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Clinical Observations on Endoscopy of the Male Urethra.

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CLINICAL OBSERVATIONS ON ENDOSCOPY OF THE MALE URETHRA.*

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While it is considered a triumph in every branch of medicine and surgery to bring the intricacies of disease and its pathological appearances nearer to the eye by mechanical means, it seems strange that the direct ocular examination of the interior of the male urethra by the endoscope has up to the present time met with so little favor from the profession. While it is nearly universally conceded that the methods commonly employed for the treatment of the chronic affections of the urethra still remain unreliable and unsatisfactory in a good many cases, yet the endoscope is resorted to by but few, as by far the greater part of the profession either ignore its existence obstinately, deny its efficacy, or even consider and denounce it as dangerous. Nearly every author on the subject has had reason to complain of this apathy or antipathy, and various reasons have been adduced for this experience. Perhaps the patrons of the endoscope themselves are partly to blame, because some,

* Read before the physicians of the German Hospital and Dispensary of New York, April 9, 1886.

no doubt, were too enthusiastic about its value, and promised easy and quick success where, in reality, good results can be attained only by long and patient work. Others, again, were too hasty in presenting as a complete system what really consisted only of valuable fragments of pathological and therapeutical knowledge. It seems to me that the period has not yet passed wherein the single worker with the endoscope can best promote the acknowledgment of the diagnostic and therapeutical value of that instrument by plain and faithful reports of his experience, even though some of his observations, and the interpretations thereof, should prove erroneous. Errors often tend to bring out the truth, mistakes of one explorer may lead the other into the right direction, and good results, obtained in even a small number of cases, may encourage others to enter this field of arduous labor with still better success.

As soon as I found myself more frequently confronted in practice with cases of chronic gonorrhœa in which injections, internal medicines, and sounds had been tried sufficiently without any notable effect, I felt the desire to look into the urethra for the purpose of ascertaining the cause of the persistent discharge. At that time nearly all publications on the subject referred to the endoscope of Désormeaux, who, in 1855, had presented his instrument to the Académie de médecine, and in 1865 had published his book on the same. Although it can not be denied that excellent results had been obtained with Désormeaux's instrument, even its admirers conceded that it was rather cumbersome and too complicated for use in general practice. Couriard and Ebermann, in St. Petersburg, as early as 1865, had employed less complicated instruments—viz., the laryngeal mirror and separate tubes; but little attention had been paid to their observations. But when, during and after 1874, Gruenfeld and several other Vienna authors began to

communicate their experience with still less complicated instruments and methods of examination, the possibility of exploring the interior of the urethra satisfactorily seemed to be within reach, and I at once set to work as soon as I could get the necessary instruments. After repeated fruitless efforts, I gradually began to be more and more successful, so that in 1880 I was able to detect a group of polypous growths in the membranous urethra, and to remove the same by means of an instrument which was described in a paper published in the New York "Medical Record" in August, 1881. Unfortunately, I have kept but scanty notes of my early cases; but since 1882 I have kept a record of nearly all of my patients. From these notes I have taken (without selecting) one hundred cases of chronic disease of the male urethra, brought to a close by January, 1886, in which the endoscope had been employed, to form the material on which this paper is based.

The mechanical apparatus which I have made use of deserves to be described first. A good light is one of the principal conditions of a successful examination by the endoscope. At first I used a common portable gas-lamp, with an Argand burner, but soon found its light deficient in intensity and in color. Next I tried the direct sunlight, caught and reflected by a plain mirror attached to the frontal elastic bandage. It afforded the most excellent illumination even of the deeper parts, so as to permit of observing the natural color of the mucous membrane. In fact, I believe that some details, particularly finer vascular changes during the formation of new capillary blood-vessels, for instance, can hardly be recognized by any other light. Its main drawback, however, is that it can not be had at all times, especially during winter-time, so as to occasionally necessitate a delay of the examinations for a whole week; while the heat in summer makes its application very trying,

not to forget passing clouds obstructing the view, and thus extending the examination over an unduly long time. Diffused daylight I did not find of sufficient intensity, and white clouds, which afford a strong enough light, are not always at hand when desired. Finally, through the kindness of Dr. F. Zinsser, I came into possession of a Vienna kerosene-lamp of peculiar construction, having twelve solid wicks of the caliber of a pencil circularly arranged around a carbon plate, which deflects the flame somewhat outwardly. It affords a slightly yellow, but brilliant, steady, and reliable light, is always ready for use, and has been found to answer all general purposes during constant use for several years. A common laryngeal mirror attached to the frontal bandage is used as a reflector.

As no suitable endoscopic tubes, similar to those of the Vienna author's, could then be found in the New York market, I sought the aid of Mr. F. Eissner, of No. 18 Third Avenue, to whom I am greatly indebted for the intelligent execution of my wishes and for valuable suggestions. Intent on having an instrument as plain and simple as possible, after several experiments we agreed upon an endoscopic tube which now has been used constantly by me for several years, and which, I understand, has been found useful and convenient in the hands of several other gentlemen of the profession. It represents a modification, or rather a simplification, of the straight, simple endoscopes of Gruenfeld (Fig. 1 of the adjoining cuts) and Steurer (Fig. 2), being more similar to the one described by the latter (in the "Vierteljahresschrift f. Dermatologie u. Syphilis," 1876, 3), and consists of a straight tube, with rectangularly cut ends, and a disc attached to the ocular end. Fig. 3 shows that I have dispensed with the funnel-shaped part of the ocular end, which has also been considered rather superfluous by Auspitz ("Vierteljahresschrift f. Dermatologie u. Syphilis," 1879, 1),

for, while increasing the distance between the eye of the observer and the object of examination, it offers no advantages by increasing the intensity of the light by deflecting any rays, as only nearly parallel rays can reach the end of a tube eight to thirteen centimetres long. The disc attached by Steurer has been retained, because it serves the purpose of compressing the urethra and the entire penis backward toward the symphysis, and of reducing its entire length to such a degree that, by a tube much shorter than the urethra itself, the latter can be examined in every part under more

FIG. 1.

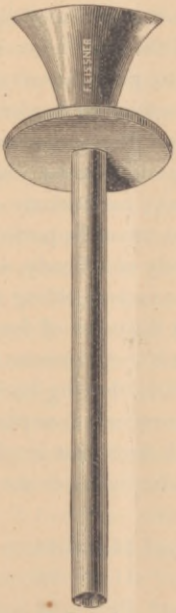

FIG. 2.

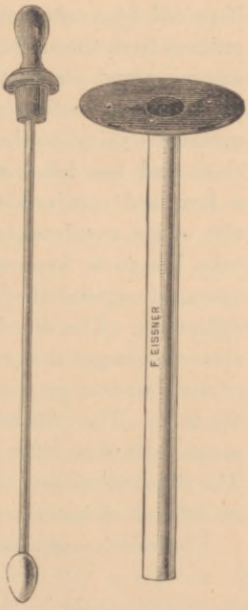

FIG. 3.

favorable circumstances. The tube itself is now made of coin silver in preference to cannules made of brass, German

silver, or hard rubber, because silver can be worked in much thinner tubes, which, in consequence of the wider bore, furnish a wider field of view. Besides, they are much less affected by the chemical action of caustic and astringent substances, which are used for application through the endoscope, and can be kept clean and smoothly polished much easier. Like Auspitz (*l. c.*), "I have been taught by experience that the dissipated reflexes, dreaded so much by others, do not increase in quantity if the inner surface of the tube is always kept clean and smooth, while, on the other side, in blackened tubes the intensity of the light is greatly impaired by a considerable resorption of light-rays." The reflexes from the surface of the disc, however, I found very annoying and obstructive to good observation. This was obviated by riveting an unpolished hard-rubber plate, 1·5 millimetre thick, to the metal disc of Steurer, which, being clean and less liable to be injured by chemicals, insures a firm and comfortable grip, particularly during exploration of the membranous and prostatic portions, wherein the tube has to be kept securely and firmly, and to be moved cautiously against the by no means trifling resistance of the sphincters. The disc has a diameter of four centimetres—somewhat larger than Steurer's—to prevent the overlapping of an abundant prepuce while shoving back the penis over the tube. The obturator, conductor, or plug of my instruments does not differ much from that employed by others. The silver tubes have been furnished to me by Mr. Eissner in different sizes—viz.:

Charrière's scale, No. 27, of	11 and 14	ctm.	length.	
" " " 25, "	11 "	14	"	".
" " " 24, "	11 "	14	"	"
" " " 23, "	8½, 13, 15, and 17	"	"	
" " " 21, "	8½	"	"	
" " " 18, "	8	"	"	

As a rule, it is advisable to use the widest and shortest tube that passes the meatus, as long as the mucous membrane is not distended too much; for the examination of the membranous and prostatic portions, however, it is preferable to be satisfied with a tube of smaller caliber. The anatomical formation of those parts renders them more liable to slight injuries and to hæmorrhage; only in exceptional cases can tubes above 24 Charr. be used with advantage for the deeper parts. By soldering a fine silver ring around the visceral end of the tube and smoothing it off again to a certain degree, the advantage is gained that the edge of the tube, thus strengthened, is not bent or made ragged so easily by injuries, and that the instrument can be introduced entirely or at least for some distance without a conductor, thus affording a more natural and sometimes more valuable inspection. The thickening of the shell of the tube, however, increases the difference between the edge and the bulb of the conductor so much that it makes the introduction more painful, thereby probably outweighing its advantages. The straight, open, rectangularly cut tubes are the only ones I have ever used; therefore I can not judge of the usefulness of other instruments described by Gruenfeld as the straight and curved fenestrated and the laterally fenestrated endoscopes. Graduating the tubes for the purpose of locating the diseased parts of the urethra distinctly is of doubtful value, because the urethra is either intentionally or unintentionally extended or compressed so easily during the examination that it becomes rather uncertain to fix the distance from the meatus in an exact manner.

The instrumentarium is completed by a number of strong galvanized wire rods, one end of which is bent into a ring serving as a handle, the other filed sufficiently rough to hold small pledgets or tampons of surgical cotton for clearing the surface and for the application of medicinal

substances. A small ring-shaped curette on a long wire handle is an instrument of various usefulness.

The best position for the patient during endoscopic examination of the urethra is that of reclining on a strong, plain table, or on a surgical table or chair, the upper part of the body moderately elevated, the buttocks as near as possible to the edge of the seat, the thighs well separated, the feet resting on the round of the chair on which the examiner is seated. By adding the pillow of the lower part of my Marx exploring chair, the seat reaches a height of thirty-three inches from the ground, which enables me to examine the pars pendula as well as the deeper parts without changing my position or kneeling between the lower extremities of the patient, or distorting my neck too much in following the ocular end of the instrument in its movements. The lamp is placed to the right on a small table, which holds the instruments, cotton-holders, and medicines; the tube is held and directed by the left hand, leaving the right one to adjust the light and reach the mucous membrane with the cotton pledgets.

With the aid of such instruments it is not difficult, after some experience, to inspect minutely in every case every spot of the mucous membrane from the orifice to the bulbous part, and in the majority of cases the membranous and prostatic portions as far as the neck of the bladder; there are cases, however, where it is impossible to pass the external sphincter. Of course only a small portion of the lining of the urethra can be seen at a time, but as the tube, on being withdrawn, passes every point of the canal, the mucous membrane comes into view bit by bit. The shape in which the interior of the urethral channel presents itself in the central portion of the tube has been differently compared to a cone or to a funnel; I should rather compare it to a paper filter, because the surface generally shows more or

fewer fine folds converging to the center. The central position of the tube—*i. e.*, the one parallel to the axis of the urethra—is the most favorable one to judge of the general condition of the mucous membrane as well as of the surrounding tissue, as it best reveals the degree of elasticity, softness, and swelling of the parts inspected by the changes in the folds, and the manner of bulging. The surface of the mucous membrane itself, irregularities of the epithelial covering, indentations and recesses in the same, particularly the lacunæ of Morgagni, are better shown by an eccentrical position of the visceral end, wherein the part under examination presents itself perfectly flat and level to the eye. To get a quick summary view of the whole interior lining of the urethra, I prefer to pass the tube in spiral movements either backward from the bulbous part or centripetally, thus gradually spreading the entire surface before the eye. It is not my intention to give a minute description of the appearance of the interior of the urethra, nor to consider the significance of the changes in color, nor of the different reflexes. I refer those who desire information on all the details to Gruenfeld's excellent book, in which a clear and full account of them is given ("Die Endoskopie der Harnröhre und der Blase," by Joseph Gruenfeld, Stuttgart, 1881).

I have never examined a urethra which I had reason to believe was entirely healthy; but I have often observed conditions of the mucous membrane, over its full extent, or over a part only, which, to judge from what we know about the anatomy of the organ and from descriptions given by other observers, I felt justified in assuming as normal. The healthy mucous membrane shows a more or less pale-pink color, quite often with stripes of a lighter shade, and a smooth, glistening surface, giving the appearance of a soft, dull, silk tissue. For practical purposes, naturally, it is more important to study the appearance of the urethra in the state

of disease. Most authors have described the local symptoms of several forms of acute urethritis. Generally they have been classified together with the chronic cases, not to the advantage of clearness in distinguishing the same, I believe. I have never felt justified in using the endoscope in a case of acute inflammation, not seeing a necessity for doing so, and because the introduction of the instrument not only is necessarily painful, but may really do harm. By far the greater number of cases in which I have employed the endoscope were those of patients who, without any other inconvenience, pain, or sensation, showed a more or less copious mucous or purulent secretion, visible mostly in the morning only, either persisting for months or reappearing after short intervals of apparent cure on the slightest provocation by drinking or sexual irritation—*i. e.*, cases of gleet or chronic urethritis or gonorrhœa, if such a classification is admissible. Some patients were suffering from stricture without a discharge being noticeable; others complained of the well-known appearance of a grayish drop during defecation or after micturition; finally, there were some who complained only of pain, burning, itching, or pressure in the urethra without the presence of a discharge. Among my 100 patients, in 84, chronic discharge from the urethra was the principal complaint; 8 applied for treatment on account of unpleasant sensations, 4 of whom showed a slight discharge; so that in 88 there existed a chronic secretion, 4 had stricture, and 4 prostatorrhœa. The discharge had lasted for a more or less continued period—in no case less than three months, in some for several years. Nearly all of my patients had been previously under the care of other physicians, a large percentage having been treated with sounds; not a few had been operated upon, mostly "for stricture."

It can be stated in general that endoscopic examinations of such cases soon make the erroneousness of some of the

old doctrines proclaimed and confirmed in text-books, etc., apparent. The first experience is, that the regions pointed out by the patients as spontaneously sensitive or particularly tender to the touch of a bougie à boule, as a rule, show no pathological condition of the mucous membrane (as might be expected), but these localities are even more frequently found in healthy condition. Nor is it found to be true that the posterior parts of the pendulous urethra, the bulbous or membranous portions, are usually or even more frequently affected in chronic urethritis, as has heretofore been maintained, it appears, on the contrary, that in by far the greater number of cases the anterior and central portions are the regions principally affected, that sometimes the two inches nearest to the meatus alone are diseased, and that these very cases may prove the most obstinate ones. Still, on these two doctrines the adversaries of the endoscope have mostly relied, as well as on the supposition that the bulbus was the usual seat of chronic inflammation, and Guyon and his pupils have founded their treatment by "instillations" in the deeper urethra. Among my 100 cases the seat of morbid changes was found to be: the prostatic and membranous portion alone in 5 cases; the prostatic and spongy alone in 2 cases; the prostatic, membranous, and spongy in 22 cases; the membranous and spongy alone in 26 cases; the spongy or pendulous portion alone in 45 cases. There participated at all, the prostatic portion in 29 cases; the membranous portion in 53 cases; the spongy in 95 cases; the bulbous specially in 44 cases.

The pathological conditions themselves, as they appear through the endoscope, are of great variety and show numberless combinations, so that one meets with great difficulty in trying to arrange them systematically into definite groups. They may pertain to abnormities of color, of the smoothness of surface, or of the elasticity and resistance of the tissue of

the mucous membrane and of its surroundings. The color may vary from the natural pale-pink in one direction to the pure, glistening white of a tendon, and in the other to scarlet, to the darkest shades of bluish or brownish red, or into slate-color; these different shades may extend continuously over a large part of the urethra, or may be restricted to single spots of the size of a pea or even smaller, quite often appearing in radiate or longitudinal stripes. In considering the value of changes in the color of the mucous membrane, account has to be taken not only of individual differences, but also of the effects of the introduction of the instrument, of the pressure of the edge of the tube, the touch of a cotton-wound wire, etc., which are apt to effect a temporary, often quite sudden change. However, more permanent discolorations do exist. In one case I found the upper wall of the urethral cavity, to the extent of nearly two inches, of a dark-red color, like raw beef, but perfectly smooth, contrasting strangely with the normal pink of the lower surface, a condition which was observed to decrease in intensity at several subsequent examinations. Sometimes the dull luster of the healthy mucous membrane gives way to a more glistening, satin-like appearance, while the perfect smoothness of the surface is retained.

More distinct features appear in relation to the smoothness of the surface of the mucous membrane. Under favorable conditions of light, a fine network of small capillary blood-vessels can be distinctly observed. In other cases the surface has a more velvety appearance, as if composed of numerous, most closely apposed hairy points with light reflecting from each of them. But more regularly we meet with what has been generally described as the granular condition of the mucous membrane: the dark-red, uneven surface is broken by elevations of the size of a rape or millet-seed, which are placed more or less closely together, leaving

depressions of a deeper, more brownish color between them. According to the size of the granulations, but little of the smoothness of the surface may be lost, or the affected part may look like undressed kid-leather, or like a strawberry. The light is reflected in the shape of distinct points from the granular elevations. This granular appearance of the mucous membrane has been considered by Désormeaux, and by the greater number of authors, as the regular and constant pathological condition in gleet, so as to identify urethritis granulosa and chronic gonorrhœa. Different opinions have been given on the origin of these granular elevations. To bring them in connection with the normal papillæ of the mucous membrane seems hardly justified, as they are observed in portions of the urethra to which the papillary construction does not normally extend. It appears not impossible that the simple mucous glands, which exist all over the urethra, may have something to do with the granular condition.

It has been stated that granulations are found more frequently in certain portions of the urethra, and that they follow certain rules as to the extent of the lesion. It is true I have seen this condition often enough in the bulbous portion, but as well in other parts, from the membranous and prostatic tracts to the fossa navicularis, and here my experience is in accord with Gruenfeld's observations. But I have been struck by the frequency with which I have met with granular patches in connection with dilated and inflamed lacunæ of Morgagni, a fact which I have not found mentioned distinctly by any author. I am inclined to attribute a much greater importance in the pathology of chronic urethritis to these organs than has been done by the other authors on this subject. According to Henle, these recesses or small cavities, visible to the naked eye, are passages which are lined by the mucous membrane and

its epithelium, into which real glands open only in rare instances. From more recent observations by G. Overdieck, however ("Ueber Epithel und Drüsen der Harnblase und weiblichen und männlichen Urethra," Göttingen, 1884), it appears that the lacunæ of Morgagni should be considered as compound glands, which well seem able to take a greater part in the pathological conditions of the urethra. In not fewer than sixty-three among my one hundred cases I found an abnormal condition of the lacunæ of Morgagni, or at least a distinct presence of the same. Sometimes only after the disseminated granular patches of the mucous membrane had been under the influence of local treatment did the lacunæ make their appearance in the center, often as large as a hemp-seed, not seldom partly covered by a semilunar fold of the mucous membrane in the shape of a pocket. The edges now appear rough, as if eroded, now smooth, like elevated walls surrounding the recesses; again they appear as elevated craters resembling the annular mountains (*Ringgebirge*) on the map of the moon. In accord with Henle, I found the lacunæ most frequently along the upper wall and in the folds or corners which are formed on both sides by the upper and lower half of the membranous lining of the urethra in the natural, undistended position; however, they are found often enough on the lower surface. As I have observed in quite a number of cases that while under the proper local treatment the lacunæ of Morgagni gradually changed their appearance by showing smoother and lower edges, and diminishing in deepness, the discharge gradually became less, and finally disappeared, I feel justified in considering these glandular structures as the seat of the inflammation and as the source of the discharge, respectively, of the threads which are found in the urine in decreasing quantities. In a paper on latent urethritis ("Annal. des malad. des organes génito-urinaires," ii, p. 78

et seq.), T. P. Guiard, a pupil of Guyon, comes to the conclusion that the urethral glandular apparatus probably plays an important part in the pathology of urethritis, and that a glandular urethritis really exists. There is no reason, he argues, why the small glands should remain intact while the larger ones, like the epididymis, Cowper's glands, and the prostate, are known to be frequently attacked, and he suspects that the inflammation has extended to the glands whenever a case obstinately resists treatment, particularly by instillations of nitrate of silver, provided a constitutional cause is wanting. And, although he cites Morgagni and Terranéus as having actually observed a diseased condition of the lacunæ, he misses the evident proofs of glandular urethritis. Perhaps he would find his suspicions confirmed if he only would look through the endoscope, but it seems that Désormeaux is entirely forgotten in his own country!

I here must mention that in two cases, which, however, do not appear among my records, but which I remember quite distinctly, I noticed at a distance of about one inch from the entrance into the membranous portion, on moving the tube forward in a centripetal direction, that suddenly a small drop of a white, milky fluid oozed from a minute spot in the upper surface of the urethra. This I could distinctly observe on several examinations at different times and at the very same spot. It is probable, from the locality, that the opening from which the fluid came was the mouth of the duct of one of the glands of Cowper.

Quite a peculiar condition, similar to granular formation, but of some distinct features, was observed in several cases, where the patients complained of a burning pain along the urethra without any discharge. It appeared in the shape of dark, brownish patches of the size of a pea or a bean, the surface of which was dry, slightly eroded, not unlike morocco leather, seated principally in the lateral

folds. Being touched with Lugol's solution, these patches assumed a dark-brown, nearly black color, which made them appear much more distinct, the surrounding portions of the mucous membrane remaining unchanged by the iodine. With the disappearance of the patches under the influence of repeated applications of iodine in the watery solution, the disagreeable sensations of pain and burning gradually gave way.

Nearly unanimously the authors on the endoscope have maintained that granular urethritis is regularly followed by a consecutive infiltration or thickening of the mucous membrane, and that it unavoidably leads to the formation of stricture if left to itself. This I decidedly contradict. It is true that I have observed the symptoms of thickening of the urethral tissue quite often beside a granular surface—*i. e.*, disappearance of the folds and distortion of the reflexes, together with resistance on introduction of the tube—but, on the other hand, I have by no means exceptionally found the mucous membrane showing normal folds, normal reflexes, and not the slightest resistance or bulging-in on withdrawing the tube in the presence of granular patches of undoubtedly long standing. Again, I have seen the mucous membrane perfectly smooth and of a natural pink color, where in circumscribed regions (more frequently in the central portion of the spongy urethra) the urethral wall appeared decidedly infiltrated, bulging in as a rather rigid mass into the lumen of the tube. The same condition of the surface could be observed over other infiltrations, which extended over some distance in the shape of ridges. I found those ridges about two or three inches from the meatus in three patients with naturally very small and narrow urethras, being very rigid and extremely sensitive; the treatment, although finally successful, was tedious and laborious. I therefore conclude that a granular condition

and infiltration of the mucous membrane may exist independently of each other.

There exists still another partial thickening of the mucous membrane in the shape of stripes, now of lighter, now of darker, color than the surrounding parts. Gruenfeld describes them as formations of new layers of epithelium (*Epithelauflagerungen*), but he seems to be somewhat in doubt about their real nature. In some cases the stripes appear as prominent white ridges, and then new formation seems probable, while in other cases they are depressed, so that a shrinkage from cicatrization may be the cause. In several instances I have found the mucous membrane of the entire spongy urethra perfectly smooth, white, and rigid, with sharply defined, small lacunæ, giving the impression of considerable hardening of connective tissue. Rightly, however, Gruenfeld has warned us not to take the endoscopic picture as sufficient evidence of the nature of pathological changes, as it still requires microscopical examination to decide the question. This must be particularly maintained of another pathological phenomenon, which I have not observed myself, but which has been mentioned by several authors as an analogue of the real trachoma of the conjunctiva, where large, corn-like substances, imbedded in the mucous membrane, project over the surface.

Less frequently than with new formation or thickening of tissue I have met with loss of substance. Now and then you encounter portions of the urethra which, deprived of the epithelial layer, show a yellowish, dirty surface similar to superficial defects in the oral cavity; they are extremely sensitive to the touch, and I think they would best be designated as erosions. I found them as the only substantial abnormities in three cases as one of the most obstinate forms of disease. They remind me very much of a peculiar form of urethritis described by Gruenfeld as urethritis her

petica or phlyctænularis; but it seems that such a name would rather indicate an acute, typical disease than a chronic one. In fact, I have twice observed the appearance of circumscribed lesions of substance during chronic urethritis—once as a simple loss of the epithelial cover, presenting a clean, red surface with slightly deeper-colored margin, and again as an irregular, flat ulcer with distinctly yellow ground, which healed without a scar in a comparatively short time under the use of iodoform. These I consider to have been really attacks of herpes. I shall not leave unmentioned the occurrence of several losses of substance which were beyond doubt caused by the sharp edge of the tube while not being handled with sufficient care, but they were found to be healed at the next examination without leaving any signs. I have never observed a real chronic ulceration or a chancre in the urethra, such as have been described by several authors.

Since the case reported in 1881 I have not met with polypi in the urethra, but I have observed in four cases papillary excrescences or vegetations of the deeper portions of the urethra, which, at least in two cases, showed all the characteristic features of the condyloma acuminatum. In the orifice of the urethra, and near to it in the fossa navicularis, they are met with quite frequently, but there are no cases on record, as far as I know, where they extended in greater number for three or four inches backward toward the bulbus. I intend to report these cases more fully in a separate paper, together with a case of angeioma cavernosum of the upper side of the spongy urethra. Once I saw what I should like to call a real surgical granulation of the size of a hempseed in the posterior part of the spongy urethra. It was definitively cured by a single application of nitrate of silver.

Strictures have always been an object of great interest to every one using the endoscope, those of large caliber as

well as the narrow, rigid ones. The existence of the former is easily proved by the endoscope, but it seems open to question whether it is right to call a stricture what really is often only a swelling of transitory nature, not a definite permanent condition. As stated before, I have frequently observed thickening and greater rigidity of the urethral walls with or without granular condition of the mucous membrane, which, on examination by the bougie à boule, produced the very same signs on the presence of which the diagnosis of strictures of large caliber is founded. In several cases I have watched these swellings from their very beginning, have noticed their steady growth from the time of one examination to that of the next, so as to necessitate the subsequent use of smaller-sized tubes; but I could just as well watch their gradual disappearance under proper treatment and their return to normal conditions. I do not mean to deny, however, but rather to confirm by other observations, that such temporary swellings may become permanent indurations, and finally real strictures.

The appearance of chronic cicatricial strictures through the endoscope is very interesting and of great variety. I can not give a better general description of the same than that given by Fuerstenheim ("Berl. klin. Woch.," 1870, p. 532). "The configuration of strictures is quite variable; it is either—unfortunately, but very rarely, in old and indurated strictures—funnel-shaped, the narrow part directed toward the bladder, easily allowing a sound to enter, or they come into view as an obstructing surface with a small, wart-like prominence in the center, or as a rough, uneven mass with many small prominent points, among which it is very difficult to find the entrance into the stricture. Sometimes between the wart-like elevations small islands of natural but red mucous membrane remain intact. On proceeding to withdraw the tube, the elastic normal mucous membrane can

be noticed to close up like a curtain around the immovable, rigid face of the stricture. The point of a probe does not cause an impression, but moves the whole mass before it." A similar description has been given by Cruise, of Dublin ("Dublin Quart. Jour.," May, 1865). In several instances where, on examination by bougies, the diagnosis of stricture had been made, endoscopic inspection showed no trace of a narrowed channel; in one case evidently a very dilated lacuna of Morgagni had invariably caught the point or the olive of the bougie and prevented its farther introduction, thus simulating stricture. In other cases where the endoscopic tube was arrested at a certain point during introduction, nothing but an erosion or a highly inflamed patch of lacunæ was detected, which probably had caused reflex contraction of the urethral muscles. It was not unusual to easily pass the tube (often even without an obturator) through a portion of the urethra which was supposed to be strictured. Even the membranous portion sometimes allowed the passage of the endoscopic tube, when sounds and bougies had met with insuperable spasm. The prostatic portion of the urethra can be inspected in most cases, and the colliculus seminalis with the caput gallinaginis easily be made out, unless the discharge of blood, which may take place quite easily, obstructs the view. In several instances I could distinctly see an oblong fissure on the height of the colliculus, which I had to take for the entrance to the utriculus masculinus. I could never clearly trace the openings of the seminal ducts nor of the ducts of the prostatic glands, although the location of the same was clearly indicated by the sudden appearance of a non-bloody fluid in the grooves adjoining the colliculus. The difference in the appearance of the living organ from that found post mortem is nowhere so conspicuously prominent as in the prostatic urethra. It has already been stated that the granular

condition is not unusual in the prostatic portion. In other cases where impotence and nervous disorders were complained of I could notice conditions of the colliculus and of the caput gallinaginis which probably were pathological, but I do not feel justified in drawing any conclusions on the strength of my observations. For I believe that in the configuration of this extremely complicated region there reigns a great individual variety, not less distinct than, for instance, in the configuration of the nose. Now the colliculus appears like a flat, broad, ribbon-like eminence, and again the caput is elongated forward into a fine point reaching near to the bulbus, or beginning abruptly like a promontory; or the colliculus comes into view like a tumor, easily to be mistaken for a polypous growth, etc. Besides, the erectile nature of some of these parts has to be considered. As long as we have not a more exact knowledge about the limits of normal individuality, it seems premature to speak so decidedly of hypertrophy of the colliculus, etc., as Gruenfeld does. I must acknowledge, however, that Gruenfeld openly avows that he often found a normal appearance of the prostatic urethra, where, from the symptoms present, he expected to find pathological conditions. In cases where epididymitis had preceded, I have been astonished to but seldom find signs of inflammation in the recesses next to the colliculus, while in the majority of cases nothing indicated a diseased condition of the mucous membrane surrounding the entrance of the seminal ducts. I have no doubt that by and by we shall gain more distinct knowledge of the normal and pathological conditions of the prostatic urethra.

It is a great advantage of the straight, open endoscopical tube over all more complicated instruments of the kind that it allows the immediate application of medicinal substances, or of surgical manipulations, to any part of the mucous membrane found diseased. The medicinal applications are

made on the same general principles as upon other mucous membranes of the human body. All observers agree to have been astonished to find the mucous membrane, particularly the deeper part of the urethra, so tolerant against the direct applications of the stronger astringents, and even of caustics, considering the extreme sensitiveness of the same parts against much milder solutions, as, for instance, of nitrate of silver or of the bichloride of mercury, if used as injections with the ordinary urethral syringe. Cotton pledgets attached to wire rods are used by me exclusively in preference to brushes. They are always fresh and clean, are easily replaced, and give absolute security that no other spot is touched than the one intended, as its effects are only communicated to the mucous membrane by actual contact. The solutions which I use most frequently are: Nitrate of silver at 2½, 5, 10, 20, and 50 per cent.; sulphate of copper, 3, 10, and 30 per cent.; bichloride of mercury, 1 per cent.; tannin, 10 per cent., in equal parts of glycerin and alcohol; liquor plumbi acetici; liquor ferri sesquichlorati, with equal parts of glycerin; chromic acid, 10 and 50 per cent.; tincture of iodine; Lugol's solution of iodine (iodine 1, iodide of potash 2, water 12 parts); carbolized iodine (equal parts of Lugol's solution and pure carbolic acid); iodoform powdered, and in a saturated solution in ether; besides nitrate of silver and sulphate of copper in substance. It is impossible from present experience to state definitely under which conditions the one or the other remedy, the one or the other solution of the same substance, is to be preferred. I must own that I have acted altogether empirically, finding great individual differences as to sensitiveness and effectiveness. In general, the solutions of nitrate of silver and sulphate of copper must be considered the most useful remedies, the latter principally where the lacunæ of Morgagni are the obvious seat of the disease. The strongest solutions

of silver, chromic acid, and copper, and the crystals of these salts, were applied only for the destruction of such papillary excrescences as could not be removed by the polypi guillotine or by the ring-shaped écraseur. Examinations and applications were made at intervals of from three to seven days, according to the conditions of the urethra and to the strength of the remedy applied, and a subsequent change in the condition of the diseased portions could be nearly always observed. Generally the immediate effect is an increased flow from the urethra for twenty-four to thirty-six hours, after which time the discharge begins to diminish spontaneously to its former or even a diminished quantity. Sometimes the urethra becomes perfectly dry for about twenty-four hours, to be followed temporarily by more copious discharge. At subsequent examinations the mucous membrane appears less red, of smoother surface, the granulations less distinct, the lacunæ less excavated, with sharply defined edges and not as moist as before, until gradually the whole appearance becomes more and more of the normal color and smoothness. Injections are generally continued at first twice a day, but, after some improvement has set in, are omitted altogether. In only a small number of cases internal medicines were administered; in the greater number sole reliance was placed on the local treatment. The number of applications and the time over which the treatment was extended differ very much, depending often on the regularity with which the patients were able to attend; in one case a single application effected a cure; in general, the applications varied from two to twenty-five in number, distributed over several weeks to several months. To close the treatment by the introduction of large steel sounds was sometimes found beneficial. I have never been able to understand why moderate smoking should be detrimental to the urethra, nor have I found good reasons given by any

author why smoking ought to be forbidden to patients suffering from chronic gonorrhœa; therefore I have allowed the moderate use of tobacco to my patients. While I consider the stronger alcoholic liquors positively injurious, I have not interdicted the moderate use of wine, particularly light claret, or of good, well-fermented beer, to those patients who were addicted to their use; and those who were sure to resume this habit as soon as they would consider themselves cured were rather encouraged to return to their usual way of living before the treatment was closed. Experience has shown to me that the results in such cases were not different from those where the patients had never been used to take any alcoholic drinks whatever, or were abstaining during treatment.

New growths like polypi or vegetations require removal by surgical means or by strong caustics. Gruenfeld has constructed quite a number of instruments for this purpose. I have found the instrument described by me in 1881 for the removal of polypi quite satisfactory in all cases where the vegetations were large enough or not too remote from the meatus; the ring-shaped curette mentioned before was sometimes used to advantage in the anterior parts of the urethra. Vegetations or condylomata acuminata are just as obstinate, or even more so, to return after removal by cutting or burning when they make their appearance within the urethra than outside; but I finally succeeded in all the cases in thoroughly and permanently eradicating the same.

In cases of stricture the endoscope may prove useful in various ways. In a few cases of so-called impermeable stricture which were treated in the German Hospital, after several unsuccessful trials to enter or pass even the finest instruments, I succeeded in discovering the entrance of the stricture, in the shape of a narrow recess eccentrically lo-

cated among several hard prominences, and in introducing a filiform whalebone bougie through the stricture to the bladder. Once entrance gained, one of Gouley's tunneled sounds was passed over the whalebone, and thus the path was opened for successful further dilatation, so that within a few weeks I was able to inspect the entire length of the urethra as far as the prostatic portion through a tube No. 23 Charr., and found a smooth, still somewhat rigid, mucous membrane throughout the former seat of stricture. In other cases, which bled on being touched only by bougies or sounds of any caliber, so that even the smallest numbers could not be passed or entered, endoscopic examination revealed the presence of small patches of sound mucous membrane among cicatrized and granulating tissue. Here I introduced steel sounds No. 16 to 18 Charr., and gradually forced them forward through the stricture, being able to make absolutely certain that the sound kept within the normal urethral channel and avoided false passages. In this way I gradually pushed on until the instrument reached the bladder; afterward further dilatation to Nos. 23 and 24 proved quite easy and free of danger. In this way I cured a stricture which for fourteen years had baffled all attempts to pass an instrument. Its deep location, extending through the entire membranous portion into the immediate neighborhood of the bladder itself, would have rendered any urethrotomy, either external or internal, a very precarious proceeding.

In every case of stricture the positive acquaintance with the configuration of the impediment to the free passage of the urine or to the introduction of a bougie which can be obtained by endoscopic examination will prove of great value to correctly judge which course of treatment ought to be taken. The obstruction of the urethral channel may extend to the entire circumference of the urethra, or it may

be situated in the upper or lower or in the lateral portions of the urethral tissue. Internal urethrotomy, and, to a certain degree, even external urethrotomy, are executed more or less blindly; in the internal operation the cutting is done either upward or downward, and therefore may divide perfectly healthy parts and leave the real obstructing mass untouched if situated laterally. External urethrotomy may leave the indurated upper wall intact while opening a way through the normal floor of the urethra. If a stricture has to be operated upon, the ideal way would undoubtedly be to operate under the eye through the endoscope. That this can be done has been shown by Gruenfeld. I have no experience of my own so far, but I shall certainly try to follow the example of Gruenfeld as soon as I find an occasion, and I have no doubt that, sooner or later, ways and means will be found to make urethrotomy no longer an uncertain procedure. Undoubtedly electrolysis of stricture, too, could be applied more effectively if performed after careful inspection of the obstruction.

As to strictures of large caliber, I have previously stated that they often can be cured by applications of strong solutions of nitrate of silver, tincture of iodine, etc., and do not always require surgical interference. In two instances I observed that I had involuntarily performed divulsion of a circumscribed swelling of the mucous membrane by passing a somewhat large endoscopic tube, leaving a slightly bleeding longitudinal fissure passing through the center. It healed quickly under application of powdered iodoform, leaving no trace of the wound nor of the swelling. This experience seems to prove, indeed, that such "strictures" can be cured by cutting, or rather by scarification, the limit of which such an operation ought not to surpass. If surgeons would only take the trouble to look at the strictures before they begin to operate, I have no doubt many an op-

eration would be done more cautiously or would be left undone, and not to the detriment of the patients. To show how lightly and indiscriminately this cutting is done at present, I shall cite a passage from a paper published but recently ("Medical Record," May 8, 1886, p. 524), in which the author, speaking of an obstinate case, says: "In three weeks the discharge had dwindled down to a watery condition, which remained in spite of all I could do. After trying all known means, *I was compelled to cut him.* He stood the operation badly and made a slow recovery, but in two months the wound had healed and the discharge had entirely dried up." Here is not even a pretense of a stricture; it is not mentioned where or what was cut, but "the patient was cut" simply because he could not be cured of his discharge by all known means (including the endoscope?). If only surgeons would take pains to inspect the results of their work some time after operation, they would undoubtedly be less reckless and less quick to cut. If they could see such deep, furrow-like, inelastic scars, extending through the mucous membrane into the corpus cavernosum for an inch or more in length, as I have met with in several instances, they would understand, on but little reflection, that the interruption of the continuity of an elastic tube by such rigid masses can not be irrelevant, but that it must act as an obstruction or as a contraction whenever the urethral channel is extended by the physiological actions of micturition, erection, and emission of semen. It is certainly not to be wondered at, if constant traction and retraction of healthy parts by such a scar cause local as well as reflex irritation.

It is a somewhat delicate matter to speak of the final results of the endoscopic treatment of chronic urethral discharge, and it was not without some apprehension of self-delusion that I approached my records for a summary of the

same. I was agreeably surprised, however, to find a more favorable state than I had expected myself, even after eliminating all cases of doubtful cure, and being as sincere and strict as possible in stating a case as cured. Among the 88 cases in which a chronic discharge from the urethra had been present, 42 were positively cured—*i. e.*, in 42 cases I have positive evidence that the patients were free from any discharge for at least two months after the treatment had been stopped, and after they had followed their usual mode of living without restraint, except avoiding excesses *in Baccho et Venere*. Eleven were apparently cured when last seen, but, being without any later information about their condition, I have not felt justified in stating them as certain cures, but have preferred to put them into a separate class. In 8 cases the discharge was not entirely removed until after some other treatment had been substituted; it remains doubtful how much the endoscopic treatment had really contributed to the final result. That it was not without good effect appears from the fact that the same treatment that led to a final cure had been ineffectually employed before the local treatment had been resorted to. It can therefore be fairly maintained that in 61 cases out of 88 the effect was favorable. There were, further, 16 cases in which the endoscopical treatment was not continued sufficiently long, or where really only one or two examinations were made, while in some others improvement had been achieved, when for some reason or other treatment was discontinued. This leaves 11 cases in which either permanent advantages could not be obtained in spite of a sufficiently extended treatment, or even adverse symptoms appeared after the application, which rendered it advisable to discontinue the method. I am unable to give any reasons for this experience. In general, no evil consequences could be observed to follow the endoscopic treatment except some pain

within the first twenty-four hours after the applications, and an increase of the discharge for the same period. Epididymitis, cystitis, and adenitis, which may complicate chronic urethritis during any treatment, either with or without instruments, have been met with, but certainly not more frequently than during the use of steel sounds, injections, etc. Except for these complications, my patients were always able to attend to their business.

It remains to briefly consider what claims the endoscopic treatment can make upon the attention and recognition of the profession. I do not mean to put too much weight on the cases of new growths within the urethra, which can not be recognized or treated by any other method. I shall not repeat what I have stated before about the importance of endoscopic examination of strictures. The nearest and the most important field for the endoscope will always be chronic gonorrhœa. Those who consider a chronic discharge from the urethra a trifle will not think of taking the trouble to apply the endoscope, nor those who are not ashamed to treat a patient with the largest possible steel sounds without affecting the slightest change for months or years, or, in fact, as long as the patient does not give it up in disgust himself. But he who has ever understood what this miserable drop of discharge in the morning really is to the patient—how it destroys all enjoyment of life, embitters every pleasure, how it estranges him to the society of his friends, that it can make a man crazy and drive him even to self-destruction—will gladly welcome any means that enable him to make one step nearer to the successful treatment of that terrible disease. If Reginald Harrison is not universally condemned for performing external urethrotomy and drainage of the bladder in a number of cases for the sole purpose of curing a chronic urethral discharge, certainly the use of the endoscope ought not to be consid-

ered audacious or superfluous any longer. While it is neither infallible nor the only method by which good results can be obtained, it undoubtedly has very often proved beneficial where other means have failed, and will continue to do so in still higher degree the more its use is developed. Like laryngoscopy, rhinoscopy, ophthalmoscopy, etc., the endoscopy of the urethra has a rightful claim to be called one of the scientific methods of diagnosis and therapeutics.

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