ON THE

NATURE, CAUSES,

and

TREATMENT

OF

VESICO VAGINAL

FISTULÆ

by

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1853.
In treating this subject which we have selected for consideration in the following pages, we do not deem it necessary to enter into any minute details respecting its early history, and indeed we are of opinion that it is very questionable whether such a course would repay us for the time and trouble expended on it, even had the limits to which it is necessary in these pages to compress our thoughts permitted us to do so.

Its early history is intimately and inseparably connected with that of midwifery and there is ground to lead us to the conclusion that the frequency of the occurrence of this disease has increased in the same ratio as civilization has advanced. It is a fact now generally conceded, that the artificial mode of life prevalent among civilized nations, and the refinement and luxuries which invariably accompany a nation's progress from a state of barbarism, have contributed in no small degree to render the body more liable to disease, and less adapted to discharge its functions right than the free, unrestrained, and more
natural mode of life which prevails among the more rude and uncivilized races of mankind. Some acquaintance with the way in which this disease was treated formerly, cannot fail to be profitable: and even a brief sketch of it may enable us to make some deductions, which, even at this stage to which medical science has arrived, may be of much use either in directing us to employ a judicious mode of treatment or in guarding us against the errors into which others have fallen. Such a sketch we propose to give in its proper place when we come to speak more particularly of this disease under the head of treatment.

No powerful arguments are requisite to convince the surgeon that it possesses many claims to his attention, for few diseases are capable of rendering life more miserable than they, its victim not only becomes disgusting to herself but to all around her, if such is its effect upon the mind that life becomes a burden and at length when the incurability of her disease has become impressed upon her she often seeks means to terminate her miserable existence with her
own hand; And we cannot wonder at the disease producing such an effect on the mind of a sensitive woman condemned for years to her lonely chamber without hope of relief; and shut out from the society of those near and dear to her, and at last worn out in mind and body she sinks into a welcome grave.

While this disease has not met with that attention which it deserves in our own country, it may be from the less frequency of its occurrence, it has called forth men of talent in France, Germany, and America, whose superior ingenuity has frequently been crowned with success, many such as M. Joffrey, Tiltzer, Desault, Record, Sims, and a host of others, have devoted a large portion of their time to its treatment, with what success will be considered hereafter; While these countries have produced many such men, our own country has produced a few, as Hobart, Emmert, Horner, Keith, &c.

In the following pages we purpose first considering some anatomical points connected with the subject, and then proceed briefly and
in succession, to give a short outline of its Cause, Prognosis, Diagnosis, and Treatment.

To be able to understand the disease and to treat it successfully, depend in a great measure upon our anatomical knowledge of the part. This observation admits of universal application to all surgical diseases, and especially to the one under consideration; for without such a knowledge, surgeons would not have been able to have performed such complicated operations as they have had recourse to for its cure. Some have said that descriptive anatomy has become too refined at the present day, and that it cannot give greater success to an operator who excels in it. But why should operations be more fatal in the hands of a surgeon, if he possess an equal amount of surgical knowledge, and talent to apply it, than in the hands of one deficient in such an accomplishment? When we say that a thorough acquaintance with the anatomy of the parts to be considered is essential to our
understanding the disease, we need offer no apology for occupying a short time on this subject. In the following remarks, we will confine ourselves as much as possible to a description of those parts, which are the immediate seat of the disease.

The Bladder is composed of three distinct coats attached more or less to each other at different points, and when combined form its walls, varying somewhat in thickness, owing to the partial development of its muscular coat on the sides and apex. They are arranged from within outward, in the following order: Mucous, Muscular, Serous.

The mucous coat possesses the same structure though somewhat modified as mucous membranes in other parts of the body, and may be said to be the analogue of the skin, and as well adapted to perform its peculiar function as that of the Bronchi, Stomach, or Intestines. It possesses great strength and is somewhat corrugated, capable of great distension, and of adapting
itself to any given quantity of urine which the bladder may be able to contain. It is attached to a fine loose cellular sub-mucous tissue upon which it moves, which under habitual retention of urine admits of its being pushed between the fasciculi of the muscular coat, forming what is called a sacculated bladder.

On making an opening into the bladder at its upper part, and looking into it, the mucous membrane at its anterior and lower part presents a purse like appearance, surrounding the internal meatus. Near to this opening will be observed a small projection called the uvala, and about an inch posterior, will be observed two small openings viz. the openings of the ureters. If two imaginary lines are drawn from the uvala to the openings of each ureter, and connected together by another, extending between the two last-mentioned openings; a space will be marked out named the trigone. In this space so defined fistula frequently occur. The mucous membrane is continuous with that of the ureters, and by lining the urethra it becomes
continuous with the mucous membrane of the vagina.

The muscular coat is found to be arranged in two layers immediately beneath the mucous membrane. The innermost layer is composed of fibres arranged in a circular manner, thicker at the anterior portion of the bladder, surrounding the urethra, the posterior, and middle portions. The fasciculi are more distant from each other than those of the external layer, which is further increased when the organ is distended with urine. These fibres would seem to be equivalent to the circular fibres found in the alimentary canal, and their function that of diminishing the cavity of the bladder from side to side.

Immediately external to this circular layer will be observed a strong layer passing in an opposite direction to those last mentioned viz, from before backwards, anteriorly, and superiorly; they are attached to the true ligaments of the bladder, (two in number) from this point they pass directly backwards over its apex and base, where they are intimately connected with the circular set of fibres, and become attached to
the two inferior true ligaments of the bladder and urethra. The breadth of this layer will vary from about one to two inches, the fibres are loosely attached to the surrounding tissue which externally is cellular containing in some cases considerable deposits of fat.

The four points of attachment named above, give this layer considerable power in expelling the contents of the bladder, and this would seem to be their function. They would likewise seem to be equivalent to the longitudinal set of fibres seen in the large intestine and arranged in a similar manner.

Their fasciculi seem to be thicker than those of the circular set, and in combination with the circular layer, and mucous membrane, form the urethra. The urethra is firmly imbedded in the roof of the vagina. It is a canal of about one inch and a half in length perforating, and suspended by the triangular ligament of the pubes. Its canal is somewhat funnel-shaped, widening towards the bladder. Its external orifice is surrounded by a circular set of fibres acting the part of a sphincter. The urethra
will be observed to be about four lines in thickness, at and near its external orifice, decreasing to three lines, as it passes backwards towards the bladder, and is very vascular. Its structure is somewhat dense, yet it yields readily to artificial dilatation; it is very liable to slough from pressure upon its canal during labour.

A plexus of veins exists at its upper part where it is likewise attached to the crura of the clitoris and to the pelvic fascia through the true ligaments of the bladder.

The serous covering of the bladder being continuous with that of the abdominal cavity, passes from the anterior abdominal wall, upon the anterior and superior portion of the bladder, extending laterally upon its sides, it is reflected upon the anterior part of the fundus uteri, leaving the lower anterior portion of the uterine in the unimpregnated state uncovered by peritoneum, excepting about an inch at its upper part. The base and back part of the bladder are thus left uncovered by peritoneum, being in contact with, and resting upon, the cervix and lower
portion of the body of the uterus. Between
the uterus and bladder at this point, is in-
terposed a large quantity of very loose cellular
mucous, as to admit of the distension of the one
without materially displacing the other. The
peritoneum is continued over the back part of
the uterus, and passes off from its cervix upon
the posterior part of the vagina and recurring
in the shape of a pouch for a short distance;
becoming continuous with the common peritone-
a10al lining of this part of the pelvis. There is a
considerable space between the vagina and
peritoneum, and a large quantity of the loose
cellular tissue which abounds throughout the
pelvis is interposed between them.

The vagina is a curved canal from
four to six inches in length, standing between
the os uteri and os sternum. Its walls are
composed throughout their whole extent of three
coats, a mucous, fibrous, and elastic. They would
seem to be the prolonged walls of the uterus
modified in a peculiar manner. Its external
opening is surrounded by a sphincter, which
is attached above by its apes to the clitoris.
inferiorly, to the central point of the perineum.

The vaginal canal widens posteriorly into which the lips of the ov project for a short distance. The sides of the vagina are comparatively thin, but its roof seems to possess considerable thickness, and is in immediate contact with the bladder. It is somewhat thicker anteriorly and its general thickness may be stated to vary from three to two lines. The pelvic fascia which is reflected upon its sides, meet with that covering the bladder at its lower part, and becoming joined, the two seem to form a septum between the bladder, and vagina, and become continuous with the corresponding layer of the opposite side. Beneath this septum and the vagina there exists a great number of fine arteries furnishing an abundant supply of blood to the tissues at this point.

Upon the sides of the vagina will be observed a large plenum of veins which seem to be imbedded in the loose cellular tissue surrounding it. The wall of the bladder would seem to be capable of considerable displacement,
at its base where it rests upon the roof of the vagina, and on making a section through its walls and that of the bladder the mucous membrane of the latter, projects into the vagina, forming a valvular aperture. It would seem that the upper part of the vagina possesses an arterial supply equal, if not superior to, any part of the body, and that an argument founded upon a want of this kind, could not explain the supposed want of vitality in its future; and account for the nonunion of fetus; as such a want does not exist.

Its lateral walls are comparatively thin; compared with its roof, some of the fibres are arranged in a circular manner; others obliquely, of a pale color, and loosely attached to each other; at its upper part they are closely connected to each other and to the surrounding tissues. As regards its attachments, and strength, the same remarks apply to the mucous membrane.

At the posterior and lower part of the vagina just before it joins the uterus, its walls are somewhat thin and rupture might more
easily take place here, than in any other part of the canal. This is of very rare occurrence.

The chief seat of such injuries is along its upper part, and consequently through the thickest portion of its walls. Its loose cellular connections adapt it most wonderfully to its functions, and it is astonishing that it is not ruptured more frequently.

With these few brief remarks bearing chiefly upon the parts most liable to disease, and upon points of interest afterwards to be mentioned, we will close this part of our subject and pass on to a consideration of its causes.

Among the first to give any authentic information concerning the obstetric practice of early times was Hippocrates, from whose account and those of subsequent writers, it is evident that little or nothing was known of the mechanism of labour. It was not till the year 1818 that the process of parturition was first correctly described by Naegle. Previous to this time many
had been accustomed to work out the problem with mathematical precision, but without appealing to nature, and consequently committed very gross errors. It is probable that many accidents have arisen from their inability to assist the efforts of nature in her own way, and there can be little doubt but that their interference in a great number of cases augmented the danger of the patient. Hence it would appear that accidents of such a kind as we are describing must necessarily have been of frequent occurrence. Vesico-vaginal in almost every case, may be traced to pressure of some kind upon the structures forming the vagina and bladder, leading to loss of vitality in the tissues. Since the mechanism of labour as it is found in nature, and described by Naegele, has been taught cases of fistulae are comparatively rare, but still they exist in sufficient numbers to warrant us in paying some attention to the disease. The chief causes of this disease may be conveniently classed under three heads.
I. The disease may be produced by causes on the part of the mother.
II. Causes on the part of the child.
III. Injuries arising from the use of instruments and other accidental causes.

As examples of the first class we might instance the following: first, where there is unusual rigidity of the external soft parts; secondly, where the pelvis is narrower at the outlet than at the brim; the child's head being of the normal size; thirdly, the presence of osseous or other tumors causing the head to remain too long resting upon the maternal structures.

Examples of causes coming under the second head will be found in cases where there is no obstruction on the part of the mother, but where the head of the child is preternaturally large, of greater dimensions than could be passed through a pelvis of the standard size, with safety to the mother. Secondly, in cases of monstrosities, where the body to be passed becomes fixed and allowed to
remain too long resting upon the pelvic organs.

As examples of the third class, Accidents arising from the use of various kinds of instruments; Secondly calculi in the bladder. Thirdly, when the bladder becomes distended with urine during the passage of the child's head through the pelvis, from neglect on the part of the practitioner.

We will now proceed to a more particular consideration of the three classes of causes, and endeavour to give examples illustrative of each. But there is another cause, which may be appropriately termed, a continuing cause, yet to be mentioned, viz. the action of the secretions, such as the urine upon the fistula. This we propose to discuss after noticing briefly the three classes of exciting causes.

As we know that labour is dangerous to the life of the mother, and that the danger increases in proportion to its duration; we must conclude that the danger of the establishment of fistula increases
in a like proportion. This is proved from statistics to be the case and will be illustrated by referring to the following Table by Prof. Simpson.

Duration of Labour in six fatal cases of sloughing of the vagina.

<table>
<thead>
<tr>
<th>Duration of Labour</th>
<th>Number of Deliveries</th>
<th>% of cases of sloughing</th>
<th>Proportion of sloughing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 24 hours</td>
<td>15.586</td>
<td>1</td>
<td>or 1 in 15.586</td>
</tr>
<tr>
<td>after 24 hours</td>
<td>2.64</td>
<td>5</td>
<td>or 1 in 53</td>
</tr>
</tbody>
</table>

In some cases it is almost incredible, what an amount of pressure the parts will bear; but a comparatively slight pressure, when long continued, produces the greatest destruction; for the application of severe pressure to any part of our bodies, if it be not long continued, the parts will quickly regain their power on its removal; this observation holds good as regards the pelvic structures. If the head or breech of the child be detained in the passage either from inertia of the
uterus or from rigidity of the parts themselves, or any other cause has remained so long pressing upon the party, so that they become congested and swollen, the incautious use of instruments may give as it were, the final blow to the parts and the cause of the accident seem to rest upon them alone; but frequently the cause is clearly referable to the extent of mischief already existing before they were applied. This would seem to have been the way in the following case which we quote from Dr. Ashwell. "The patient was a married woman who at the age of 22 (ten years ago) was delivered of a still born child after (to use her own words) being in labour three weeks), when at length delivery was completed by instruments. A serious and protracted illness followed her delivery, and on recovering she found herself totally unable to retain her urine. The symptoms continued up to the period of her admission into the Hospital. On making an examination, an opening was found passing from the vagina into the bladder." The same author
gives another case, and there are many more of the same kind recorded, where a recto-vaginal fistula was the secondary result of an abscess forming in the pelvis. This occurred to a lady the wife of a medical gentleman, where the foetal head had been allowed to remain in the pelvis for nearly forty hours. If the urine is allowed to collect in the bladder and the head of the child at the same time advancing, the bladder has been known to protrude before the head and become ruptured. And this is more likely to be the case when the child's head is too much ossified; for the walls of the bladder are liable to be ruptured by a slight force when somewhat suddenly applied, and under the circumstances stated.

In reference to the causes coming under the second head, they are of more rare occurrence than those coming under the first class. The child's head without being in any way malformed, but above the average size, is likely in many cases, to be productive
of danger to the soft parts. The head of a child being fully ossified at birth would increase the chances of accident to the mother.

Hydrocephalus might be supposed to act as another cause, but as it distends the soft parts equally on every side, it is not a very probable cause of mischief.

Thirdly, injuries arising from the use of instruments and other accidental causes.

Situations which have been produced in this way have and are rapidly decreasing in number. Accidents from them may be in general traced to the application of instruments, where they are inadmissible, or not required, or from some mismanagement in their use. At the present time their application is limited to very few cases, compared with what it was in the days of Chamberlain, who observes that this practice was so common that it was usually said, "Whenever a man comes, the mother, or child, or both, must die."

About the year 1746 Larnette states that on his first beginning practice, that number of old surgeons when called to attend a woman
in labour, invariably made a practice of not forgetting their instruments, and deemed it incumbent upon them, to extract the child by their means, and that their instruments were their only resource, indiscriminately in all labours." Dennis says: "It is certainly within our recollection when cases similar to those which are now almost universally relieved by the forceps, were as certainly treated by the [crochet]; the child a certain victim, the mother a probable one." Vol. I. Page 296.

This remark of Denis's may be used by us and applied with equal force to the practice which he himself adopted.

Denman gives the following advice when speaking of the use of the forceps: he says: That we are to remember that the forceps are not to be applied because we have the power of using them, but because the necessity of the case is such as to require their use."

Instrumental labours are somewhat rare at the present day, but this rarity may in some measure tend to produce
accidents, when cases occur which demand their use. This may happen in two ways. First by allowing the efforts of
nature to be exerted too long, so that on the application of instruments, the parts are in such a state as not likely to escape
sloughing; and secondly, the practitioner will possess less dexterity in their application; from his want of practice, in using them.
The bladder when distended has been perforated instead of the child's head, and in some cases the perforator has been passed through the upper
wall of the vagina into the cavity of the abdomen.
Some practitioners make use of instruments more than others. The following table by Dr. Churchill will illustrate this and the proportion of instrumental cases.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>Number of labour</th>
<th>Forceps cases</th>
<th>Craniotomy cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dublin Clarke</td>
<td>10,199</td>
<td>14</td>
<td>49</td>
</tr>
<tr>
<td>Dr. Collins</td>
<td>16,054</td>
<td>27</td>
<td>118</td>
</tr>
<tr>
<td>Paris Baulhebogue</td>
<td>17,388</td>
<td>31</td>
<td>6</td>
</tr>
<tr>
<td>Dr. Sachapelle</td>
<td>22,243</td>
<td>76</td>
<td>12</td>
</tr>
<tr>
<td>Dr. Poivin</td>
<td>20,517</td>
<td>96</td>
<td>16</td>
</tr>
<tr>
<td>Vienna Boer</td>
<td>9,389</td>
<td>35</td>
<td>13</td>
</tr>
<tr>
<td>Heidelberg Nagel</td>
<td>1,711</td>
<td>55</td>
<td>1</td>
</tr>
<tr>
<td>Berlin Kluge</td>
<td>1,111</td>
<td>63</td>
<td>6</td>
</tr>
<tr>
<td>Dresden Cahus</td>
<td>3,549</td>
<td>184</td>
<td>9</td>
</tr>
<tr>
<td>Berlin Liebold</td>
<td>2,093</td>
<td>300</td>
<td>1</td>
</tr>
</tbody>
</table>
But it is not in the practice of such as are given in the table that we are to look for accidents arising from the use of instruments. No doubt their superior judgment would direct them both as to the proper time for applying them and the mode of doing so. Dr. Davies in his "Obstetric Medicine" mentions a case where the obstetric scissors slipped from the child's head and perforated the rectovaginal septum. Dr. Collins and Murphy each mention a case of fistula occurring in their practice from the use of forceps. Other examples might be given of this kind, but their insertion would only increase the tedium of detail and be productive of no advantage.

The accidental causes giving rise to fistula are the following. Some are only conjectural, from our not having able to find recorded examples, but given by some authors as probable causes such as Vaginal, Entocele, and Rectocele. Pelvic abscess may by burrowing into the tissue between the back of the bladder and upper part
of the vagina, burst into the vagina, and bladder, or by bursting into the bladder alone, the urine might collect in its cyst and cause sloughing of the vaginal septum.

Dr. Reid says the fissure may be congenital but he does not give an example.

Dr. Davies in his Obstetric Medicine mentions a case described by Louis of congenital recto-vaginal fistula. Also a similar case by Becqueton in l' Histoire de l'Académie des sciences 1719. Mr. Ingleby gives the following account of calculi causing fistula in the Lancet for January 1836.

"Some years ago I attempted the removal of a large stone which, after delivery, had ulcerated the superior part of the urethra and projected considerably across the vagina, but the turbulence of the patient overcame the moderate restraint imposed upon her, and all entreaties to produce submission, proved unavailing. In a case somewhat analogous to this I assisted my friend Mr. Wilkinson in an attempt to extract a calculus through a fistulous opening in the bladder (the result..."
of difficult parturition, many years previous but the mass was held too firmly by the fungoid looking and eroded edges of the fibula to admit of its removal; a year afterwards W. McPherson succeeded in extraction of the calculus which was in size equivalent to a pullet's egg. It would seem difficult to imagine a patient escaping without a fistula forming if the calculus be of any size and not detected and removed previous to labour setting in. Another cause given is that in amputation of the neck of the uterus the inflammation may extend to the vaginal septum and terminate in sloughing. Likewise removal of tumors from the upper part of the vagina when they involve a considerable portion of its roof. Venereal and cancerous ulcerations attacking the roof of the vagina or cervix uteri by extending may involve the back part and base of the bladder in the disease.

Having now briefly run over the three classes of causes we will take up the consideration of the secretion as a continuing cause.
As nature has endowed every organ in the body with a peculiar function so has she adapted each organ in structure for the peculiar function it is designed to perform. They likewise possess common sympathies. In functional derangement of a particular organ, distant organs become affected. In some cases, we are able to trace out the mode in which the sympathy is conveyed, yet in many instances we fail in doing so. Arrangement of the urinary apparatus thus act not only upon distant organs and the general system but locally, as in fistulae. We know that if any natural secretion of the body, destined for secretion is retained, its non-elimination soon becomes manifest in its action upon the system.

The same observation applies where the secretion may be eliminated and secreted, but through an unnatural channel. Milk is well known to be bland and innocuous when confined to its proper functions, viz., the ducts of the mammary gland and the child's stomach, but when from any cause it finds its way into tissues not designed for its reception, death and sloughing of the parts follow. A familiar example of this is observed in abscess of the mammary and
in destruction of the kidney from some obstruction to the secretion of urine, with its attendant constitutional disturbance. If it be true that pilifer destroys tisue, in this way we may a priori expect a greater destruction of tissue and constitutional disturbance to arise from the effusion of urine; that not being a bland fluid, but on the contrary, acid and poisonous. Hence the cause of its non-secretion or diffusion among other tissues than those designed by nature for its reception, produces the most alarming symptoms: as for example in acute suppression from cold, or in rupture of a distended bladder, or in cases of lithotomy, when the urine becomes infiltrated among the raw tissues, consequent upon the operation. In vesico vaginal fistulae we do not see in most cases, such an extent of poisoning as is manifest in the above example; yet we must expect to find its action proportionate to the surface exposed; and so it is. For when considerable sloughing of the vaginal septum takes place and the urine comes
to act upon it, its constitutional action may be less manifest, owing to other puerperal symptoms masking its action upon the tissues. Its local action will be evident upon the parts themselves and through them upon the system in general.

We will consider for a moment its action upon the tissues which, have recently thrown off, the slough. As soon as the slough has separated, the urine passes from the bladder into the vagina, and in passing over the tissues, already implicated in disease, it is probable that it will contribute somewhat to its further extension; or secondly, by its presence, it will destroy the reparative action, set up by nature. The first step of nature to heal a breach of surface is to cause a determination of blood to the part, with exudation of coagulable lymph; but this is washed away as soon as it is exuded. As we cannot expect nature to repair a fistula in this way, her next method will be that of granulation, and such a process is set up in the part.
and progresses somewhat, but the urine coming in contact with the granulating surface renders this second attempt abortive, for as a granulating surface in other parts of the body, is found to heal best under the mildest applications and the non-removal of the protecting layer of pus cells; so would it be in furuncles. The urine being anything but a mild application not calculated to favor granulation, nature is defeated in this her second attempt at repair. As a last resource, and the best, the circumstances will admit of, her object is to adapt the parts to this change in their function, the first step in this third stage is an increase in the effusion of plasma into the future round the opening, causing consolidation of the part, and her second step is the production of a membrane, resembling a process covering upon the parts with which the urine comes in contact. This last step, viz. the formation of a membrane varies in the time of its accomplishment.
in some cases it is slowly formed, in others
more rapidly, and in other cases not at
all. But, in its place, the effused plasma
becomes developed in the shape of fungoid
looking masses, upon the edges of the
fistulae; sometimes the salts become deposited
from the urine as it percolates through
the opening. The vagina and external parts
become excoriated and painful and in some
cases covered with eruptions, this may
be mitigated somewhat, by cleanliness,
but never removed as long as the fistula
is present; the fistula then now become chronic
and fully established. In some cases of fistula
of small size or fistula arising from direct vio-
ence, as from a cutting instrument, or from
rupture of the bladder without any great des-
truction of parts by ulceration, and sloughing
it may be supposed that such fistula might heal
of themselves, providing the urine was not present
to defeat the attempt of nature to repair the
breach. In these cases the urine must be
regarded as a continuing cause; that it is such
we will attempt to prove, before entering
upon the question of treatment.

If there is a tendency after labour to the formation of a слough, the Lochia may have something to do in producing it, or connected in some way with the extension of the diseased action. There will appear to be some probability in this if we examine the part which produces it. Some have exposed the uterus to be in a gangrenous state, when examined soon after delivery, its whole internal surface being of a dark ash color and the discharge upon its surface the same. Dr. Churchill believes it to be sometimes acid, and that it produces considerable vaginal irritation if the part have experienced much contusion during labour. We may suppose that the action of the urine upon one side of the vaginal septum and bladder, and the presence of the acid Lochia on the other, might favor sloughing of the parts; further the Lochia has been supposed to have something to do with the production of Phlebitis, especially in cases of Placenta Previa: During the first day or two the
discharge is neutral and consists of a yellowish fluid with blood corpuscles, epithelial scales, and fat cells. At the end of four or five days it becomes highly alkaline, giving out ammonia. Could it by collecting in the vagina act injuriously through its alkaline reaction upon the.MenuItem in the neighborhood?

The Menstrual secretion cannot be supposed to have anything to do with the continuance of fistula, hence without spending more time on this point we will now pass on and consider shortly the subject of diagnosis.

**Diagnosis** — In considering this part of our subject, there are two chief points to be kept in view. The first is to ascertain the probability of a fistulous opening forming after labour, and secondly, the diagnosis of the fistula when fully established. The importance of the first proposition is evident, but it is not so easily accomplished as the second. In order to ascertain the probable formation of a fistula the first object should
be a careful and minute examination of the vaginal canal and that must be had recourse to as early as possible after the labour is concluded, for upon this in a great measure our success will depend in preventing destruction of the tissues. Hence in every case of instrumental or protracted labour, where there is the least ground for the attendant to suppose that sloughing might occur, an early examination ought to be instituted. If on examination the parts are more highly congested and inflamed than usual, and if there should be observed claret-colored or dark greenish-looking patches at the upper part of the vagina, we may be certain that there is a tendency to slough, or that a slough is already formed.

The tendency to sloughing will be manifest for sometime before it is really formed, in some cases it varies from four to fifteen days before it is thrown off; this is the time for actively employing remedies to either wholly stop the diseased action or at least to render the slough
as limited as possible. Dr. Churchill recommends the injection of tepid water under these circumstances. Cases have occurred in which rupture of the bladder has been mistaken for an escape of liquor Amnii where the uterus, during a violent contraction has suddenly forced the Sheds' head upon the distended organ, and on after examination two or three fingers, were passed from the vagina into the bladder. If in such an accident as this, an examination with renewed measures is had recourse to early, it is probable that the fistula might be cured before it had passed into a chronic state.

If these indications have not been attended to, the following phenomena, as described by Dr. Blundell will warn us of something going wrong in the part, after labour is over. For the first few days after delivery the urine has passed with difficulty or the catheter has been often required and then perhaps for a few days more the urine has flowed without assistance, then perhaps incontinence of urine has followed.
succeeded by the escape of a membranous substance from the vagina, which on immersion in water has been found to consist of a portion of the bladder and vagina, altered in consequence of mortification.”

The first indication given by Dr. Blundell is of very frequent occurrence, in cases where no sloughing follows, but the others are almost certain indications of mischief. In some cases the escape of the mortified membrane might be mistaken for a clot of blood or a part of the membrane being left behind in the uterus, and subsequently thrown away by the nurse. The patient’s attention will be directed to the seauding action of the urine upon the parts soon after its separation, and the accident will be easily recognised by examination but recognised too late. The diagnosis of chronic fistula as before said is comparatively easy. We may be induced to suspect their existence from the antecedent history of the patient and from the general effects of
the disease upon the parts, as well as her constitution but to be sure of its presence an examination is requisite. Various methods have been proposed for effecting this object, some of which are useless being incapable of fulfilling the object we have in view during an examination.

The object of our examination is not simply to detect the existence of a fistula but to make ourselves fully acquainted with its pipe, situation, and the state of the surrounding parts.

Any method of examination incapable of fulfilling the above indications is useless for the parts ought to be seen, as distinctly, as a fissure in the palate. The method which seems the most likely to answer our purpose best, is one described by Dr. Sims of America, for which he claims the credit of inventing, but which has previously been described in South's edition of Thein Surgery at Page 73. The following is Dr. Sims' method of examination as given in Braithwaite's Retrospect of Medicine for December 1852. In order to obtain a correct
view of the vaginal canal; Place the patient upon a table about two and a half feet by four, on her knees, with the knees elevated and the head and shoulders depressed. The knees must be separated some six or eight inches, the right at about right angles with the table, and the clothing all thoroughly loose so that there shall be no compression of the abdominal parietes; An attendant on each side lays a hand in the fold between the glutei muscles, and the thigh: The fingers extending quite to the labia majora; Then by simultaneously pulling the (nates) upwards and outwards, the os uterinum opens, the pelvic and abdominal viscera graduate towards the epigastrio region, the atmosphere enters the vagina, and there pressing with a weight of fourteen pounds upon the square inch, stretches the canal out to its utmost limit, affording an easy view of the os linea fistula &c.

To facilitate the exhibition of the parts, the assistant on the right side of the patient introduces, into the vagina, the lever speculum, and then by lifting the perineum,
stretching the sphincter, and raising up the recto-vaginal septum, it is an easy tour to the whole vaginal canal as it is to examine the fauces, by turning a mouth wide open to a strong light." Dr. Sims speaks of this method as being painless, and applicable in the diagnosis not only of this disease, but in others affecting the cervix uteri and in the absence of any contractions or cicatrices the canalawl swells out to an enormous extent. There may be some objection to this mode of examination. A speculum might then be used, open at its upper part. By this means the patient would be less exposed. In some cases a speculum may be sufficient to detect their existence; yet Dr. Sims' method seems to be superior in cases where operations are requisite.

We will now proceed to consider the probable prognosis of fistula.

**Prognosis**—There are many different opinions held by writers as to the disease admitting of a radical cure. From this
when taken into consideration, along
with its variable extent, in different pa-
ients, render it a most difficult task
to lay down any method by which we
may be able to form general rules to
guide us in our prognosis of individ-
ual cases. Very much will depend
upon our knowledge of the general prin-
ciples of Surgery, and in our skill in
applying them. It cannot be denied
that in applying these there are some
peculiarities in treatment to be observed,
and much will depend upon the way
we employ them, in connection with
these peculiarities. When we come to
speak of treatment, it will be observed
what various widely different methods
have been adopted, most of them success-
ful in some cases, yet no single one of them
applicable to every case. This might be
inferred from the nature of the disease.
Of we wish to arrive at the probable
success of any one of them, we have not
a sufficient number of cases recorded and
described with that precision which they
ought to have been to render them at all
useful for our purpose, and we are likewise
ignorant of the number of unsuccessful cases.
In this, as well as in other disease, the
consideration of the following points will
assist us in forming our prognosis, they
may be divided into constitutional and
local; under the constitutional, we include
the patient's general appearance, her age,
occupation, previous manner of living, dis-
position, and temper. The command
she possesses over herself, the power of en-
during fatigue, her wish for an operation,
and her determination to attend rigidly
to the directions of her attendant.
The presence of other diseases, indeed might
altogether preclude the possibility of reme-
dial measures. Such as Phlegmosia dolens,
peripheral fever, crural phlebitis, convulsion,
mania, &c., &c. and various other acute and
chronic diseases. The chief local considera-
tions are the following. The situation of
the apertures, its condition, with that of the
parts in the immediate neighborhood.  
it, extent, and direction.  The measure of
any have been already used to effect its
obliteration, the length of time it has exis-
ted, its mode of formation, if any local
disease exists along with it; and its nature

These several points in the last division
we will briefly run over in succession,
as they would seem to be more intimately
connected with our forming a prognosis
of the success of operations on the part.

The situation of the fistula—Our prognosis
will be less favorable, as the fistula is found
to be situated further from the orifice.
There are two reasons for this, first the
parts possess less thickness of tissue as we
proceed backwards, and secondly the
nearer the external opening it is situated,
the less difficulty there will be in effecting
the various manipulations required during
an operation.  With respect to the condition
of the aperture, we would say, the fewer chance
it has undergone the more favorable will
be our prognosis, for in that case a less amount
of tissue will be required to be removed by the knife, should that be employed, and the part will be brought into closer apposition, and with a less tendency to retraction than is found in some cases where a considerable part of the margins require to be removed. Should there be any disease in the cervix, an operation might increase it or should carcinoma be present, it is needless to say how useless would be our attempts to cure the fistula. Contractions and cicatrices in the vagina, narrowing the canal, might either forbid the operation or render its completion unsatisfactory and difficult.

Should it be congenital, our success would chiefly depend upon its nature and extent. In general we may say the smaller the opening, the greater certainty we have in closing it. Dr. Sim is of opinion that a fistula about the size of a finger is closed with more certainty than smaller ones. In most fistulae the opening extends across the vagina, in these cases there will be less tendency to
eparation of its edges, on account of the longitudinal and oblique fibres possessing less power than the circular. In the longitudinal fissure the circular fibres of the vagina and bladder will give rise to a greater separation of its edges. In general it may be said that this mode of previous treatment will operate unfavorably if it have the effect of enlarging the opening, by tearing away any of the tissues. With respect to the length of time it has existed, it is clear the longer the more unfavorable, especially in those cases where the opening has in the first instance been a simple tearing of the tissues without sloughing. An early operation with proper treatment would in all probability have been successful. Dr. Blundell recommends in the event of the patient being seen early as for example by the attendant, during labour that we should wait and strive to improve the general health, and at the same time to keep a catheter in the bladder, but he acknowledges that he never saw a case that
under these circumstances. Now in cases where the sloughing has not ceased, and where the patient is so much reduced, that we should not be justified in interfering, we ought to wait; but where these conditions do not exist, we cannot see any advantage in waiting, as the patient in many cases passes into an indolent state from the action of the wine &c., upon the parts which she only recovers from when the fistula has reached its chronic stage. There is a reason for us not operating too early, in the probability of secondary abscess forming in the lesser &c., but these cases are so rare, that probably they would not in general be sufficient to deter us from interfering. Cases have occurred where the urethra has become permanently closed, from the length of time which has elapsed, requiring the establishment of the canals. The prognosis will be less favorable, where, in addition to the fistula a calculus is present; and requiring removal. There are several other points which might be noticed under this head, but time
will (not permit resuming upon them). Therefore we will take up the consideration of its treatment.

Treatment. Having discussed the cause and prognosis in a very brief and imperfect manner, we will now enter upon the most difficult but at the same time most interesting part of our subject. In the first place, let us dwell for a short time upon the various methods of cure which have been proposed. We do not intend to give a detailed account of each, as some are only modifications of each other, but to notice in succession their chief peculiarities and illustrate each one as far as possible, with cases which have occurred. However interesting a further detail might be, it would only dwindle out our pages to an unnecessary extent and be productive of no real benefit.

The various systems hitherto adopted may be conveniently classed under the five following heads: I. By drawing off the urine and compression of the fistula. II. By cauterization. III. By stitching. IV. By the uniting apparatus.
V. By transplantation.

1. Drawing off the urine and compression of the fistula. For this purpose Delaunet recommended that an elastic catheter of proper size should be introduced into the bladder, and fixed to an instrument which could be worn without inconvenience, resembling a truss. Upon this truss was a silver plate with an aperture in it, so as to admit of the locking of the catheter to it; and to facilitate its ready removal for the purpose of being cleaned. To bring the edges of the fistula together a tent made of linen, or something in the shape of the finger of a glove, should be stuffed with lint, and smeared over with resin, wax, or some unctuous substance, to withstand the action of the urine, and then introduced into the vagina. Guthrie recommended the introduction of a sponge into the vagina; and Cote, a hollow peucinous cylinder; and Bognet, the wearing of an oval elastic speculum. In addition the patients were recommended to lie on their back; the patient occupied this position from a month up.
to a year; some cures followed; an account
of which will be found in the Ed. Med.
Surgical Journal for 1821; by Desaut
Barnes, Young, Guthrie. When this line
of treatment failed, cauterization was
had recourse to; by the application of
nitrate of silver, or the actual cautery.
At the same time persisting in the pre-
vious treatment before mentioned.
Deputeman was in the habit of introducing
a speculum, open above into the vagina,
and then toasted the edges of the opening
with a red hot iron, or a piece of lunar
caucic fastened to a rod, and afterwards
throwing up in injections of warm
water, this was repeated at intervals of
from five to eight days. Lallemand
made use of cauteryization, but before he
applied it, he introduced a piece of wax
into the vagina, and by pressing it upon
the aperture, obtained an exact impression
of its size, and a knowledge of its situation.
Then he applied nitrate of silver to its edge,
and after waiting till the clough had
separated, and the part was inflamed, and suppurating, he introduced through the
urethra a kind of catheter furnished with
shoos (sonde ariagne) to transfer the back
part of the fistula and draw it forwards;
with the double object of drawing off the
urine and keeping the edges of the fistula in
close apposition. If the first application of the
instrument was not sufficient it had to
be repeated, and by the frequent application
of the way to the aperture she was enabled
to judge of the state of the parts. We have
met with several interesting and successful
cases reported in various journals, treated
both by nitrate of silver and the ligature,
the nitrate of silver being used to coagulate
the edges; when this was satisfactorily ac-
complished ligatures were applied and the
parts brought together. In the London
Medical and Physical Journal for 1825
Samuel Hobart reports a case treated in
this way. The fistula in this case was situ-
ated about two and a half inches from
the xiphisternum, large enough to admit
The point of the finger, with calloused edges. Before Mr. Hobart saw the case, it had been treated by Desault's method for two months, and the edges touched with caustic, without the slightest improvement. The actual cauterization had been likewise tried but without success. With the intention of closing the fistula by suture, Mr. Hobart invented an instrument to enable him to pass the ligature through the fistula, edges of which he gives a drawing. A catheter was kept constantly in the bladder, and nitrate of silver applied to the fistula, edges. As soon as the slough had separated he applied two strong silk ligatures saturated in melted wax, and allowed them to remain fourteen days; the vein effectually prevented any incrustation forming upon the ligature. They were then removed and the opening was found to have sealed, and continued so. There was slight paralysis of the sphincter, from wearing the catheter, which left her in a short time. The Lancet for August 4th, 1847, describes a successful case treated by Prof. Emenent, with cresote, as follows:

A. Meico vaginal fistula subsequent to artificial
labour having been treated by "lapis infernalis" seventeen times without success. Eminent proceeded to remove the gangrenous scalp produced by the last cauterization, after which the fistula was obliterated, opening to a great extent, by means of a pencil brush immersed in creosote. The success was most surprising; the new scalp was so firm as to enable the patient to retain her urine the whole day, and to micturite without becoming moist; the detachment also occurred much later, than after the first application of other caustics, and when effected the urine flowed in far less quantity, from the somewhat diminished fistula. A second application of creosote six days afterwards, induced a perfect cure of the fistula, and no urine has flowed from it during two months. A fortnight after the last cauterization Eminent found the fistula perfectly cicatrized; its previous existence marked only, with a bluish red streak, two lines in length. He therefore declares creosote to be the best application in such cases, and the nitrate of silver too feeble, and the concentrated acids
too energetic in their action." 

In the above case the size of the fistula is not mentioned, nor the method of drawing of the urine; if any was had recourse to during the treatment, it would have been interesting to have been informed on these points. A great variety of irritating substances have been used to procure obliteration of fistulae; such as the mineral acids, dichloride, nitrate of mercury, sulphate of copper, and those already mentioned, of which it is useless to give examples. We will conclude our account of cauterization, by giving some account of a case treated by Mr. Baxter Esq., Surgeon London, with the actual cautery. The case was one of a very aggravated kind the patient had been treated in the Middlesex Hospital for six weeks previous to Mr. Baxter seeing her. On examination the vagina was found to have been obliterated by sloughing, nature having attempted a cure by bringing down the uterus and approximating the edges of the wound. The fistulous opening between the bladder and remains of the vagina,
was about three lines in depth, its length half an inch, its breadth a quarter of an inch, and situated about the third of an inch above; and before the ostiure the urethra was impervious. Having reopened the urethra, by means of a large broach and dilated it by Weiss’ dilator. Mr. Barker then introduced a catheter fixed by tapes before and behind; she next stuffed the hollow space with lint, and directed her to lie constantly on her back. After persevering in this treatment for some time, he proceeded to securify the edges of the fistula occasionally, but failed by this means to obtain adhesion; he now had constructed an iron cautery, the shape of the fistula, heated it to redness, and allowed it to change color—then applied it to the hardened edges, as quickly as possible, so as to necroseate them. After repeated applications of the cautery, sometimes oftener than every ten days, the fistula became gradually smaller. He was obliged to apply at last a cautery (not larger than a common needle) to the then discontinued the use of the catheter, and the patient gradually regained
the power of retarding their urine. One thing worthy of observation in this case is, the position Mr. Baxter directed his patient to remain in, and the great extent to which sloughing took place without causing death.

We now come to notice briefly, operations in which stitching of various kinds was employed. Among the first we believe to apply this method was Roenhuyzen. Baxter Voelter used stitches of various kinds. Haegle described various sutures, and the methods of applying them, Schreger with some success followed in his steps. Wutiger gives an account of eighteen cases in which he operated by stitching. He was successful in three, and in addition to the ligature, he practised paracentesis vesica believing that the urine was the great cause in preventing union.

Among the various sutures employed were the twisted, gauzes, interrupted, running, and quilled. The interrupted is recommended by Helius and made of soft thread.
Wutzer preferred the twisted sutures, assigning as a reason, its bringing the edges of the wound closer together and not allowing the urine to percolate between the edges of the wound. Dr. Pancoast of America uses what he calls the "plastic suture," the threads being passed with short, sharp, curved, needles. Dr. Sims of Philadelphia a gilled suture, substituting in the place of gills long pieces of lead with holes drilled through them, at short distances, for the passage of the ligatures. We should occupy too much time by giving an account of the methods of applying the sutures which have been described but we may notice a few. Deienbach passed seven threads with curved needles from the hinder to the front part of the fistula, which on being drawn; one loop held of the wall of the vagina, the other that of the bladder, the ends were then tied, brought out, and fastened to the on the inner side of the fistula, seared the edges, and brought them together by tying.
Hillian passed a needle three lines from the edge near the front angle of the fistula, having its convex surface directed backwards in the longitudinal axis of the fistula, and again brought it out at the same place, seizing it with the forceps, and bringing back the threads to the front; he used the first introduced thread to bring down the fistula, when he tied the remainder. In cases where the fistula was deep in the vagina, great difficulty was experienced in passing ligatures with a common needle. To overcome this difficulty Naegle, Lallmand, Deuber, recommended the use of a needle holder. Schreger passed the threads through rosary beads and used them to bring the edges of the fistula down. Numerous needle holders have been invented, some very complicated; some have preferred large needles, made of malleable iron, any description which we might give, without drawings, of these pieces of mechanism, would not be sufficiently clear to be un-
understood: In the next place we will give a short account of transplantation.

This method we believe was first made use of, in the treatment of vesico-vaginal fistulae by M. Yobert but transplantation under the name of 'urethro-plasty' was used by A. Cooper, Earle, Alliot, Delphe, &c &c for the cure of fistulous apertures in the prethra of the male. M. Yobert sometimes made extensive dissection round the base of the bladder, and crest of the uterus.

The following is Chelius' account of M. Yobert's method of operating. By means of Grueis's forceps or hook, he drew down the inner edge of the fistula, pared it, and then did the same with the front edge. He next separated an oval piece of skin from the mucous membrane of the right labium, so that the flap at the edge of the vaginal aperture, formed by closing the cut, a nest of four lines broad with a needle.
catheter he introduced a loop of thread through the urethra up to the fistulous orifice, in the vagina, and drew the other by the catheter out of the urethra. The turned back flap was so folded that its mucous surface touched itself and through its double edge, the end of the thread hanging out of the vagina, was passed spirally with a needle twice, and so a plug of flesh formed with a raw surface. By drawing the end of the thread, hanging from the urethra, the fleshly plug was pulled between the fistulous edges, and properly pressed up with the finger. An assistant continued to draw the urethral end of the loop, whilst the operator after refreshing, drew a thread forwards, which had been introduced into the upper edge of the fistula for the purpose of bringing it into contact with the flap of flesh. An elastic catheter was then introduced into the bladder, the ends of the threads fastened to a T bandage.
(or with sticking plaster to the thigh) and the wound covered with agaric.

Mr. Yollet subsequently made the flap from between the thighs or buttocks and succeeded in many cases.

Videl proposed destruction of the wall of the bladder and vagina by bringing together the labia having first pared them. This seems to be rather a questionable proceeding on the part of Videl. There are many other methods which we might describe such as those by Pancoast, Horner, Ruth, etc. Those already given may suffice to lead us to expect many difficulties in our treatment and in many cases to make up our minds to meet with failures. In addition to this we may derive considerable assistance in endeavouring to form some rational mode of treatment, admitting of general application in the cure of all fistula.

The first point that seems to arrest our attention as requisite is the prevention of the urine from coming in contact
with the edges of the fistulous opening. For every surgeon who has had any experience in the treatment of such accidents has regarded the wound as the great obstacle to his success in obliteration of the opening. If we could overcome this difficulty there is every probability of greater success. The second point which presents itself for our consideration is this, What are the best means for bringing the edges of the wound together and most favorable to adhesion? Dr. Sims is in favor of the scalpel for removing the callous edges. After reviewing the success of such application as the cautery and other caustics in general we fully acquiesce in Dr. Sims' opinion as it seems to be the most rational. When the edges of the wound are made raw by the scalpel the guillotined sutures seem to be the best adapted for retaining the edges in apposition especially that modification which Dr. Sims has proposed. We shall next
proceed briefly to illustrate the application of these principles.

With the view of finding some plan of fulfilling the first indication viz. preventing the action of the urine, we made diagrams and dissections of the parts in order to ascertain to what points of the bladder the urine gravitated, in different positions of the body and if possible to find out some means to remove the urine from it as soon as it had entered it.

This was suggested to us by observing that if a globular body with solid walls was partly filled with fluid, the height at which the fluid stood was but little affected; during the time its position was slowly changed. From this we concluded that as the bladder was a hollow vessel the urine it contained must be subject to the same law and as the base of the bladder and urethra are fixed to the upper part of the vagina by a considerable
thickened of muscular and fibrous texture so as to render it comparatively immovable at that point; it presented a considerable resemblance to the solid walls of a globe. As very little distention or contraction could take place where this adhesion existed, when the organ was distended by urine, the walls expanding laterally and superiorly. In order to test the accuracy of this, we made a section of a female pelvis and having placed the body in the horizontal position, we dissected out a portion of the ureters about midway between the kidneys and bladder, disturbing their relations as little as possible. On the next place the bladder was partly filled with fluid by injecting it through the exposed ureters to about the height indicated in Figure I. On placing the body in the upright position the urine gravitated towards the anterior, and urethral portion of the bladder, as indicated in Figure II.
leaving the back part in a collapsed condition. On placing the body upon the abdomen, the fluid now filled the anterior and lowest part of the bladder, leaving as near as we could ascertain the "bas fond" untouched, and reaching about the line of level indicated in Figure III. Remembering that the coats of the bladder had lost all vital contracility and that this collapsed condition of its walls might not exist in the living subject, or to a much less extent. We next proceeded to inject the bladder with about an ounce of liquid, placing the subject in the positions above indicated. We then injected successively half an ounce and two drams of liquid. Having emptied the bladder we made a circular opening through the upper part of it, for the purpose of observing the course of the injected fluid, on leaving the valvular orifices of the ureters, and likewise the relative levels of the base and trigone, in relation to the internal meatus.
During a forced injection the fluid on leaving the ureter passed directly across to the opposite ureter. On injecting through both ureters simultaneously, the two currents met in the middle were broken and flowed directly backwards, with a slight projection in front, arising from the force used during the injection as is endeavoured to be shown in Figure IV.

On injecting very slowly a small quantity of fluid, it was observed on leaving the ureters to spread itself over the back part of the trigone for a little way, and then gravitate towards the "bas fond" of the bladder for a little way, and then gravitate towards the "bas fond" of the bladder for a little way, and then gravitate towards the "bas fond". Our object was to imitate as nearly as possible the natural distillation of the urine from the ureters and observe its mode of accumulation in the organ in the horizontal position. On looking into the bladder from above, the subject being placed upon its back, the "bas fond" by measurement was found to be its lowest portion (the vagina being
in a collapsed condition) fully one inch below; the level of the urethral opening, accounting for the gravitation of the urine to that point when the vagina was distended to what (might be supposed to be its natural state, the bas-fond was raised about half an inch towards the urethral level. The next point we wished to ascertain was, in what way the urine passed through artificial openings made at different points, corresponding to the usual position of fistulae in the living subject.

With this view we simulated a urethral fistula, on injecting the bladder the liquid passed to the "bas-fond" as in former experiments, rising gradually to the trigone, and finally to the urethra; on reaching the nearest point of the opening it extended itself for a little way along its edges and then flowed directly into the vagina. On making small and large openings in the trigone we observed the same result, with this difference, that a less quantity of fluid was required to reach the level of the opening.
on making analogous openings in the "bas fond" it passed directly backwards on leaving the ureters, and so out of the bladder, without collecting to any extent round the artificial opening. After having thus observed at what points the urine was most liable to collect, our next object was to construct a catheter which could be retained in the bladder for a length of time, and which would ensure the evacuation of the urine with as little chance as possible of its interfering with the edges of the fistula after operation.

This problem we endeavoured to work out by diagrams. After many trials we found it impossible to construct a catheter which would answer the purpose without at the same time paying some attention to the position of the patient. The kind of catheter which seemed the most likely to meet our requirements is attempted to be shown in Figure V. It is a simple silver tube bent in the shape of the letters S
perforated along its upper convex surface by numerous holes, open at both ends, at one end fitted with a kind of collar, with the object of making it self-retaining, and to adapt it to the urethral orifice, making it not so liable to be displaced when the patient moved. Since we constructed the above we have seen a catheter almost identical with it, of which Dr. Sims has given a drawing. He has used it successfully in many cases of fistulae, and speaks highly of its self-retaining powers about which we had some doubts having had no opportunity of applying it.

We will now proceed, necessarily in a very imperfect manner, to apply the foregoing remarks to the treatment of special fistulae. We may arrange them under the three following heads: I. Fistula situated in the urethra. II. Fistula situated in
the trigone, the neck of the bladder, and commencement of the urethra.

III. Fistula situated in the "bas fond" and back of the bladder.

As soon as a fistula is formed in any part of the urethra, or previous to its full establishment, as soon as any probability of its formation has been observed, the patient ought to be placed on the back, and a catheter introduced, and suitable applications applied to the parts, if possible to stop the disease.

This position as shown in the experiment would seem to be the most favorable for preventing the action of the urine upon the part. For the urine rises to a certain level and then flows into the catheter. If the patient has recovered from the shock to the constitution which necessarily follows parturition, and everything is so favorable that the practitioner considers it his duty to propose an operation, for its radical cure, the patient should be placed in the position described under the head "diagnosis," in as good a light as
possible, and as little exposed as is consistent with the efficient performance of the operation.

Chloroform having been previously administered. The edges of the fistula are then to be resealed by means of a tenaculum or forceps and scarified to a sufficient extent with a fine pointed scalpel. When this is successfully accomplished, it leaves a raw even surface. The edges as soon as the principal part of the oozing has ceased may be brought into close apposition. If this be not accomplished without considerable dragging, and there is a danger of the ligatures cutting their way through the parts, two slight longitudinal incisions may be made on each side the fistula to relieve the tension. The suture will in the next place be applied, and the quilled suture in preference to any other. For this purpose a fine spear pointed needle will be required, with its eye a short distance from the point. Some fine silks ligatures and silver wire with two pieces of gutta percha or lead instead
of two quills. Dr. Sims describes the passing of the ligatures in the following manner:

"The needle is introduced as many times as required, filled with silk; then lengths of silver wire are attached to each end and drawn through; then a piece of lead is procured round, and a little longer than the opening, a sufficient number of holes are drilled through it, which are gouged out on each side; one end of each wire is passed through each and a split shot attached to it; it is then drawn tight and the shot fits the depression; the other ends are put through another piece of lead, and the edges of the wound brought together, the last wires are shotted and the ends are clipped off. On the next place a catheter is introduced sufficiently small as not to produce any tension upon the ligatures; and the patient is placed upon her back in bed; a certain degree of cold must be applied to the parts to prevent over action, and the ordinary treatment of a healing wound followed out. A tension of some kind is placed in the
led to receive the urine. An opiate given if required, and a nurse left beside her.

The ligatures must not be touched for eight or ten days, unless some untoward symptoms arise. The catheter will require to be removed twice or thrice a day for the purpose of cleansing, and consequently a relay of catheters will be required.

Before the operation is begun, the bowels must be thoroughly evacuated, and means taken to prevent their action for fifteen days afterwards, as their action would in all probability destroy the process of union. The patient's food should consist principally of a little tea and a very few biscuits. The cicatrix will have attained considerable firmness about the fifteenth day. The patient may then be allowed to change her position, but on no account to attempt to pass her water by a natural effort of her own, as there is great danger of the cicatrix giving way for at least three weeks or a month after the operation.

If chloroform be administered previous to the
operation the patient will require to be held up in the requisite position by artificial means. If the ligature should fail from any cause, and a sufficiency of parts not remain to warrant us in giving them another trial, we might try Mr. Roberts method of transplantation as previously described. With very few exceptions the description given will apply to all fistulae in any situation. It would be impossible to notice every deviation in treatment which would be requisite in every case. There are many points which might require notice, but they are of less consequence than those which have been referred to. It is not our intention in the meantime to notice them, but to confine ourselves to the principle of treatment.

There are some peculiarities which require further notice, and these are points chiefly connected with the action of the urine upon fistulae situated in different parts of the bladder.
We shall then, with this view, consider our second division of fistulae, viz those situated in the trigone, and neck of the bladder; These fistulae are in general of larger size and varying from the size of a fine probe to that of one or two fingers. They are deeper seated than those of the urethra, and the operation is more difficult; but this is in some measure overcome by means of a longer needle, and by drawing the parts further outwards by a tenaculaum. If the parts will not admit of being drawn sufficiently down, a needle holder may be used or a long needle made of flexible metal, as the greatest difficulty in the operation is said to be in properly passing the ligatures. The greatest possible accuracy ought to be observed in bringing the edges together, for much of our success will depend upon this important part of the operation.

With respect to the best way of preventing the action of the urine upon these fistulae, we should pay that the pelvis ought to be somewhat raised and the patient placed on her back, she might be placed likewise upon the abdomen and allow
the urine to collect in the upper and anterior part of the bladder, where it would not be liable to come in contact with the fibrous edges. Dr. Sims has been in the habit of treating fistula in this situation by placing the patient upon her back during the whole time of treatment, and depending rather upon the curved catheter for drawing off the urine than upon placing the patient in any particular position. As the urine was seen in the experiments to enter the bladder at the base of the trigone, if the fistula was of any size some of it would of necessity find its way through it; at least as soon as it had filled the base of the bladder, it would soon reach the level of a fistula situated in the trigone and could only be prevented from flowing into the vagina by some valvular arrangement of the mucous membrane of the bladder being present, which is sometimes the case. In small fistula the position of the patient upon the back would in all probability not interfere with the process of union as
the curved catheter would remove the urine before it reached their level.

Fistulae coming under the third division present greater obstacles to the operator than any previously described. They are in general larger in this situation, and from their position more exposed to the action of the urine. On glancing at the diagram shewing the height, and manner in which the urine collects in the bladder, when the patient is placed on the back, it will be evident that the urine will, without collecting, escape from the bladder into the vagina.

The quantity of urine which the bladder could contain under these circumstances would be excessively small, and in the case of a large opening it would escape by extending itself over the fistulous edges and then escape drop by drop into the vagina. The whole extent of the fistula would be thus exposed to the acid fluid.

It appears from the above reasons that placing the patient on her back in the horizontal position would be inadmissible
in the treatment of fistulae situated in the "bas fond" of the bladder. Placing the patient upon the abdomen seems to be the only likely position to answer the object we have in view. By not attending to this may have given rise to the general opinion which exists, that fistulae so situated are always incurable. Also to Mutgers performing the operation of paracentesis vesicae. If we place the patient upon the abdomen and adapt a catheter to the bladder so that the point will dip into the collected urine in the anterior part, the contact of the urine with the fistulous edges may in a great measure be prevented. The collecting of the urine as illustrated in the diagram would seem to warrant us in recommending this as the most favorable position in which the patient can be placed.

Finally if our endeavours to effect a radical cure have been unsuccessful our only resource left is palliation. There are two objects we ought to have in view
wot the preventing as much as possible the action of the urine upon the vagina and external parts and lessening its acid action by dilution &c. To fulfil the first point indicated various means have been tried. The one that seems the most likely to be of general use is an elastic tube made of gutta percha capable of being distended with air and fitted to a metallic framework to render it firm. When this tube is introduced into the vagina and inflated with air it presses equally on all sides and in some cases would totally plug up the fistula and allow the patient to go about with some degree of comfort. Elastic bottles have been used with the object of collecting the urine. They are described in various works. Sponges also have been lodged in the vagina for the purpose of preventing the action of the urine. Much skill and judgement will be required to fulfil the varied requirements of each case at least a bawde
but the surgeon is bound to afford what relief he can to the sufferer of this loathsome disease and the least mitigation of the patient's suffering will be a source of pleasure to himself and gratitude on the part of the patient.

In concluding our remarks we would say that we are fully conscious how imperfectly we have executed our task. On many points our time and space have permitted us merely to indicate rather than illustrate. This has arisen from the complicated nature of the subject, to the full elucidation of which, a much more extensive treatment is necessarily demanded. But we have endeavoured, to the best of our ability under these circumstances, to seize the leading and fundamental principles and as far as possible, illustrate them under their respective heads. How far we have succeeded in this it is not for us to say. The difficulty of compressing
our thoughts into a small compass may be considered a sufficient excuse, where our remarks seem meagre and abrupt.

While on the other hand in reference to what may have been omitted we have merely to repeat, that while we would have been willing to have brought forward other points, and to have illustrated them by examples. We thought it better to adhere to the method of presenting an outline of the general principles of our subject, and avoiding anything in the way of detail, which could be excluded, without at the same time affecting the general perspicuity of the whole.