

Original Articles.

CLINICAL NOTES OF PSORIASIS.¹

BY F. B. GREENOUGH, M.D.

It is with no expectation of throwing any new light on so well-known and not uncommon a disease as psoriasis, that I venture to occupy the time of the meeting. The fact, however, of having had the opportunity of seeing quite a number of cases of this disease, 394, and of having endeavored to obtain such records of them as were obtainable, seemed to me to furnish data for some statistics, which might be of value, if for nothing else, with regard to the questions of sex, age, date of first appearance of the disease, evidence, either positive or negative, as to the history of an hereditary influence, etc.

Apart from the mere statistical information that can be obtained from these records, I have been much interested in seeing how far the cases seen conform to the description of the disease as given by the recognized authorities. In any large number of cases some anomalous ones must occur, and these are the ones that are more especially interesting from a diagnostic point of view. Inasmuch as the majority of the patients seen have been out-patients at the Boston Dispensary, the records necessarily cannot be anywhere near as complete, as they would be in the case-book of one's private practice. In fact, with the exception of the entry made at the time of the first visit, which gives the sex, age, the date of the first appearance of the disease, if any apparently reliable testimony on that point can be obtained, and also any hereditary influence or known absence of it, the data as to appearance, progress, and termination of the cases are entirely a matter of recollection.

These 394 cases of psoriasis occurred in a number of about 15,000 patients seen seeking advice for cutaneous disease. That is to say, the cases of psoriasis observed, were a little over two and one-half per cent of the cases of general skin disease seen. This is a larger proportion of frequency than usual: Hebra's statistics give the ratio of psoriasis to general disorders of the cutis, as one in sixty, or one and two-thirds per cent. Of these 394 cases, 205 patients were males, and 188 females. This gives a slight excess in favor of the male sex. With regard to the age of the cases when first seen, twenty-one were under ten years old. Four were four; one was five; five were six; two were seven; six were eight; and four were nine; in all twenty-one. Thirty-three were from ten to fifteen; forty-seven were from fifteen to twenty; one hundred and twenty-nine were from twenty to thirty; seventy-two were from thirty to forty; forty-two were from forty to fifty, and there were fifty cases that were fifty years of age and over; in all, three hundred and ninety-four. Forty-four cases when first seen gave decided testimony, or it was given for them, that they had not had any previous manifestation of the disease. Seven of these were under ten: that is, two were four; two were six; one was eight; and two were nine; five were from ten to fifteen; six from fifteen to twenty; fourteen from twenty to thirty; six from thirty to forty; five from forty to fifty, and one over fifty.

In one hundred and seven cases the age at which they were first attacked by the disease, was reported in

a way to warrant accepting it as probably correct. They were as follows: under ten there were thirteen; that is, one was three; two were four; two were five; one was six; three were seven; four were eight: in all thirteen. From ten to fifteen there were thirty; from fifteen to twenty there were fifteen; from twenty to thirty there were twenty-six; from thirty to forty there were thirteen; from forty to fifty there were five; and over fifty there were five, which five cases were respectively fifty, fifty, fifty-two, sixty and sixty-seven.

Taking these one hundred and fifty-one cases, (forty-four seen and one hundred and seven reported) where the date of the patient's age when first affected by psoriasis could be got, we have: number of cases, 151; under ten there were twenty; from ten to fifteen there were thirty-five; from fifteen to twenty there were twenty-one; from twenty to thirty there were forty: making ninety-six; from thirty to forty there were nineteen; from forty to fifty there were ten; over fifty there were six; in all, one hundred and fifty-one.

It will be noticed that out of these 151 cases, ninety-six were first affected with psoriasis between the ages of ten and forty, which is what we should expect: that is to say, that a large proportion of the whole number should come between those ages, but twenty cases out of 151, occurring in individuals under ten years of age is certainly contrary to the teaching of the books, and that there should be six cases who were attacked by the disease for the first time, after passing their fiftieth year, is still more extraordinary. In ninety-seven cases I was able to get what seemed to me to be sufficient evidence as to the existence, or the reverse, of an hereditary influence. I have only taken those where the intelligence of the patients and the circumstances of their lives made it seem probable that their testimony on the subject was reliable. In thirty-one cases I got a history of the probable existence of psoriasis in some immediate member of the family, and in sixty-six cases there was a denial of any such disease, from individuals who had lived at home, or would be likely to have known if any of their near relations had been afflicted in the same way that they were. The fact that very nearly one-third of the number of patients from whom any definite evidence on the subject could be obtained, gave an account of the disease having manifested itself in their family circle, would tend to show that hereditary influence played more of a rôle in the causation of psoriasis than is generally thought. It is true that thirty-one cases out of three hundred and ninety-four is not a large proportion, but on the other hand it must be remembered that the great majority of these cases, being seen as out-patients in a public service, belong to a class in which family ties are not long kept up, and many of them being of foreign birth, know little or nothing about their family. In fact in only ninety-seven instances could any information which seemed reliable, be obtained, and of these, very nearly a third reported the existence of an hereditary influence. The term hereditary influence is used in its broadest sense, as I have included under it the cases where the disease was reported as having been known to exist in uncles, aunts, brothers and sisters, and in some cases in progeny. Perhaps a family tendency to the disease would be a more strictly appropriate term.

With regard to the general health of these cases, I should say that on the whole, Hebra's statement that

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the subjects of psoriasis are apt to be strong, robust and hearty, holds good; perhaps to a lesser extent in the female than in the male sex. Whether this difference between the sexes is any greater than can be explained by the fact that the women of the lower and middle classes, are as a rule, less robust than their laboring, outdoor-working husbands, I cannot say. I remember few of these cases of psoriasis that showed great general debility and poor condition, whereas, on the other hand, quite a large proportion of them exhibited every evidence of robust and blooming health, having large muscles, and being rosy, perhaps with a tendency to rather more adipose tissue than is consistent with our idea of perfect condition.

The conventional type of the butcher, or market-stall man, represents very well the physical condition of quite a number of them. In many others, however, the general health was neither markedly good nor the reverse. The localities of preference of the eruption in the cases seen, have proved very uniformly to be those described by the authors. In those cases where the eruption was at all fully developed, almost constantly efflorescences would be found about the elbows and knees, and occupying the extensor side of the limbs much more than the flexor. This fact is one of the most important helps we have in diagnosis. There are of course exceptional cases, of one class of which I have seen several instances, having several spots, or one large patch of eruption confined entirely to the legs below the knees, without any sign of manifestation elsewhere. One of the most interesting of the cases seen was that of a negro. The eruption was of the nummular form, consisting of several circular patches, from the size of a quarter to that of a silver dollar, slightly raised above the surface, and giving to the touch the feeling of infiltration. The color of these patches was perhaps slightly darker than that of the surrounding, healthy skin, but very slightly so, and this was the only evidence of hyperæmia. The patches were covered with heavy epithelial scales, which instead of the characteristic pearly whiteness, showed a dirty grayish tint, and when removed and held up to the light, even to the naked eye, showed numerous very fine points of pigment, as though they had been powdered with a very fine, dark gray pepper. Unfortunately this patient, like many others, disappeared, and was only seen twice. It is chiefly with reference to diagnosis, and more especially with regard to points of differential diagnosis, that the observation of a large number of cases can be made of value. While a fully developed and typical case of psoriasis is one of the most well marked and easily distinguished of skin diseases, there are nevertheless cases where the diagnosis is by no means so easy, either because the case is anomalous or from the fact of the eruption having been affected by treatment, or on account of its having, when first seen, already begun to change in appearance from the process of involution having begun. Again where a large number of cases are seen, some will be found that are complicated by the coexistence of other cutaneous disorders, from which of course a patient is not exempted by the mere fact of his having psoriasis. The eruptions which most resemble, and at times are not easy to distinguish from, psoriasis, are those which are symptomatic of constitutional syphilis. My experience has been that quite a fair proportion of cases of psoriasis are mistaken for, and treated as, syphilis. I remember one case of a respectable middle aged woman

who showed a perfectly typical case of psoriasis, with a history of its having first appeared before the age of puberty, and of having been affected by it off and on ever since, saying that she would follow out any treatment that I ordered, but she hoped that I would not give her mercury, as she had been salivated six times without any improvement in the disease. One of the most common regions for the manifestation of psoriasis is the scalp, and it is also a place where the diagnosis is sometimes difficult. The first appearance of the eruption in this situation is very much the same as that which is found as one of the earliest, and not unfrequently the first, symptoms of secondary syphilis. In both cases the efflorescence consists of a small crust or scab, raised above the surface, generally on the top of the scalp, or on the temporal regions, which generally is first discovered by the patient from the fact of his comb catching on it. As far as one can judge by simple inspection there is very little difference between them, but while the crust of a commencing patch of psoriasis is entirely epithelial, which when picked off will show a few points hardly larger than a pin's point from which blood oozes, the scab due to syphilis is the result of a small pustule, and when removed will show a drop of moisture, or at least a raw surface as a base.

There is one peculiarity in the eruption of psoriasis on the hairy scalp, not only in its first appearance as small separate points of epithelial crusts, but also when it has increased into large patches, even to the extent of involving the whole of the region covered by hair, and that is that the hyperæmia, which is always noticed in patches on the skin elsewhere, cannot be seen. That is to say, psoriasis on the hairy scalp shows more or less epithelial scales, but no redness. In this respect it is analogous to the efflorescence of the tinea trichophytina, which on the scalp simply appears as a dirty, grayish scurfy spot, while on the integument elsewhere we have a decided redness of the circular patches affected. Whether the congestion of the affected part of the scalp does not exist, or whether the hair prevents its being appreciated, I cannot say, but its absence is not due to the locality, for in cases of patients who have become bald who have psoriasis, the redness of the patches on the scalp is just as marked as anywhere else. One quite characteristic symptom of psoriasis of the scalp, is the existence of a band of hyperæmia from three-eighths to one-half an inch in breadth, running along the forehead contiguous to the margin of the growth of the hair. The skin here is red and shiny, but I have never seen heavy scales on it. This band of hyperæmia is typical of psoriasis and is to be considered in questions of differential diagnosis between psoriasis of the scalp and eczema capitis. This differential diagnosis is at times rather puzzling, and I have seen a few cases where I was decidedly in doubt as to whether I had to do with a case of psoriasis of the scalp, eczema capitis, or favus. The thing to be remembered is, that in psoriasis the crusts and scales are simply epithelial, whereas in even chronic eczema some evidence of dried serum or pus is likely to be found, or at least, history of its previous existence is obtained. Eczema, when affecting the whole scalp, is very apt to extend to the ears, and I never have found any enlargement of the post-cervical glands in cases of psoriasis, whereas in eczema of the scalp it is quite common. The line of hyperæmia on the forehead, which I have referred to, is never seen in eczema, and lastly, it would be rare to have a

case of eczema capitis in which you could not get a history of some previous acute attack, as shown by the exudation of serum matting and stiffening up the hair. With regard to favus, the patient would have to be quite young, the crusts would be more solid and like mortar, which when picked off would leave a granular raw base. Evidence of destruction of the hair follicles, as shown by partially bald patches would be seen, and very likely the yellowish cup-like appearance characteristic of favus could be determined. The microscope would, of course, settle the diagnosis. I have never been able to satisfy myself that psoriasis of the scalp, even when affecting the whole of it, caused any permanent loss of hair. This seems extraordinary, when we think of the very decided damage which we see resulting from what seems to be a much less serious abnormal condition of the scalp in cases of alopecia furfuracea. Nevertheless, I think I can say, having carefully watched some cases in private practice, that the hair is not affected either in quantity or quality. In one case the patient, a lady, thought that a rather premature tendency to grayness was due either to the disease, or to the local remedies used, but I doubt it. Before leaving the scalp I would say that I have often found in doubtful cases that a question as to whether the patients had not at times been troubled with a very decided amount of dandruff, would, if they had had psoriasis, be answered very promptly in the affirmative. On the general integument a squamous syphilide is one of the eruptions that is most likely to show points of resemblance to a case of psoriasis. In both, the serpiginous outline of the efflorescence is apt to be found, owing to the same cause, that is, the extension and coalescing of circular patches. In this connection the regions on which the eruption is most thickly distributed is a very important point, as while psoriasis is found to affect the extensor side of the arms and legs, the syphilides are much more apt to be developed on the side of the flexors. There is, however, a decided difference in the first appearance of the two eruptions. Although psoriasis is universally described as starting as a small raised spot of congestion covered with an epithelial scale, my observation is that it invariably begins as a very minute point of simple hyperæmia. Theoretically every efflorescence, whether macular, papular, squamous, vesicular, or pustular, must begin by hyperæmia, but I mean that in psoriasis, this condition of simple congestion lasts for several days as such. In the case of a macular syphilide it is different; in twenty-four, or even twelve hours from the time when the cutis was seen to be normal, a crop of macules from the size of a small shot, to that of a little fingernail, will appear. It is, of course, possible that these spots may start as very minute specks of congestion, but I have never seen them in that stage, whereas, I have time after time seen the gradual development of a patch of psoriasis from an almost infinitesimal point of congestion. In the fading out of these eruptions there is even a more marked difference. In a syphilide, as the congestion passes off, a decided pigmentary stain will be seen, which remains for some time. In the case of a patch of psoriasis no pigmentation at all remains. The reason of this is that the nature of the eruption is such, that the epithelial layer, in which the pigment in cases of chronic hyperæmia is deposited, is being blown off and exfoliated as fast as it is formed. That this is the case is shown very well in cases where chrysorobin is

used as a remedial agent. After applying it for a few days it will be noticed that while the healthy skin around the patch of psoriasis to which it is being applied will be stained and dirty looking, the patch itself will look like clean healthy cuticle, and as long as that is the case the morbid process has not been overcome. That is to say, the remedy must be persisted in, until the stain is as marked on the spot treated as on the surrounding skin. It is not, however, the remaining pigmentation alone that is characteristic of a fading syphilide, but in many cases that pigmentation shows a decided character, which is not seen in any other eruption, at least I never have seen it. As the hyperæmia of a syphilitic macule ceases we find a certain amount of pigment deposited on the extent of surface formerly congested. The hyperæmia will be found to continue, however, in a series of points, which correspond to the mouths of follicles, and when it disappears entirely these points will be seen to be accentuated, or more darkly pigmented than the intervening surface, which gives a very characteristic punctated appearance to the skin, which is only seen after a syphilitic eruption. It is, however, the later or squamous type of syphilide which is especially liable to be confounded with psoriasis. A fully developed syphilide of a squamous character, is very apt to show points where there is more or less tendency to breaking down, or ulceration, in which case the crusts or scabs would be very different from the dry, shiny epithelial scales exfoliated from a patch of psoriasis. It must, however, be remembered that in some cases of psoriasis there is sufficient itching to cause scratching and tearing the skin, as a result of which, scab crusts may be found, and also that the coexistence of scabies, or the presence of pediculi vestimentorum may produce the same result. These crusts, however, will generally contain dried blood as well as pus and serum, and the evidence of scratching can be recognized by the linear lesions resulting. Excepting as a result of actual injury to the cutis, by the fingernails or other sources of irritation, the scales found on the patches of psoriasis consist of simple epithelium, whereas those covering the efflorescence of a syphilitic eruption will be formed by dried pus and serum. The amount of pruritus that accompanies an outbreak of psoriasis varies very much in different cases, and its intensity does not seem to depend upon any special characteristic of the eruption, either as to its stage of development, its form of distribution, or the amount of surface of the integument involved. In some cases it is most marked at the time of the first appearance of the disease, and ceases as it develops; in others, it reaches its maximum of intensity when the patches are fully developed and covered by heavy epithelial crusts. I should say that it was rather an exception to have itching a prominent symptom, but in some cases it certainly is one of the most distressing ones for the patient. There are many cases of eczema squamosum in which if a piece of paper, with a hole cut in it, say an inch or two in diameter, were placed over a patch of efflorescence, the surface seen could hardly be differentiated from psoriasis, and *vice versa*. Fortunately, we are not confined to examining any one part of the integument, and when the whole of the eruption is seen, the distribution, the more sharply drawn margin in the case of psoriasis, the existence somewhere of heavy characteristic scales, if psoriasis, or evidence of dried serum or pus, if eczema,

will help our diagnosis. I have, however, seen a few cases where the eruption was confined to the anterior part of the lower leg, and consisted of several small, or one large, patch of shiny red infiltration, without any scales, crusts, or scabs, in which no cutaneous abnormal manifestations elsewhere were to be seen, and no light could be obtained by any previous history, that have been quite puzzling in the way of diagnosis. I remember one of these cases, the diagnosis of which (between psoriasis and eczema) I have never felt sure of. In one instance, I made the mistake of taking a commencing case of psoriasis to be one of seborrhoea. The patient was a young woman, rather anæmic, who showed two circular patches over the sternum covered with very thin fine scales, of a dirty yellow color. Through these scales the base of the patches was seen to be very slightly congested. They were not raised above the surface of the skin, and had, by report, existed for some little time slowly increasing in diameter. It was only after having seen the patient three or four times that a crop of similar patches appearing on the trunk and limbs convinced me of my error. I have had the case under observation since, seeing her through two or three relapses. I have noticed in other cases, occurring in female subjects, the same thin and almost powdery character of the scales covering a patch of psoriasis, and I am inclined to think, though I will not state it as a fact, that in this form of the eruption the scales can be removed without being followed by the characteristic oozing of minute points of blood, which shows that the papillæ have been laid bare.

In another case I mistook the first appearance of psoriasis for tinea trichophytina. This case was seen some time ago, and I think that the youth of the patient, a little girl, four years old, had more influence on my judgment in excluding psoriasis than it would now have. The eruption, however, certainly did resemble that of tinea very closely. It consisted of a few small circular patches, confined to the breast and shoulders, slightly raised above the surface, the slight amount of scales noticed being decidedly more evident on the margin than elsewhere, and accompanied with a marked pruritus. In this case, as in the previous one, a more general outbreak of the eruption showed the true nature of the disease. I have never seen any eruption on the palms of the hands or soles of the feet that in any way resembled psoriasis, with the exception, of course, of eczema, that was not undoubtedly syphilitic. This is a point on which I can speak most decidedly, of course merely as far as my own observation gives. And equally decidedly can I say that I have never seen any lesions of the buccal mucous membrane, accompanying, or in any way connected with, or due to, psoriasis.

With regard to the influence of temperature or climate on the disease, I have not been able to form any opinion. Some patients state that they are always better in the summer season, and about the same number say that cold weather seems to improve their condition.

With regard to treatment, my experience has undoubtedly been the same as that of every other practitioner, that is, that some cases do very well, and others do not do at all well. We most certainly know of no specific, and of the many local applications that have been tried that one which will produce a marked improvement in one case will prove absolutely inert in

another. The great majority of the cases that have come under my observation being out-patients visiting a charitable public service, the opportunity for carrying out a protracted course of treatment is very slight, as those that do not get relief will go to some other institution. One can hardly expect a man who has been hard at manual labor all day, or a woman, who has a family of children to take care of, to give up from a quarter to half an hour before getting the rest they so much need, to rubbing in ointments, etc., to say nothing of the mess and dirt it makes.

To get rid of a decided case of psoriasis is most important for the patient, as this cutaneous lesion is almost universally looked upon as showing some taint which would render the subject unfit for intercourse with other people. Even when the result of treatment is most successful the patient must be told of the not only possibility, but great probability, of a future relapse.

On the whole I have found the preparations of a tarry nature, especially the oil of cade, the most efficacious in the treatment of psoriasis. I have used them very largely and have never had a case of the black urine, and other toxic symptoms that are sometimes called forth by these agents. I always make it a principle in a new case, not to have the remedy applied over large surfaces at first. In some cases great comfort can be obtained by simply using some emollient to soften the crusts, especially those on or near the large joints, which in some cases make every motion almost a torture. Cod liver oil is one of the best applications for this purpose, and as a matter of routine practice I use a mixture of equal parts of it and the oil of cade. In addition to softening the scales, their removal is important. This can be done by washing with any soap, the *sapo viridis* being one of the most efficacious in cases where it is not too irritating. In private practice where the cod liver oil is objected to, the oil of cade can be diluted with olive oil, glycerine, or some of the petroleum products. Oil of cade, glycerine, and rectified spirit makes a very good application, when the greasiness of the remedy used is objected to. I order the tarry preparation to be applied at bedtime, with a piece of flannel or a brush, and in the morning to have the places to which it has been applied thoroughly washed with German soap, or the *spiritus kalinus*, or if these are too strong, simple castile soap.

On the face or hands, where the patient objects to using tar, the white precipitate ointment in some cases has acted very well. In *chrysarobin* we have undoubtedly a very powerful agent in many cases. It is used generally by patients under protest, as it absolutely ruins any clothing or bed-linen that it may come in contact with. I have also found that it is not safe to use it on the face or scalp, even when ordered in quite a small proportion to the vehicle employed, as it is apt to start up quite a violent dermatitis. When employed on the trunk or limbs it should be remembered that its use should be persisted in until the staining of the patch being treated, in the same way as the surrounding tissue, shows that the exfoliation of epithelium has ceased. When the scalp is the seat of the disease the result of treatment is generally very marked. An application of the oil of cade, diluted according to the sensitiveness of the patient, with cod liver, olive, or other oil, at night, followed by a thorough shampooing the next day, with the *tr. kalinus* and the

use of a stiff brush to remove the scales that have been loosened up, will give great comfort to the patient. There can be no doubt but what the internal administration of arsenic has a marked effect in some cases; in others it seems to be absolutely inert. I have not found any benefit from increasing the dose, and in cases where a moderate amount does not produce any effect, I stop its administration.

Even in those cases where treatment is most successful the patient must be warned as to the likelihood of a relapse. I have, however, some half-dozen cases under pretty constant observation and treatment, in which, by taking hold as soon as any signs of a relapse appear, the disease has been pretty well held in check for some years.

In conclusion, I would say, that while I am fully aware that the deductions drawn from the points I have touched upon, must, in a great measure, be repetitions of well-known facts, I have ventured to hope that, even if only as confirmation of accepted ideas, or the reverse, by personal observations, my notes may not be absolutely useless.

THE APPLICATION OF ANTISEPTIC PRINCIPLES TO GENITO-URINARY SURGERY.

BY A. T. CABOT, A.M., M.D.

IN the discussion upon "Catheter Fever" which prevailed in the past year throughout Great Britain, it was generally acknowledged that a considerable proportion of the cases included under this term are of septic origin, and are due to the introduction of germs upon instruments used. This view found especial support in Edinburgh, where Professor Chiene, Dr. Wyllie, and Professor Annandale advocated it most strongly.

Certainly, as the habit of making thorough autopsies becomes more general, many cases of fatal issue after instrumentation, which would formerly have been referred to reflex or other nervous influences, are found to be septic in character.

It is not proposed to discuss here the various causes of "Catheter fever," but to confine our attention to the cases of urinary disease which are generally admitted to be of septic origin.

These cases may be divided into four classes:

First: They may be of a distinctly pyæmic character with metastatic inflammations in the joints, internal viscera and other parts of the body, frequently accompanied by chills.

Secondly: They may present the familiar symptoms of septicæmia, with chills, high temperature and rapidly fatal course, with the post mortem appearance of a granular degeneration (cloudy swelling), of the various internal organs.

Thirdly: In other cases with grave constitutional disturbance leading rapidly to a fatal issue, autopsy may reveal diphtheritic ulcerations of the urethra, bladder, ureters and even of the pelves and substance of the kidneys.

The cases included in these first three classes are most commonly ones in which there has been some operation involving a wound; such as the division or divulsion of a stricture, a difficult catheterization or a litholapaxy in which abrasion of the mucous membrane has occurred.

The *fourth* class includes those cases, less serious,

but far more common, in which a general cystitis is set up by the introduction of ferments upon dirty instruments.

Fortunately the neglect of absolute cleanliness does not always result in harm, and this is so, not because the germs are harmless, but because healthy tissues and especially epithelial surfaces have great power to resist septic influences.

If a bladder is in good condition and completely empties itself at every urination, the introduction of a few germs is not likely to cause trouble, for before they can multiply to any extent and produce a marked degree of fermentation, the urine in which they are propagating is thrown out and the danger is averted.

If, however, owing to any obstruction or through loss of power, the bladder does not completely void the urine, it then cannot free itself of any germs that may find their way into it, so that these ferments when once introduced have ample time to act upon the residual urine and to produce changes in it. And the irritating products of this fermentation soon cause inflammation of the bladder walls.

Unfortunately, these cases in which the bladder habitually contains residual urine are just the ones in which the frequent use of a catheter is required, so that it often happens that germs are introduced into stagnant urine and many cases of cystitis are the unfortunate result. A result all the more common from the fact that in these cases the catheterization and care of the instruments must often be left to the patient himself who cannot understand the importance of the care necessary for thorough asepticism.

Professor Chiene, in a recent discussion in the Edinburgh Medico-Chirurgical Society, enumerated the following ways in which septic matter may reach the bladder:

First: It may be introduced upon an impure instrument.

Secondly: It may be carried in also by air rushing through a catheter.

Thirdly: It may enter by passing along an inflamed urethra, which has been irritated by a prolonged use of instruments.

Fourthly: Organisms may pass between the instrument and the wall of the urethra when a catheter is tied in.

Such are the dangers! To guard against them is possible but not easy.

Urethral and bladder instruments are complicated and hard to keep clean; even a catheter which is in frequent use can be rubbed and thoroughly cleansed only upon the outside, while the inner surface of the tube, constantly traversed by urine, which is often foul and loaded with mucus, cannot be reached except by irrigation. Further, as catheters are now generally made, there is, below the eye, in the point of the instrument, a pocket (Fig. 1, a,) in which impurities of every sort collect, and from which it is almost impossible to dislodge them, as they are in an eddy out of the current when the catheter is flushed by a stream of water thrown through it.

In a silver, or other metallic instrument, this pocket may be easily obliterated (Fig. 1, b,) so that the eye is at the end of the tube, and a stream of water running through reaches every part with full force.

Soft rubber catheters should also be made in this way, and in some of those that I have recently obtained, made under the Jacques patent, this pocket is very