attention to the scarcity of published data on this subject and attempts to stimulate us to a better recognition of this condition. Even Guyon in 1894 dismissed the subject in his lectures with scant mention, saying that the urinary tract seems to escape luetic infection. Neumann was the first to appreciate that secondary syphilitic involvement of the bladder was not uncommon. He also describes a condition which he called luetic paracystitis. Matzenauer seems to have recorded the first observations on the appearance of syphilitic lesions of the bladder with the cystoscope in a case of vesical gumma.

Most of the reports in the literature describe an involvement of the bladder during the tertiary stage. Gummata occur that may often be mistaken for papillomata, their true nature remaining concealed unless luetic ulcers or other tertiary manifestations elsewhere in the body occur simultaneously. Ulcers should create the suspicion of being syphilitic in origin, if the bacteriological examination for tubercle bacilli is negative. Luetic ulcers are distinguished from simple and tuberculous ulcers by their markedly infiltrated and prominent margins. The gummatous processes usually give the symptoms of a neoplasm, causing hematuria throughout the whole duration of the act of micturition, whereas vesical ulcers are more apt to produce terminal hematuria. At times the accompanying pyuria may be quite marked. The subjective symptoms depend greatly upon the location of the disease, being most intense when the neck of the bladder is affected. In rare cases, retention of urine occurs.

More unusual are the casts of secondary luetic manifestation in the bladder. In these pollakiuria and pyuria are prominent symptoms, the cystoscopic examination revealing swelling and redness of the mucosa with mucous plaques.

There is a considerable number of luetic patients with urinary disturbances in which we encounter symptoms referable to lesions of the nervous system, such as cases of bladder palsy due to progressive paralysis and tabes. The tabetic changes in the bladder are of importance; they often appear in the very earliest stages of the disease. The recognition of the trabeculated bladder described by Nitze, Hirt, Boehme, Walker and the author, is of considerable aid therefore in diagnosis. The vesical alterations are the manifestation of an attempt at compensatory hypertrophy and are unattended by the usual causes such as stricture and hypertrophy of the prostate.

As for therapy in tabetic conditions, improvement may result if energetic antiluetic treatment be instituted.

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2. The Symptoms, Diagnosis and Treatment of Horse-shoe Kidney.—Whereas the diagnosis " horse-shoe kidney " was

formerly only made at autopsy or at operation, clinical observations that have accumulated during the last few years, and a study of four cases by the author, point to the possibility of clinical recognition of this anomaly, particularly since characteristic symptoms given by even an uncomplicated or a healthy horse-shoe kidney may be identified. The frequency of the incidence of this malformation in autopsies is given as 1 in 1100 by Küster, but Rovsing's investigations would tend to make the figures much higher, namely 1 in 500 cases. Our interest in this condition should be stimulated by the hope of cure offered by operative measures, for relief can be expected even in those cases where a simple, uncomplicated horse-shoe kidney is responsible for the symptoms.

The history of four cases are given by the author. The symptoms were typical and did not vary essentially in the cases reported. Dull pain either of pressure or of tension across the small of the back and in the lower abdomen was regularly present. Rest seems to dissipate all discomfort and pain, whereas exercise (particularly when it necessitates hyperextension of the vertebral column) aggravates the feeling of distress to a marked degree.

A rational explanation of the subjective symptoms is to be sought in the mechanical effects of extension of the vertebral column upon the isthmus of the horse-shoe kidney and the aorta, vena cava and nerves underlying it. Whenever the vertebral column is bent backward, the kidney must be stretched inasmuch as the upper poles are fixed. Not only does the kidney parenchyma suffer pressure and tension, but the vessels and nerves are compressed against the bodies of the vertebrae. The occurrence of shock in one case may be attributed to the same cause.

The diagnosis must naturally be based mainly upon the presence of the above symptoms and upon palpation of a transvertebral mass. Sometimes the lower pole of one or the other kidney can be traced towards the median line where, for some reason or other, its further course becomes lost to the examining finger.

In short, we are justified in making a presumptive diagnosis of horse-shoe kidney when the following picture is presented:— Dull pressure, pain across the back and on a level with the kidneys, with the history of total disappearance of all discomfort in the supine position; marked aggravation of the pain after ex-

ercise and on bending the trunk backward; the absence of a floating kidney; and the presence of a mass stretching across the spine. Occasionally, retroperitoneal tumors, especially of the pancreas and mesentery and even a hydrops of the gall bladder, may give a picture that may tax our diagnostic skill.

As regards the therapy, complete rest will alleviate the symptoms; a cure, however, can only be expected from operative procedures. The best method is the division of the isthmus, followed by suture of the cut ends of the respective organs. The most accessible approach is a transperitoneal one with division of the peritoneum outside of the colon and duodenum. When the isthmus is fibrous, we need only cut between two clamps and ligate either side. Where we are dealing with a thick parenchymatous mass, it is well to use the angiotribe of Roux, and then to cut through and sew up the crushed band of tissue.

3. Congenital Hydronephrosis.—Under this term the authors include not only those varieties of hydronephrosis that are already present at birth, but also those in which the cause only is congenital, there being a gradual post-natal development of the lesion. The pathogenesis of this last type is not as yet completely understood, although it is admitted by many that incomplete obliteration of the lumen of the ureter at some point or other in its course, may be the cause. Verhoogen and de Graeuwe have seen a number of instances in which hydronephrosis could be attributed to atresia of the upper end of the ureter, and were able to make careful anatomical studies in three of the cases.

Authorities are at variance as to what anomalies are responsible for congenital hydronephrosis. Rayer was the first to ascribe the condition to some organic lesion, having cited a case in which there was an abnormal coarctation of the upper end of the ureter. Since then the following peculiarities have been held responsible by different authors: torsion of the ureter, kinking, valve formation, and faulty insertion into the pelvis. The assumption that anomalous implantation into the pelvis is a common cause is denied by those who hold that this condition is the result of dilatation of the pelvis rather than the cause. Küster is in accord with this view, maintaining even that repeated attacks of pyelitis may lead to hydronephrosis. Still others believe that compression of the ureter by reason of its anomalous course or by the renal veins is a frequent etiological factor. The

four cases of the authors are alike in strengthening the hypothesis, that an aplastic condition of the ureter may account for the pelvic dilatation.

The author's first case gave a clinical picture so closely resembling that of appendicitis that the appendix was removed. At times there were attacks of pain simulating renal colic with nausea and vomiting. Nephrectomy was done and the kidney proved to be hydronephrotic, its parenchyma atrophic, the ureter implanted 1 centimeter above the lower pole and so narrow and thick-walled that its lumen (3 mm.) scarcely admitted a fair-sized needle. Sections of the ureter at its attenuated portion showed papillary ingrowths of the mucosa and submucosa, reducing the lumen to a narrow slit, and a sclerotic process of the submucous connective tissue.

Case II, a boy 16 years of age, was admitted to the hospital with severe pain in the left lumbar region and hematuria. Such attacks had recurred periodically since the age of two. Extirpation of the kidney revealed a hydronephrosis due to stricture of the ureter. The cortex was found reduced to the thickness of 1 centimeter. The calices broadened and the pelvis dilated. The ureter measured only 4 mm. in diameter, and opened in the lower part of the pelvis by a minute opening. Microscopically it presented a picture similar to that of Case I.

The disease in Case III had lasted four years, being characterized at the time of patient's admission to the hospital by attacks of severe pain in the sacro-lumbar angle, desire to urinate, pollakiuria, and painful micturition. The extirpated kidney was enlarged, hydronephrotic, the pelvis much dilated. The ureter entered the pelvis at its lowermost point and its lumen was hardly enough to admit a fair-sized needle.

Seeking an explanation for the stenosis of the ureter with the consecutive hydronephrosis and renal sclerosis, the authors are able to rule out lithiasis in all of their cases. The theory of Virchow, which presupposes an intra-uterine inflammatory process, is untenable, since it is only applicable to those instances in which the affection manifests itself soon after birth, and would hardly be in accord with the histories of the cases in question. It would seem more plausible to assume (with Klebs and Englisch) that the strictured zone in the ureter represents the result of anomalous or faulty development. It is well known that until the fourth month of intra-uterine life, the ureter is not

smooth-walled, but is narrowed by plication of its mucosa in a manner similar to that found in the authors' cases. These folds are encountered especially in the upper, middle and lower portions of the canal. This peculiar conformation disappears later, perhaps by virtue of the pressure of the urine or perhaps by reason of normal development. The plications at the ureteropelvic junction may persist and lead to local stenosis.

The following is the mechanism accepted by Verhoogen and de Graeuwe, as being in harmony both with the pathological findings and the clinical picture. The foetal narrowing of the ureter at the renal pelvis remaining after the fourth foetal month, and the development of the kidney continuing, the means of outflow for the urine finally become inadequate, so that hydronephrosis and hypertrophy of the renal pelvis result. Whenever the congestion (which the constant intrarenal pressure brings forth) in the kidney is increased either by exposure to cold or through excessive drinking, complete closure of the ureter may ensue. Thus are to be explained the symptoms of pain, nausea, vomiting and hematuria, on the basis of the occurrence of acute retention.

4. The Conversion of Bladder Epithelium into Secreting Cylindrical Epithelium.—Reviewing some of the theories that have been put forth in explanation of cyst formation in the bladder, Zuckerkandl concludes as follows:

1. The epithelium of the bladder may become converted into cylindrical epithelium by virtue of the action of constant and intense irritation.

2. The lesion usually designated as *cystitis cystica* and *glandularis* is produced by epithelial proliferation with consecutive metaplasia into secretory epithelium.

3. *Cystitis glandularis* and *C. cystica* are analogous processes, the secretion remaining rudimentary in the latter.

4. We may look to the metaplastic phenomenon, therefore, for the explanation of the primary development of neoplastic glands in the bladder, and we need no longer resort to the assumption of the presence of aberrant fetal rests.

10. The Origin of Prostatic Hypertrophy.—In a critical review of the studies of other authors on the origin of so-called prostatic hypertrophy, and from investigations of his own, Marion concludes that in this condition we are dealing with adenomas or fibro-adenomas of periurethral glands, the prostate it-

self not being implicated except through contiguity. The pars prostatica of the urethra contains two varieties of glands, those belonging to the prostate, and those grouped about the urethra, the periurethral glands. The former lie outside, the latter inside of the sphincter.

In his exposition of his investigations on the genesis of "hypertrophy" Marion considers separately the origin of the so-called middle and the lateral lobes. Middle lobes may represent merely adnexa or off-shoots of lateral lobes; or, more frequently, their inception is submucous, somewhere within the sphincter muscle. Thus in some specimens, the hypertrophic lobe is seen to be surrounded by a collar of sphincter muscle, and may be regarded as a nodule wholly outside of the prostate.

As for the pathogenesis of the lateral lobes, it is somewhat more difficult to come to a definite conclusion. Of the many arguments in favor of the view that the lobes have their origin in urethral glands, the following may be cited:

1. In suprapubic prostatectomy the gland is apparently covered only by mucous membrane, a fact that speaks for a suburethral origin, since a muscle layer should intervene if the process had its inception in the prostate. Further, the new growth is usually easily extirpated without injuring the prostatic plexus, or ejaculatory ducts. These facts may be taken also as favoring the view that we are dealing with adenomas and not with hypertrophy.

2. The new-formed lobes encroach on the urethra both anteriorly and posteriorly. The tissue of the lateral prostatic lobes, however, lies behind a transverse line posterior to the urethra. Hypertrophy of these lobes should cause expansion upward and posteriorly where there are no dense neighboring tissues to obstruct neoplastic advance.

3. If the prostatic gland were responsible for the hypertrophy, we should expect a general elongation of the prostatic urethra, whereas in reality only that posterior portion bearing the verumontanum suffers this change.

4. If we were dealing simply with adenomas of the prostate, we should encounter instances in which isolated tumors could be removed without injury to the urethral canal.

5. Numerous examinations of the prostatic bed after prostatectomy bear testimony to the view that the prostate is left behind after prostatectomy. This fact strengthens the assump-

tion that we are dealing with adenomas and not with true hypertrophy.

6. Cross-sections of that portion of the vesico-urethral region which is extirpated in prostatectomy demonstrate the presence of the new glandular growth directly beneath the mucous membrane. A fibro-muscular capsule surrounds the neoplastic tissue and crowds away the prostate. The muscular elements of this capsule speak strongly against the view that we are simply dealing with an adenoma originating in the prostate.

The absence of displacement of the prostate in forward and lateral directions, and the singular crowding backward of this organ, indicate that the capsule is something more than the mere covering of an adenoma.

7. The fact that the growth takes place within the sphincter (which is easily demonstrable in the early stages of "hypertrophy"), is one of the most reliable proofs of the correctness of the assumption that its origin is not in the prostate.

8. Finally, it is noteworthy that we never encounter urethral glands within the hypertrophied masses, or between these and the urethra, a fact which is not compatible with the hypothesis that the "hypertrophy" begins in the prostate.

Although we cannot conclude that true prostatic adenomas do not exist, the data adduced above bear eloquent testimony to the correctness of the author's view that in most cases, at least, the prostate gland takes no part in "Prostatic Hypertrophy."

13. Prostatic Lipoids and Prostatic Concretions.—Until a short time ago the recognition of the lipoid substances was based entirely upon their appearance in the polarization microscope. They differ from true fats in their double refraction, but resemble them in micro-chemical reaction, in that they take up the Sudan III, and Scharlach R. stains, as well as osmic acid. The recent introduction of Ciaccio's method for differentiation of the lipoids from fats was therefore most welcome. This procedure depends upon the insolubility of lipoids in alcohol and xylol after fixation in chromic acid solution, demonstrating the lipoid bodies even after imbedding in paraffin by means of the Sudan stain. What Fürbringer called "lecithin" some thirty years ago is now grouped together with other fatty bodies, under the caption "lipoids."

The presence of lipoids in prostatic secretion having been definitely proven by polarization and tinctorial reaction, Pos-

ner sought to corroborate these findings by applying the Ciaccio method to sections of the gland. Of the 13 prostates examined, all but two (taken from very young children) showed lipoids. The cells of the acini are particularly rich in these bodies, the base of the cells being the favorite site of numerous granules of various sizes. One gains the impression from the stained specimens that the lipoid granules are the specific substances elaborated by the epithelial cells. In the lumina, too, there are granules, and even the cells that lie free and detached are often filled with them. In the presence of an inflammatory process, the leucocytes also take up the lipoid bodies, and certain authors assume that there is a positive chemotactic influence which determines the inhibition of lipoids by the wandering cells.

14. Syphilis of the Bladder.—Pereschiwkin calls attention to the sparsity of observations of leutic lesions in the bladder other than gummata, and cites the histories and findings in three cases with secondary manifestations.

In Case I the bladder mucosa was normal save in the immediate neighborhood of the left ureter where there were a few small ulcers with deep red floors.

Cystoscopic examination in Case II revealed four minute red areas in the vault of the bladder.

The third case showed ulcers of various size and shape, oedematous ureteral ostia, and internal sphincter. All these lesions rapidly disappeared after a few injections of salycilate of mercury.

15. Congenital Diverticula of the Urethra.—According to some authors, there are valve-like formations in the urethra during foetal life, that prevent the outflow of urine. Kaufmann believes that these valves are not the causes of diverticula, but rather that developmental anomalies are responsible. Only eighteen instances are recorded in the literature. The author cites the case of a boy eight years of age who presented a pocket inferiorly behind the fossa navicularis of the urethra. During the act of micturition this sac-like process filled up and became almost as big as a walnut. A plastic operation, with incision of an oval piece of the mucous membrane, was performed, resulting in complete cure.

19. Experimental Studies of Tests for Renal Function.—Wohlgemuth endeavors to point out the reliability of his

Diastase Test for renal function, and compares the results obtained by it with some of the other well-known methods. His procedure depends upon the premise that a diseased kidney will excrete less diastatic ferment than a normal organ. A study of a series of urines of nephritics by the author, and the more recent reports of other workers, seems to point to the correctness of this assumption. If we take a set of test tubes in which the ferment containing fluid (urine) is put in a decreasing series of amounts, and then add equal quantities of a 1% starch solution to each tube, we will be able to estimate the quantity of ferment after incubation at body temperature, if we then test with a drop of a 1/10 normal iodine solution. In those tubes in which digestion is advanced a yellow or reddish color is found and where there is not sufficient ferment to act, a blue or purplish tint will appear.

The author concludes that his method can give valuable information as to the comparative function of the two kidneys. In interpreting results we must compare the concentration of diastatic ferment in the specimens of urine collected simultaneously from the two kidneys. If the figures drop very low, the assumption of profound renal lesion is warranted, except in the presence of polyuria. The presence of blood, too, may vitiate the results, since the serum activates the ferment, giving, therefore, higher values to those specimens that contain blood in appreciable quantities. On the whole, Wohlgemuth believes his method to be very simple, convenient and reliable.

20. An Endovesical Method of Operating for Tumors of the Bladder.—Blum describes his instruments and method of treating benign tumors of the bladder and records the results obtained in 52 cases. All work is done either through the single or double Nitze catheterizing cystoscope.

A steel spring (1.8 mm. wide) is wound into a spiral catheter of a calibre of 6 Fr. (Charrière), and serves for the passage of a snare made of aluminium-bronze. The vesical end of the wire snare is attached to the corresponding end of the canula, the free end being manipulated by its external projecting portion. In addition, the armamentarium includes grasping forceps, a hook and a cautery. The latter is somewhat heavier than the other instruments, measuring 7-9 Charrière.

After injecting 4 cubic centimeters of a 5% novocain solution into the urethra, the bladder is filled with 150 cubic centi-

meters of ¾% boric acid solution, the quantity of the filling fluid being made to vary acording to the site and accessibility of the growth.

Having located the tumor, the wire loop is made to encircle it, the steel canula carrier being pressed against the bladder wall. The snare is then drawn tight, the cystoscope removed, and the snare and catheter allowed to remain *in situ* for 24-48 hours. The removal of the snare is then easy, since the tumor becomes rapidly necrotic.

One or two weeks after endovesical avulsion of a papilloma, a circular spot with necrotic deposit is all that remains in evidence. In uncomplicated tumors of moderate size, the technic as given, can be carried out in the office in one sitting, and without the loss of an appreciable amount of blood. If it is difficult to encircle the pedicle, a double catheterizing cystoscope is used carrying a grasping forceps and the snare. After pulling the growth forward with the forceps, the snare is easily passed. Larger tumors may require several seances for complete removal.

Society Proceedings

NEW YORK ACADEMY OF MEDICINE.

Section on Genito-Urinary Surgery.

Stated Meeting, Held November 15, 1911.

A SERIES OF CASES OF GONORRHEAL RHEUMATISM CURED BY SEMINAL VESICULOTOMY

Dr. Eugene Fuller presented several patients on whom he had operated. He regards the operation of seminal vesiculotomy as serious because it requires careful technique. The cases were kept in the hospital about three weeks. Sometimes there was atrophy of the muscles in association with the joint symptoms, and this called for massage, especially in the chronic cases; in the acute cases, however, the repair was very quick if operation was done without any delay. The results as demonstrated by the presentation of the following cases, were very good.

Case 1 was a man who for seven years before operation had to use crutches when up and about. He was 26 years of

age and had his first attack of gonorrhea nine years ago. Since then he had had gonorrhea six times. In 1907 he had a severe attack of gonorrheal rheumatism and was treated for nine months before there was any apparent improvement in his condition. The right shoulder, both hips, one knee and ankle were involved. He could not walk at all. On October 11, 1911, he was operated upon and he feels well to-day. The pains he had before operation left him the day following the operation.

Case 2 was twenty-three years of age, and had his first attack of gonorrhea five years ago, in the early part of May. In the latter part of that month his joints became infected and he entered the City Hospital. The right shoulder and knee, also the wrist of the same side, were involved; the left knee was but slightly affected. On October 21st he was operated upon. Eighteen hours after the operation all the joint pains left him.

Since Dr. Fuller had been doing seminal vesiculotomy he had become very enthusiastic because of his results. Although some cases do get a certain amount of relief after the employment of vaccines, this method is not as reliable as the operation for drainage of the vesicles.

Case 3, a man thirty-four years old, had an attack of gonorrhea fifteen years ago; since then he had six attacks. The left knee and right ankle were very much involved. He could walk with great difficulty. Immediately after the operation the pain left him, and to-day he complains of no pain whatever.

Case 4, a patient twenty-three years of age, had his first attack of gonorrhea three years ago; since then he has had three other attacks. His left knee, ankle and arm were so involved that the slightest touch caused him agony. He was operated on October 28th, was up and around in a few days, and a few days later was able to leave the hospital. At present he has only a little stiffness in the knees.

Case 5 was a patient who had an attack of gonorrhea eight years ago and another attack last May. The joints were very much involved as well as both shoulders. While in the hospital he lost as much as sixty pounds in weight. To-day, after the operation, he was able to be about and to do much work around the hospital. He has been improving right along since the operation.

Case 6 had very severe joint manifestations which were relieved by the operation.

Case 7, a patient operated upon October 18th, had been discharged from the United States Army because he was unable to use his hand at all. In this case Dr. Fuller did not gain as much as he expected from the operation. There was partial anchylosis and it was necessary to break up the adhesions forcibly. Dr. Fuller thought that in two months the patient would be able to do everything necessary in his calling.

Case 8, a patient thirty-five years of age, almost completely bedridden, had to use crutches when he wished to leave his bed. His muscles were so atrophied that it was hard to distinguish the condition from neuritis or progressive muscular atrophy. He was operated on 1-½ years ago, and he has improved gradually since.

Discussion of Dr. Fuller's Presentation

Dr. Schmitter, U. S. A., said that he had some experience with the Fuller operation. In the army many men are discharged because of gonorrheal joints. Only one month ago there were two men about to be discharged from the Army because of disability; one patient had his ankle involved and the other his wrist. Within twenty-four hours after the operation the pains disappeared. The operation saved them for the service.

Dr. Eugene Fuller in closing said that when he first performed this operation, he was often asked what bacteria were found in the seminal vesicles and whether cultures were taken at the time of operation. It should be remembered that the operative wound is three or four inches deep and that it is a very difficult thing to make a smear and get cultures. He therefore gave up attempting to make cultures from the vesicles.

THE MICROCOCCUS CATARRHALIS AS A CAUSE OF INFLAMMATION IN THE GENITO-URINARY TRACT

Dr. Ayres desired to show that the micrococcus catarrhalis, first, is capable of causing a urethritis of more or less severity; second, that if it is not recognized early and treated properly it is a dangerous infection; third, that if handled with proper care it is of slight pathogenicity; fourth, that an urethritis caused by the micrococcus catarrhalis presents an entirely different clinical picture from that of an acute gonorrhea; and fifth, that in the internal genital of the female it is a dangerous infection and not an organism of slight pathogenicity.

Under the first heading Dr. Ayres stated he had seen six

cases of micrococcus catarrhalis during the year and his paper included the detailed history of three.

Under the second, Dr. Ayres recited the history of one case which had been treated as a gonorrhea, who developed prostatitis, seminal vesiculitis, cystitis, epididymitis and pyelitis all because the infection was not recognized early.

Third: — In two of the cases reported, the diagnosis had been made early and the history of the progress of the disease showed the mildness of inflammation under proper treatment.

Fourth: — Dr. Ayres claimed that a micrococcus catarrhalis urethritis always began as a subacute inflammation and differed decidedly clinically from an acute gonococcic urethritis. He further stated that gonorrhea rarely began as a subacute urethritis.

Fifth: — Dr. Ayres reported two cases of pyosalpinx due to the micrococcus catarrhalis. In both cases laparotomy had to be performed and recovery was decidedly tedious.

Dr. Ayres claimed that it was impossible to distinguish the gonococcus from the micrococcus catarrhalis morphologically and showed many smears taken from patients infected with micrococcus catarrhalis which to every appearance were true gonococci. He claimed that the only method of differentiation was by culture, stating that the micrococcus catarrhalis would grow on nutrient agar at room temperature, while the gonococcus would not. He claimed this to be an easy and accurate method of diagnosis, as, in gonorrhea, it was generally admitted that the gonococcus was the only germ to be found in the early stages. A subacute urethritis containing Gram negative diplococci in the pus cells was subjected to this test. If a catarrhalis growth appeared on the median gonococci were absent, but if no growth appeared, the germs found in the discharge were gonococci. Such a test was not sufficient from a medico-legal standpoint.

Dr. Ayres believed that infection could take place both by direct contact and through a hematogenous route. In support of the latter theory he cited the case of one patient who had not had intercourse in over fifteen months; and furthermore both cases of pyosalpinx cited, appeared to be of hematogenous origin.

In regard to treatment, the author had little to say. He suggested that cultures should be made from all cases beginning subacutely and nothing but an antiblenorrhagic be given until the result of the culture was known. If the micrococcus catarrh-

alis was found, the treatment was the proper one and should be continued for a week with no local interference. If at the end of a week there was still a discharge, some very mild astringent should be used.

Dr. Ayres warned against making a diagnosis of micrococus catarrhalis infection simply because the urethritis began as a subacute or chronic inflammation. Gonorrhea is decidedly too serious an infection to be excluded without thorough investigation.

Of the first eighteen cases tested by culture at the Post-Graduate Dispensary, fifteen contained Gram negative diplococci in the pus cells. Of these fifteen one proved to be an infection due to the micrococcus catarrhalis. The author thought that the proportion of cases of micrococcus catarrhalis infection to that of gonococcic infection would run fully as high when a sufficient number of cases had been studied.

Discussion of Dr. Ayres' Paper

Dr. Schmitter, U. S. A., said that he had been working on the gonococcus for about two years and had cultivated the micrococcus catarrhalis several times. He believed that this diplococcus could become Gram-positive in the agar cultures. He thought that the extra-cellular forms were more likely to be micrococcus catarrhalis, the organisms varying also in their morphology, being much larger in recent cultures; smaller, and at times Gram-positive, in old cultures.

Dr. Eugene Fuller said he was very much interested in the paper just read by Dr. Ayres because it tended to show that we must be careful in diagnosticating gonorrhea. Several years ago Dr. Fuller read a paper entitled: "Is the determination of the gonococcus as simple a matter as was commonly supposed?" It seemed that every medical student was absolutely confident of his ability to recognize gonococci. Medical men and even bacteriologists are a little more conservative today than they were years ago. Personally he did not think that the statement made by Dr. Sondern was entirely correct. Dr. Sondern spoke of there being an error of about five per cent. (5%); Dr. Fuller thought that twenty per cent. (20%) of error would be nearer correct.

Dr. Leo Buerger said that it was exceedingly interesting to note that the micrococcus catarrhalis occurred in such a large

number of cases of non-specific urethritis; for, although he had not been wont to examine the secretion of his urethritis cases by cultural methods in a routine way, he had the impression that the organism in question occurred rather rarely. Indeed, he had found the micrococcus catarrhalis in but one instance during the last five or six years, and in this case it certainly was not the organism responsible for the infection. It must be remembered that there are a great number of bacilli normally in the urethra and that many of these may cause an inflammation. Thus the pseudo-diphtheria bacillus may at times be the cause of urethritis. One should be very careful in drawing conclusions as to the etiology and pathogenicity of an organism found in the secretion from a case, and careful work must be done before we can decide as to whether any particular organism is responsible for the inflammatory process.

Regarding the isolation of the micrococcus catarrhalis, he did not believe that it was sufficient to cultivate the organism in agar tubes in the manner employed by Dr. Ayres, for mixed cultures must necessarily result from the author's technique. It is preferable to employ plates when we wish to make a study of the bacteria present in any given secretion, and in his own work he was accustomed to use Petri plates containing serum agar, upon which the fluid to be examined is streaked so as to bring out isolated colonies. Thus it may very well have happened that in some of Dr. Ayres' series the presence of other organisms, such as staphylococci, may have influenced the findings. Thus, Dr. Buerger had pointed out some seven years ago that pneumococci, when grown in symbiosis with certain bacteria, would take on extraordinary morphological and cultural characteristics. Although he did not doubt the occurrence of the micrococcus catarrhalis in the cases reported, he wished to call attention to the fact that in future corroborative work a more careful bacteriological method ought to be employed.

Dr. Frederic E. Sondern said he was much interested in the paper just read by Dr. Ayres, as he thought the expressed views may change opinion on the value of the ordinary determination of gonococci in spreads by their appearance. It has generally been believed that a Gram negative, chiefly intracellular, diplococcus found in spreads of a urethral discharge is the gonococcus, admitting 5% error in medicolegal practice. The micrococcus catarrhalis, while Gram negative, has usually been found

somewhat larger than the gonococcus and chiefly extracellular. In the specimens containing the micrococcus catarrhalis he had examined through the kindness of Dr. Ayres, it was, however, not possible to state that these organisms were not gonococci. Dr. Ayres' statement that a micrococcus catarrhalis infection is found once to about every fifteen cases of gonococcus infection, may possibly contain the 5% error admitted in the diagnosis of gonococci without culture. In event of a question concerning the differential diagnosis in these infections, cultures are certainly necessary, and in this connection it is well to remember that a growth of gonococci is not invariably obtained even on suitable media, particularly in chronic cases.

Dr. V. C. Pedersen said he had not had any personal experience with the micrococcus catarrhalis in the genito-urinary tract, but he had with another organism, the streptococcus brevis. The patient in question was a physician who contracted gonorrhea twenty-two years previously, and both elbows and ankles became involved. Every winter he had exacerbations of the trouble. A specimen was secured from his urethra and a microscopic diagnosis of gonococcus was made. He was given stock vaccines with benefit. He received many millions of dead gonococci in a period covering several months. Then without any known cause the knees, too, became attacked. A specimen was sent to a laboratory where a diagnosis of gonococcus was made by cultural means. Upon further examination, the diagnosis was changed to streptococcus brevis. Autogenous vaccines were then administered for three months. To-day the doctor is able to go about his professional work and able to crank his automobile.

Dr. Winfield Ayres, in closing the discussion, said that he had also observed old cultures of the micrococcus catarrhalis that were Gram-positive. In his work he had aimed at obtaining a reliable method that could be used in office practice, something that would be simple and which would entail the using of nothing more than tubes of nutrient agar. In some of his cases the diagnosis was corroborated by Dr. Sondern.

Infection of the Urinary Tract by the Bacillus Lactis Aerogenes.—*J. A. Leutscher* (*Bull. of Johns Hopkins Hosp.*), October, 1911. In a comprehensive review of cases of infection of the urinary tract possibly due to the *bacillus lactis aerogenes*,

the author includes two cases of his own where the bacillus was positively identified in culture. In one case, a female 28 years of age was attacked during the second month of pregnancy with urinary symptoms among which frequent micturition, tenesmus and bearing down pain, were the most prominent. The urine was acid containing leucocytes and an occasional red blood cell. Each of two catheterized specimens taken ten days apart showed the *B. lactis aerogenes* in pure culture. The condition persisted for four weeks with a marked tendency to recurrence whenever urotropin was omitted.

The second case, the husband of the above, developed a urethritis accompanied with a watery discharge that contained a few pus cells but no gonococci. The symptoms of an acute cystitis followed, the temperature rising to 103° F. after four days. There was marked prostration, headache and some nausea. Fifteen days after the onset epididymitis developed. The prostate was not enlarged or tender. A bacteriological examination of the urine was made on the ninth and fourteenth day of the disease, and in both the *B. lactis aerogenes* was found in pure culture.

From a study of his own cases and a review of the literature the author concludes as follows:

1. The *B. lactis aerogenes* is a rare cause of cystitis.

2. The great majority of infections (of the bladder) are due indirectly to the introduction of instruments.

3. Infections of the bladder, in cases where no instruments have been introduced, are very frequent in women and rare in men.

4. In infections of the bladder in women, without a history of the introduction of the instruments, the route of infection is usually an ascending one and due to the direct invasion of the bacteria from the urethra.

5. Such direct invasion of the bladder also occurs in the male, and probably much more frequently than is usually supposed.

6. The introduction of a catheter or instrument into the bladder is a very serious procedure, since it may produce a pyuria if the local conditions are favorable, or a bacteriuria which later may be converted into a pyuria when the local conditions become favorable.

Pyeloradiography after Dilatation with Oxygen.—A V. Lichtenberg and H. Dietlen (*Muench. Med. Wochenschr.*, June 20, 1911). Improvements in our methods of the diagnosis of renal and ureteral calculi are still to be sought since even X-ray examination fails to show a shadow in at least 2-3 per cent. of the cases. Furthermore, even the localization of renal stones as to their position in the pelvis or calices is of no little importance in aiding the surgeon towards a rapid decision of the method of approach. In this regard, the method of collargol injection has been of but scant assistance, and the authors, therefore, investigated the utility of oxygen for the purpose of intensifying the relative density of structures in the renal pelvis and ureter. Three cases were studied, two of which were negative. In one case in which there was a large coral-like branching calculus in the renal pelvis, the plasticity of the radiographic picture was greatly enhanced by the injection of oxygen, the stone shadow being more intense, the empty portions of the pelvis showing as clear areas.

The following technic is suggested. A ureteral catheter (No. 5-6 French) having been placed in the renal pelvis, an oxygen apparatus, in which the pressure is low, is attached and the gas allowed to flow for 2 or 3 minutes, after which the picture is taken, the current of oxygen continuing. When the procedure is properly carried out, the authors believe the method to be safe and of distinct value in the recognition of calculi.

Local Anaesthesia for Renal Operations.—A. Läwen (*Muench. Med. Wochenschr.*, June 27, 1911). Läwen recommends the following procedure where the kidney is to be attacked under a local anæsthetic. Four points are selected, each about an inch above the crest of the ilium and equidistant from each other. After directing the needle towards the bone, withdrawing it 1-2 centimeters and pointing it upward, 20 cubic centimeters of a 0.5% novocain solution are injected at each of these sites. Similarly four other points are taken, each 4 centimeters from the mid-line of the back and corresponding to the 12th dorsal and 1st, 2d and 3d lumbar nerves. Here 10 cubic centimeters of a 1% novocain solution are injected. Finally the line of incision is infiltrated and after fifteen minutes the kidney may be exposed without causing the slightest pain.

VOL. VII JANUARY, 1911 NO. 1

The American Journal of Urology

DEVOTED TO

Genito-Urinary and Venereal Diseases

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OF NEW YORK

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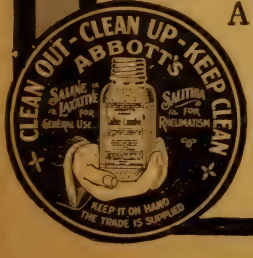

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