THE

SURGICAL WORKS,

OR STATEMENT OF THE

DOCTRINE AND PRACTICE

OF

P. J. DESAULT,

SURGEON IN CHIEF OF THE GREAT HOSPITAL OF HUMANITY, AT PARIS;

BY XAVIER BICHAT,

His Pupil, adjunct Physician of the same Hospital.

IN TWO VOLUMES.

DISEASES OF THE URINARY PASSAGES.

TRANSLATED FROM THE ORIGINAL,

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D. CALDWELL,
Clerk of the District of Pennsylvania.

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SURGICAL WORKS, &c.

PRELIMINARY DISCOURSE.

THE diseases of the urinary passages present the most remarkable example of the rapid progress, which has marked the surgery of this age. Seldom observed by the ancients, they scarcely arrested their attention, and did not form a distinct class in their books. A few detached fragments, scattering facts and remedies occasionally mentioned, constitute the whole of what they have left respecting this kind of affections. They were debarred from opportunities of seeing them; and these were not numerous until the era of the introduction of the venereal disease into Europe; but the physicians, being then engaged by the essential malady, neglected to study its consequences. A multitude of books upon gonorrhœa appeared, but no research enlightened the treatment of the contractions of the urethra, which so often succeeded it.

The frequency of the disease at length induced the necessity of studying a remedy for it. Physicians bestowed their labours upon the diseases of the urinary passages; but, as is always the case, their labours partook of the prevailing opinions. The emplastering medicine had the predominance at that time, and in a little while the treatment of these diseases was crowded with formulæ of plasters, ointments and cataplasms. Vain

resources, in which the number of the names conceals the emptiness of the substances, and the multiplicity of which is at the same time a proof of merit with the ignorant, and of insufficiency with the wise.

Daran believed that, by varying the composition of his bougies, he could accommodate their virtue to every practical case. Their use was followed by some success, which resulted, not from the medicines that were in their composition, but from the compression exercised by them upon the urethra. They were in fashion for a long time. How often is this the case with remedies in medicine, when they offer a bait to credulity, an instrument to cupidity, or a refuge to ignorance.

The diseases of the urinary passages appeared to be nothing more than the province of charlatans until within twenty years, when genius began to assume the dominion over them. Many researches, which were made both in England and France, cast a new light upon the theory of fistulæ, urinary abscesses and strictures of the canal. It was ascertained that the constant discharge of the urine through a permanent catheter was an essential object of their treatment. To have thus established the indication of the remedy, was the first step towards its perfection: the second was, to be assured of the possibility of its use. Under this view silver tubes presented only a difficult resource; those of elastic gum were discovered, and from thenceforth art could attain the object, which it could only contemplate before. Supple, flexible, and easily following all the curvatures of the canal, these kinds of tubes were free from the inconveniencies, and united almost all the advantages of the former.

Practitioners were soon aware of all the value of such a remedy. The affections of the urethra became the

objects of their labours, which were greatly multiplied and especially in France.

At that time Desault was at the highest period, not of celebrity, but of the labours which prepared for it. No person could derive a greater advantage from the catheters of Bernard. For this purpose he had the genius which creates, the experience that perfects, the dexterity of hand, which, in our art, makes discoveries valuable, and the enthusiasm of pupils to proclaim them. His discoveries were rapid—each of them had not a transcending eclat, but their assemblage changed the face of the treatment of the diseases of the urinary passages; and the finest eulogium, that could be pronounced upon this great man, I believe, would be a parallel between the present remedies and those that have been adopted within twenty years. At its origin his practice became that of all the young surgeons, and in a little time was adopted by the masters of the art. The extract of his lessons fills up, in the work of Chopart, a void with which it may be reproached upon this point; although otherwise it contains treatises that are justly to be commended. The Journal of Surgery, which appeared at this time, had for its object the publication of the progress of the art, which seemed every day to assume a new aspect at the Hotel Dieu. The diseases of the urinary passages ought, under this title, to occupy the first rank there. Desault undertook there to treat them *ex professo*. This is the only point of pathology which was completed there. Respecting other points, many observations and a few reflections were interspersed occasionally there.

I have attempted to collect these observations and reflections under a methodical form, and to present in detail, in the surgical works, what was only an abstract in the Journal. The foundation of this work belongs to

Desault—the construction is mine. On the contrary, I have hardly made any alteration in the treatise which I now present to his pupils. Desault had presided over the compilation of it, and I could only have disfigured it; this is a second edition, placed in an order which the journal did not comprise, and augmented by a great number of facts, which were collected posteriorly to those recorded there, and offering several new views of the numerous causes of retention of urine. This work, when united with that which I have already published, will form an accurate display of all the discoveries of Desault. A hand more experienced than mine, ought, no doubt, to have designated its features, but no person took the pencil—I have seized it, saying to myself, gratitude was the motive, and indulgence will be the support of my labours.

TREATISE

ON THE

DISEASES

OF THE

URINARY PASSAGES.

THE diseases of the urinary organs may be divided into two grand sections. The one comprehends those that relate to the secretion of the urine: the other includes those that are connected with its excretion. The former belong as much and more to internal than external medicine, which is applicable almost exclusively to the second. In this manner Desault had more especially cultivated them, and the reader will easily perceive that the second part of this work is, on that account, very superior to the first. In presenting this, such as it was when first published in the Surgical Journal, I have not wished to bury it in a work, that would be accommodated to the actual state of the science. To do this, it would have been necessary to create it anew, if I may so speak; and then it would have been my own work and not that of Desault.

PART FIRST.

Of the Diseases that relate to the Secretion of the Urine.

CHAPTER I.

Of the Diabetes.

AUTHORS do not concur, with regard to the definition of diabetes. Some have given this name to every extraordinary evacuation of urine; but it cannot be said, as Celsus remarks, that a diabetes exists, unless the quantity of urine evacuated is at least equal to the mass of liquids that have been taken in, and unless there is also a derangement of the health. The name of diabetes has also been given to that abundant flow of urine, which frequently occurs after a spasmodic attack, such as takes place in a sharp and inflammatory disease; but is not this abusing words and confounding symptoms with diseases?

Others have supposed that a sufficient idea of diabetes was given, by saying that in this disease the drinks, which were taken in, were discharged unaltered through the urinary passage. This definition does not seem to be sufficiently generic, since not only the drinks are lost through the urinary passage, but with them the chyle, the serum of the blood, the lymph, the bile, the fat, and in short all the fluids of the body. Those, who understand, by diabetes, a diarrhœa, a urinary consumption, an excessive and colliquative flow of urine, appear to give the best expression of its generic and distinguishing character.

The dearth of cases of this disease proves how rare it is. Very few examples of it are found among the ancients. Galen relates two, which are referred to by almost all those who have spoken of it after him, and it can be perceived that they are mere copyists of each other. Aretæus is one of those, who has described it most in detail. It seems to be more frequent in England than in France. Matthew Dobson asserts, that he had known nine patients to be affected with diabetes. Cullen says that he had seen twenty, and the French authors scarcely make mention of it. But may they not frequently have committed a mistake respecting the kind of disease which they observed; and may they not have confounded, with diabetes, incontinencies of urine, especially those which take place in retentions with regorgement, and which, when no remedy has been applied to them, are generally accompanied by the same symptoms, such as emaciation, wasting of strength, fever, &c. This suspicion is confirmed by the inaccurate mode of opening the bodies of those, who are reported to have sunk under this disease. Generally the kidneys and liver only were examined, and although no preternatural affection was remarked in them, the researches were not prolonged to the bladder; and in cases where it was done, this has always been found to be very large and sometimes full of urine.

The kinds of diabetes have been greatly multiplied. The ancients distinguished it into true and false diabetes. According to them the diabetes was true, when the quantity of urine surpassed that of the drinks, when it was yellow, white, chylous, purulent, of a mild and saccharine taste, &c.; and it was false when the urine was increased, and when it preserved the colour and nature of the drinks. They also gave the name of diabetes to the urinary lientery. But as, in the course of the

same affection, the urine often exhibits every variety, this distinction, which is not natural, only serves to render its history more difficult.

It seems to be more methodical to divide the diabetes into two sorts: the one occasioned by an alteration of the humours, and the other depending upon an affection of the kidneys. A defective assimilation of the humours forms the first sort; the relaxation and irritation of the kidneys produce the second.*

§ I. *Of Diabetes, produced by the alteration of the Humours.*

In a faulty assimilation we comprehend all those diseases of the humours, which have been considered as the particular causes of diabetes, such as an excess of the serosity of the blood, its too great tenuity, and its dissolution; and we refer to it the feverish diabetes, the arthritic diabetes of Sydenham, the mellitous or chylous diabetes, &c.

The promptitude with which the serum of the blood flows through the urinary passages, proves that the or-

* This division of diabetes obviously rests upon vague and uncertain data. I do not believe that the reciprocal influence of solids and fluids in diseases, can be marked with sufficient accuracy, to admit of this influence in their division. The period at which this work was written, exhibited also, in medicine, a multitude of hypothetical ideas, whose yoke this celebrated man had partly broken, in diseases exclusively surgical; but to which he still was subjected in those that related to medicine, properly so called, which was never the object of his particular meditations. I have attempted in the preceding volume, whose form, compilation and conception are exclusively mine, to disengage his doctrine from all that is connected with the inaccurate opinions of humoral medicine in the history and treatment of the diseases, which bore the mark of this doctrine in his courses. This being entirely his own, I have not wished to touch it.

ganization of the kidneys is very favourably disposed to this flow. This secretion occasions very little trouble to nature; if we may so speak, she has nothing to do but to pass our humours through these viscera, and has no need for a particular cause to attract them there. It is in a great measure, by this passage, that she relieves herself in a state of health of the superfluous fluids. For a diabetes to take place, it will then be sufficient that these fluids should lose their consistence, and that they should be so thin as to go in a thread-like stream through these strainers. Thus we may regard a faulty assimilation as the immediate cause of diabetes, without there being a necessity for the existence of any morbific affection in the kidneys. Persons of a phlegmatic temperament and a feeble constitution are peculiarly liable to it; also, those who have made an abuse of watery drinks, hot or lukewarm, especially after having drunk spirituous liquors excessively. Those who lead an indolent and sedentary life; who inhabit moist and cold places; who are badly fed, and who live on nothing but vegetables, especially pot-herbs; those who have had their blood impoverished by profuse hemorrhagies, by frequent and multiplied bleedings, by abundant suppurations, or by tedious diseases, which have required a severe diet. It may also be produced by a metastasis, and occur in consequence of a dropsy of the thorax or abdomen.

The ancients attributed it sometimes to the cold and sometimes to the hot temperature of the patient. Mead supposed that it had its source in the liver, but it always depends upon the debility and exhaustion of the digestive powers. The clinical experience of Home, and the practice of Cullen, have proved, that the liver was almost constantly in its natural state, and that if steatomatous collections appeared there sometimes, their existence

could not, under any view, be connected with that of diabetes.

This kind of diabetes cannot be distinguished, except in the commencement of the disease; for when this is advanced, the symptoms are the same, whatever may be the kind. We can then be guided only by the historical signs.

This disease seldom shows itself suddenly; it is commonly announced by a frequent urgency to pass the urine. Sometimes there is a sensation of cold or heat, which is propagated from the belly to the bladder. The quantity of urine, increasing every day, soon exceeds that of the drinks taken in.

In the first stage the patient is weak, dejected, without fever and without thirst, and complains of no pain in the region of the kidneys or about the bladder. The urine is increased, limpid, inodorous, almost tasteless, and forming little or no deposit. The symptoms develop themselves slowly, and are not distressing until the second stage of the disease. The body, if we may so speak, being dried up by this continual and abundant loss of fluids, becomes emaciated; a heat supervenes upon the skin and entrails, and fever and thirst ensue, which nothing can quench. The drinks are voided almost as soon as taken, and the patients are disgusted with solids but have a great desire for liquids. In this kind of diabetes they often have sharp belchings, digestion is difficult, the chyle badly prepared, mixes with the drink and is lost with it by the urine: this then changes its nature; it is sometimes yellow, sometimes white, and resembles a solution of honey in water; it has a mild and saccharine taste, with a faint urinous smell, and deposits a grayish and very thick matter.

The cutaneous perspiration no longer going on, the skin becomes rough, rugous, and is covered with small

farinaceous scales; the emaciation and drying up increase visibly. If there should be a momentary stoppage of the flow of urine, the abdomen swells and sinks again as the urinary flow is restored. The pulse becomes small, irregular and intermittent; at length the patients fall into the last stage of exhaustion; they exhibit all the symptoms of marasmus; and the vessels not containing sufficient fluids to keep up the circulation, it ceases and the patient dies.

The diabetes is more or less severe, according to its cause and duration, and the age and constitution of the patient. When this disease happens in consequence of long infirmities and in old age, when it is inveterate and the humours are in a colliquative dissolution, there can be little hope of a cure. Wintringham affirms that the true diabetes is never cured. Cullen, who had seen a great deal of it, asserts that there had not been a single cure in all Scotland; however, Van Swieten, Harris, &c. cite several.

To give more consistence to the humours, and to prevent their afflux to the kidneys, are the two indications to be fulfilled. To accomplish the first, it is advised to give incrassants and restoratives of the digestive powers. For example, we may give a decoction of rice, barley, gum tragacanth, arabic, shavings of hartshorn, to which may be added some aromatics, such as canella, or mace, or it may be sharpened with some drops of simple vitriolic acid or water of Rabel; we may also try pure milk, alum curd, martial waters with vitriolic acid, or a strong decoction of bark. We must besides be regulated in their choice, by the particular nature of the faulty humours.

In general we must avoid drinks that are too watery, or the patient's drinking to excess, as they would only increase the weakness. He should even abstain, as much

as possible, from drinking, and if he could resist the thirst which torments him, it would perhaps be better for him to take his medicines in a dry form. But may it not be feared that the disease would make a more rapid progress, from not repairing, by copious drinking, the loss which is sustained by urine? There would be less danger in seconding the effect of liquid remedies by some preparation of rhubarb, camphor, ethiops martial or saffron of mars, given under the form of opiate or of pills, with some boluses of theriaca, &c. There is no way of preventing the humours from tending towards the kidneys, but by attracting them to another part. Some have attempted to produce this revulsion upon the stomach and intestines, and have employed vomits and drastic purges. Their use is not innocent; when they do no good, they are always injurious, and complete the destruction of the digestive powers. There is no danger of this inconvenience in attracting the humours towards the skin; the analogy which exists between the cutaneous perspiration and the urine, and the facility and promptitude with which these excretions supply each other in a state of health, render this discharge greatly preferable. But little reliance can be placed on diaphoretics and sudorifics, taken internally; in this case they would become diuretics and would act upon the urinary passages, already weakened by this immoderate flow, rather than upon the skin. There are no means, more efficacious or less dangerous, of recalling the perspiration, than frictions over the whole body, made with flannel or a brush, especially if there has been a previous careful washing with lukewarm water. These ablutions relax the skin only, and do not, like hot baths, increase the general debility.

The patient should avoid cold with the greatest care; he should inhabit a spot, where the air is warm and dry:

and if his strength still permit the taking of exercise, he should do it until sweat is excited, if that be possible. Pure red wine may be used as medicine and nourishment, but it will not be proper except the disease be recent and the heat and fever moderate. In other respects, the nourishment should be selected from solid and dry substances, especially the farinaceous; always attending to the taste of the patients and their digestive powers.

When the disease has arrived at its last stage and the marasmus is extreme, we can only assuage the burning thirst of the sufferer by acidulated drinks, and wait for nature to terminate his sufferings.

§ II. *Of Diabetes, produced by the affection of the Kidneys.*

The relaxation of the vessels of the kidneys is more frequently the effect than the cause of diabetes. Sometimes, however, it happens that these viscera are originally too much relaxed, either from a faulty organization, or accidentally from the abuse of watery drinks; also from the too long continued use of diuretics; retentions of urine, which, arresting the fluids, one after the other, in all the little conduits of the kidneys, have distended them beyond bounds by an inflammation of the kidneys; or even by the custom of laying in beds that are too warm and soft, &c. The same result often takes place from two opposite extremes. Thus the relaxation and irritation of the kidneys equally give rise to the affection, which is now the subject of consideration.

Again, we may regard as a species of diabetes, that which takes place from the destruction of a part or of the whole of the kidneys. But may we not question the existence of such a kind of diabetes? It is true that Ruysch cites an example of it; he says that, in the body of a man

who died of diabetes, he found the kidney entirely destroyed, and he adds that the bladder was very large. This example is inconclusive: Ruysch speaks of it only as an anatomist; he does nothing but announce the disease; he relates no sign of it, and it is probable that having met with this pathological fact in his dissections, he only learned by a vague report what had been the nature of the disease.

There are scarcely any historical signs, which can distinguish diabetes, through a relaxation of the kidneys, from diabetes through defective assimilation; in both the patients do not experience any pain in the lumbar region; but when the humours are not vitiated and the relaxation is only local, the digestion is not impaired; and this is the reason that hunger and thirst speedily torment the patients without their being able to gratify them completely, and that the strength keeps up a longer time, and the heat and fever are more violent, &c.

It is particularly in this kind of diabetes that recourse must be had to astringent remedies, alum whey, bark, rhubarb, &c. It has even been advised to give the most irritating diuretics, such as the tincture of cantharides, with vitriolic acid, given two or three times a day in doses of fifteen to forty drops, in an appropriate vehicle. But in making an internal use of the preparations of cantharides, we should always keep in view that this insect is a real poison, whose dose, even in extreme relaxations, should never exceed a half grain, and rarely equal it. The application of cold bodies and of ice, of compresses soaked in vinegar, or the oxycrat, upon the lumbar region, is one of the most efficacious means to restore tone to the vessels of the kidneys, but it should be continued for a long time. Van Swieten says that he never obtained success from this remedy until after three months constant and assiduous use.

The second cause of diabetes from affection of the kidneys is the irritation of those organs, an irritation which is determined to them by some cause. The fluids being carried to them in too great abundance, the urine will become more copious, and diabetes will sometimes be the consequence of it. The abuse of warm diuretics; the presence of gravel or small stones in the kidneys; a gouty, itchy, dartrous, rheumatic humour, fixed upon these viscera; metastases; cantharides applied externally to the body, or taken internally; excess of venery, &c. are among the causes which may give origin to diabetes.

Besides the historical signs, there are often in this kind of diabetes very severe pains in the region of the kidneys, which do not exist in the two other kinds.

In the treatment, regard must be had to the cause of irritation. If it depends on the use of warm diuretics, it must be combated by the contraries, such as ptisans of flaxseed, marsh-mallow and dog's-tooth, warm baths, &c. We must attempt to recall the gouty humour to the skin by sinapisms upon the feet, and the itchy humour by restoring the itch, &c. If these means do not succeed, we must determine a point of irritation towards another part, either by caustic, seton or vesicatory, into which no cantharides must enter. Simple or scarified cuppings, and cataplasms applied alternately and repeatedly upon the same region, may also contribute efficaciously to the exhaustion or removal of the irritating cause, and thus cure this disease. I have not mentioned these different kinds of diabetes, but to show the limits of our knowledge of this disease. The subject is entirely new; the field of hypothesis is vast, and a service will be rendered to the art by engaging practitioners to communicate what experience and observation may have taught them upon this subject. It is only by collecting a great number of facts, that we can arrive at any certainty in the treatment of diabetes.

CHAPTER II.

Of the Suppression of Urine.

Most authors have confounded the suppression of urine with its retention, and have designated both under the generic name of ischury. Some however have distinguished them by admitting two kinds of ischury: the one true or legitimate; the other false or bastard. According to them the ischury is true, when the urine is stopped in the bladder; and it is false when it does not flow into this viscus. But this distinction does not give a sufficiently just idea of these maladies, since the urine may also be stopped in the ureters, and even flow out through a fistula, without ceasing to be secreted in the kidneys. It is, however, very important to distinguish these two cases carefully; for their remedies are not the same, and the means which would be proper to excite the secretion of urine and to remedy its suppression, would often be contrary to the re-establishment of their excretion.

It would be more accurate to define suppression to be that disease, in which the urine is not secreted in the kidneys; and retention, that in which the urine is stopped in some one of the canals, which are intended to convey it out.

Suppression may be total or partial; it is total when there is no secretion; partial, when the secretion is not abundant enough for the preservation of health.

Suppression of urine takes place sometimes in the commencement of a sharp inflammatory fever, in inflammations of the abdomen, in the attack of nervous hysterical affections, hypochondria, in paroxysms of the gout, &c.; but we will not examine it under this view; for, in all these cases, except some examples which will be

mentioned, this suppression continues no longer than the disease, of which it is a symptom, maintains the same degree of strength, and ceases with it.

The idiopathic suppression of urine is more rare; for it to take place, it is not sufficient that the secretion of urine should be stopped in one of the kidneys, but this function must be interrupted in both at the same time. It is true, that the intimate relation which exists between these two viscera, often renders their diseases common; but a sufficiently great number of observations and openings of bodies prove that the injury of one does not necessarily involve that of the other.

Amongst the numerous causes of suppression of urine, we will omit those which are not seated in the urinary passages, and which do not suppose any derangement in these organs, such as plethora, the thickening of the blood, excessive salivations, abundant sweatings, obstinate diarrhœas, dropsy, &c., which rob the blood of its serum, and attract it to other parts; and we will consider only those causes, which disturb the functions of the kidneys, by their immediate action on them. In this number may be comprehended obstacles to the circulation of blood in the kidneys, such as obstructions in their conduits, either from blood, mucus, pus, gravel, stones, &c.; inflammation, gangrene, suppuration, induration, spasm, atony, &c.

Whatever may be the cause of the suppression of urine, this disease has common signs, that are sufficient to distinguish it from every other. In general, the patients pass little or no urine, and have no desire to pass any; no tumour is felt in the hypogastric region; the catheter, when introduced into the bladder, brings away little or no water; the patients experience a pain more or less sharp, pungent or heavy, in the lumbar region; they complain of a constant loathing, and of the

importunate presence of a urinous taste; they are tormented with nausea, hiccups and vomitings; and whatever they vomit, as well as their excretions in general, exhale a urinous odour, more or less strong: at length, if the disease does not yield, it often happens that the patients experience a difficulty in breathing; sometimes they fall into a comatous affection, and at others into convulsions, delirium, &c.

The prognostic of this disease is almost always unfavourable, both on account of the disorders that are produced in the animal economy, by the presence of matters which ought to be evacuated with the urine, and of the different disorders of the kidneys, whose structure and position frequently render the termination fatal.

The urinary canals not giving vent to the superfluity of the aqueous part of the blood, and this not carrying with it the earthy portion, the salts and the other acid substances, which the action of life incessantly develops in our fluids, the turgescence and acrimony of the humours are the inevitable consequence; and from thence originate a multitude of evils, such as infiltrations, urinary œdema, gangrene, dropsy, ardent fever, consumption, &c. It is true, that nature sometimes prevents these symptoms, or retards their origin, by a partial discharge of the urine through other emunctories, as the skin, ears, nose, mouth, mammæ, anus, &c. But these new channels can never supply the functions of the kidneys completely: they will afford an early passage to the thinnest parts of the urine, but the more gross will remain, and will be the source of numerous symptoms, which although more dilatory, will not be less terrible. In such cases, we have seen patients who did not sink for one or more years; whilst others perish commonly on the fifth or sixth day, and seldom survive beyond a month.

Suppression of urine does not present any general indication; its treatment can only be relative. In it, diuretics are like other pretended specific remedies; their action is always subordinate to the actual disposition of the diseased organs. Frequently, medicines that are contrary, and even directly opposite, are given with equal success in the same disease, of which the causes alone are different. It is only, therefore, by separately considering each of these causes, that we can point out the remedies for suppression of urine.

§ I. *Of Suppression of Urine from embarrassment of the vessels of the Kidneys.*

The first of these causes is an obstacle to the passage of the blood through the emulgent arteries or veins. The ligature of these vessels in living animals, leaves no doubt of the effect that must result from this defect of the circulation. All the animals, submitted to this experiment, experienced suppression of urine, and generally with urinous vomitings. We are not acquainted with any observations, which prove the existence of this cause in man; but it cannot be denied, that an aneurism of these arteries, or some tumour, situated upon their course and upon that of the veins, may act like a ligature. Aneurisms of these vessels must be very rare, since in the great number of bodies, opened by us, we have never met with an example of it.

When we consider the size of the emulgent arteries, and the force with which the blood is propelled through them by the pectoral aorta, it is difficult to conceive that they can be so much compressed by the pressure of a tumour, as to prevent the blood from passing through them. It is probable that the compressing mass would be raised up at each contraction of the heart, and would afford a passage to the blood; or even that the

continuity of the pulsations there would at length form a kind of channel, which would insure liberty of motion to the vessel. The case is not the same with regard to the veins; their thinner parietes afford less resistance than those of the arteries; their circulation being slower, and the impression of the blood more feeble, they would yield more easily to the compressing force. The blood being retained in these veins, will be so in succession, even to the arteries, and suppression will be a necessary consequence of this stagnation of the blood.

Happily, these cases are rare; perhaps they are only suppositious. Besides, unless these tumours were so voluminous as to be felt through the parietes of the abdomen, we do not perceive by what particular symptom they could be recognized; and supposing that we were certain of their existence, we would have but feeble means to oppose to them, and these means must be relative to the particular nature of these tumours.

If obstacles to the course of the blood through the kidneys seldom occur in the trunks of the emulgent arteries or veins, they must happen much more frequently when situated in their final ramifications; these may be obstructed by too thick a state of the blood; and plethoric and feeble persons are particularly liable to this stagnation of the blood. The fulness and distention, which the vessels experience, opposing their reaction, the circulation languishes.

If, with these dispositions, the blood also happens to be drawn more forcibly towards the kidneys, by too strong a heat applied to the lumbar region, by a blow received upon this part, by an excessive use of spirituous liquors, by violent exercise, &c., it may occasion an engorgement, which stops the secretion of urine. This kind of suppression, for the most part, occurs suddenly; sometimes, however, it is preceded by increased and

limpid urine, the quantity of which diminishes gradually. Its character can hardly be mistaken; the historical signs are sufficient to distinguish it. The patients do not experience any pain in the loins; they complain only of a sense of weight and lassitude in this region, and are besides without fever.

This suppression is not dangerous, and yields easily to bleeding and diluting drinks. In this case, bleeding especially, is very efficacious, and we may even say that its effects are sometimes marvellous. Patients have declared, that during the flowing of the blood, they have felt the urine flow from the kidneys into the bladder, and in a little while after they have experienced the most urgent desire to pass it. If this engorgement should not be dissipated in a few days, the inflammation of the kidneys follows speedily.

§ II. *Of Suppression of Urine from embarrassment of the Secretory Canals.*

After the suppression that is produced by the stagnation of the blood in the small vessels of the kidneys, that naturally presents itself, which depends upon the obstruction of the secretory canals by grumous blood; for they commonly proceed from the same cause. The bloody urine, which precedes this kind of suppression, is one of its distinguishing signs. If this kind of bloody urine has been abundant, and has lasted several days before the suppression, the patient has a pale countenance, and a small, concentrated and intermittent pulse. In a word, he exhibits all the symptoms which usually accompany considerable losses of blood.

The region of the kidneys is but little painful, unless this suppression should be the effect of a blow or a fall. In this case, the pain is sometimes considerable, but it is less felt in the kidneys than in the muscles of the

loins. If the bloody urine should continue, and the patient is strong and vigorous, we must have recourse to bleeding, and to the other means, which will be mentioned hereafter. After stopping the bloody urine, the indication, that remains to be accomplished, is to dilute the grumous blood, and to facilitate its escape. Copious watery drinks are suitable in the first stage. We may afterwards make them slightly aperient, by giving, for example, a ptisan of strawberry roots, rest-harrow, common star thistle, acidulated with some grains of nitre, and we may second their effects by baths and emollient fomentations upon the lumbar region.

On this occasion, repose is the more necessary, as exercise might renew the bloody discharge. Although the flow of urine might be re-established, there may remain in some of the conduits of the kidneys small clots, which may perhaps, at some future time, become the nucleus of a calculus. Experience has shown, with what facility these last concretions are formed, when some extraneous solid body is found in the urinary passages, around which the matters that are suspended in the urine may deposit themselves.

Although the obstruction of the secretory conduits of the kidneys, from thickened mucus, is not founded upon facts, it is admitted by too many authors for its possibility to be denied. However, in admitting it, we shall abstain from repeating the signs by which it is pretended to be recognized, because they are uncertain, vague, and almost impossible to be ascertained.

The same doubts, as with the preceding, may be entertained respecting the suppression of urine, that is occasioned by pus obstructing the secretory conduits of the kidneys. This last cause of suppression rests equally upon a supposition, whose reality cannot be proved. It is quite otherwise with a collection of pus

in the kidneys: it is well known that this sometimes produces suppressions of urine; but it is not by obstructing the conduits of the kidneys—it is by destroying or compressing them beyond the sphere of their reaction. However this may be, on the supposition that the pus may obstruct these conduits, it may be carried there by metastasis, or it may be produced by inflammation of the viscera themselves, and transude through the parietes of their vessels.

Thus we perceive a puriform secretion take place through the internal membrane of the nose or the urethra, when they have been inflamed. Admitting that the pus is carried to the kidneys by metastasis, it does not yet appear how it could obstruct the secretory conduits; for, if it has too much consistence, it will not enter into these small vessels, and will pass immediately with the blood from the arteries into the veins; and if it took any other route, it must have nearly the same tenuity and fluxility as the urine itself.

In this case, the historical signs will be the only ones that can indicate this kind of suppression. In the first case, the inflammation of the kidney, which must have preceded it; in the second, the sudden disappearance of the suppuration in any other part of the body, and the pus, which would have been remarked in the urine before its suppression, would be the indicators and precursors of it.

Diluting remedies are those, that may be given with the most confidence. Purges and vomits have also been recommended: these last especially have been vaunted as very proper to divert the purulent tumour from the kidneys, to propel it in the conduits where it would stagnate, and to hasten its expulsion by means of the agitation which they impart to all the viscera of the abdomen.

The obstruction of the urinary conduits by worms, is still problematical. We have even seen patients pass worms with their urine, and we have also found them frequently in the interior of the bladder; but the existence of these animalcules in the proper substance of the kidney, in man, is difficult to be proved. Zacutus Lusitanus, Hollier, and some others, are positive as to the fact of their being seen; but may they not have been imposed upon by some tubes in the shape of worms, formed by small filaments of coagulated blood, or are they certain that these worms were not developed after death, and that they were not the effect of putrefaction?

The suppression of urine from gravel or stones in the kidneys, is one of the most frequent and severe. We are no longer, as with the most of the other causes of suppression, which have been detailed, reduced to simple conjectures: numerous openings of bodies have showed us the disorder, but unhappily they have not taught us by what means they can be remedied. We are acquainted only with the resources of nature. Art has none, or they are reserved for the more fertile researches of the succeeding generation. We will not detail here the signs of this suppression, nor the remedies which have been proposed to combat it; as they differ in nothing from those for calculus of the kidneys, and as, according to the order which we have adopted, it is more suitable to arrange these extraneous bodies in the depravation of the urine, of which they are productions, and we shall therefore treat of them at the same time.

§ III. *Of Suppression of Urine from Inflammation of the Kidneys.*

Inflammation of the kidneys is most generally accompanied with suppression of urine, and this symptom is the more frequent in this disease, as it is rare for one kidney to be inflamed by itself. Commonly the inflammation passes rapidly from one to the other, and affects both at the same time.

Besides the general causes of inflammation, the kidneys have some that are in some measure peculiar to them, such as acrid diuretics, winged cantharides taken internally or applied externally, stones in the kidneys, urine retained in the bladder, and by continuity in the ureters, and even in the kidneys themselves; in short, every thing that is capable of attracting the blood in greater abundance to them, or of augmenting irritation in them.

When the kidneys are inflamed, the urine is sometimes suppressed suddenly; at others, it diminishes gradually, and the suppression is not total until about the third or fourth day. In these circumstances, the urine is at first watery and limpid; it then becomes red; the patients have a frequent desire to make water; they experience a burning heat, a sharp and throbbing pain in the region of the kidneys, a pain, which, while it continues, is more sensible in the evening than in the morning, stronger in inspiration than in expiration, which increases when the patients attempt to make water, when they go to stool, when they lie upon the side that is opposite to the seat of the disease, when they cough, &c.; but which is not increased, like lumbago, by the pressure of the hand upon the loins, nor by the bending of the trunk, &c.

A final trait, which seems characteristic of this kind of pain, is that it is propagated along the ureters towards the bladder, the anus and the glans; that it even extends to the testicles, whose retraction it causes; and that it is often accompanied with stupor in the groin and the upper part of the thighs. When these symptoms are somewhat intense, the pulse is commonly hard, frequent and elevated; the fever is ardent; the belly painful, especially when it is pressed; sometimes it is soft, at others hard, and as it were in balls with borborygmi; the patients are constipated; they have hiccups, nausea and vomitings; their perspiration and their sweat have an urinous odour, &c.

Inflammation of the kidneys may terminate, like inflammations in general, by resolution, suppuration, gangrene and induration. The first of these terminations being the only favourable one, the remedies should be directed to this. These remedies must be taken from the class of antiphlogistics, and chosen amongst the most powerful, such as bleeding, which should be repeated in proportion to the strength of the patient, more or less rapidly, and according to the vehemence of the symptoms; leeches should be applied to the margin of the anus, warm baths, emollient injections, fomentations of the same nature upon the abdomen and lumbar region; scarified cuppings to this last part; cooling and relaxing drinks, emulsions, whey, ptisans of flax-seed, marshmallow, dog's-tooth, in which some grains of nitre may be dissolved, &c.

When resolution takes places, it is seldom so late as the seventh day, counting from the attack of the disease. It is announced by the gradual diminution of the symptoms; the heat about the kidneys becomes less; the pulse becomes more supple, less frequent and more regular; the urine, which had been suppressed, resumes

its course; and, instead of being watery or red, it is white, turbid, and makes an abundant and puriform deposit at the bottom of the vessel. If the seventh day passes without the fever, pain and other inflammatory symptoms diminishing sensibly, suppuration or gangrene of the kidneys are to be dreaded. Suppuration may be expected, when, after the above period, the patient experiences shiverings; when the fever is exacerbated, especially towards evenings; when there is less heat in the kidneys; when the pain is less acute; when it is throbbing; when, after some tranquil days, it becomes more severe; when the patient complains of a sense of weight, tension and drawing in this part; when the numbness and stupor of the groin and the interior part of the thighs increase, or are changed into a pungent pain.

The abscess, which is formed in the kidneys, is more or less extensive. Sometimes it destroys their whole substance, and consumes them entirely; at others, it occupies only a part of them. In both cases the pus may have different vents; it either makes itself a passage through the conduits of the urine and escapes with it, or it pierces the intestine colon and is evacuated by stool; or extending into the loins, it forms a tumour outwards, and makes itself an opening or receives one from art; or it spreads itself into the surrounding cellular membrane, destroys it, flows into the small pelvis or passes under the crural arch through the inguinal ring, and gives rise to new abscesses in these parts; or is finally dissipated by the sudden reflux of the humours, and is diffused in the torrent of the circulation.

The rupture and effusion of these abscesses into the pelvis or their conduits, should be considered as a fortunate event in the extremely dangerous situation of the patient. This event has even appeared to be so advan-

tageous, that it has been advised to provoke it by coughing, vomits, &c. These efforts are not without their inconvenience; they may revive the pains, keep up or recall the inflammation, and cause the abscess to break in some other part. It is therefore more prudent to abandon this work to nature, and to wait its success.

Notice of the rupture is given by the re-establishment of the urinary flow, by its mixture with a more or less abundant quantity of pus, in which is often found a kind of grumous blood, which is a portion of the substance of the kidneys macerated and detached by the suppuration. The opening of these abscesses leaves in the kidneys a sac and ulcer, to be cleansed and cicatrized. In this view, there has been a great boasting of the use of balsamic juices, especially of those which have the property of giving a violet smell to the urine, such as the balsams of Copaiva, Peru, Mecca, and turpentine, in very small doses. Lime water, and sulphureous and ferruginous mineral waters have also been advised. These waters may succeed in some cases, but they should be given with caution; because it is to be feared that they may prove too heating, and cause the patients to fall into the renal phthisis. No such danger is to be apprehended from cows or asses milk, warm from the teat, from hydromel, barley water, &c. Those substances are well suited to prevent and to correct the acrimony of the urine, and to sustain and recruit the strength of the patient.

Even if one of the kidneys should be destroyed by the suppuration, we should not give up all hope of a cure. We have often found in dead bodies, in the place of a kidney, a brawny cellular texture, under the form of thick membranes. When one of the kidneys remain sound, it performs the functions of both, and the urine is separated in the same quantity as before.

When the abscess penetrates the intestine colon, which may be known from the flowing out of the pus by stool, and by the sudden diminution of the symptoms, softening drinks and slightly detergent injections are also the only means which should be employed. Although the patient may be in great danger, nature can triumph and preserve his life.

If to the symptoms of inflammation and suppuration of the kidneys, a tumour in the lumbar region should succeed, very little doubts can be entertained of its nature. In such cases it has been recommended to make a speedy opening, for fear the pus should be corrupted by remaining, and produce effusions, or lest it should pierce into the abdomen, instead of manifesting itself under the skin. But has not this dread been carried too far? We have had more than one occasion to observe in abscesses of parietes of the abdomen, that whenever nature showed a tendency to carry the matter outwards, and manifested this by the formation of a tumour, whatever might retard the opening of the abscess, the pus never attempted another route, and sooner or later made itself a vent externally.

We do not pretend, however, to give it as a general precept, that there is no danger in delaying the opening of these abscesses; there must be a larger collection of facts to lay down this principle, but we are persuaded that there should be no precipitancy, and that we should wait at least some days, during which emollient cataplasms should be applied to the tumour. These topical applications would thin the skin, and would point out, in a more precise manner, the spot where the incision ought to be made. In all these cases, this incision should be directed from above downwards, that is to say, in a direction parallel to the axis of the body, and prolonged as much as possible. If so much blood should flow from

the wound as to weaken the patient, we should attempt to discover the divided vessels and to make a ligature on them. As the branches of the lumbar arteries, which are spread out in this part, are not commonly large enough to furnish a considerable hemorrhage, the bleeding is easily stopped by pledgets of lint, sprinkled with colophony, and covered by compresses that are graduated and sustained by a roller bandage.

In the succeeding dressings, it will be advantageous to make use of a tent of unravelled linen, spread with balsam of Arcœus, and to introduce it even to the bottom of the abscess; to keep the edges of the wound separated by a pledget of lint, spread with the same balsam, and to continue the emollient cataplasms for a long time. It is essential that this opening should not contract too speedily, and that the cicatrix should be made from the bottom towards the external part. If it is not always in the power of art to prevent these wounds from becoming fistulous, especially when they have afforded a passage to the urine, a consoling truth is that these fistulæ are not dangerous; a number of observations prove that persons may live with this inconvenience, and even reach the usual term of life. Care must be taken that these should be always open, and that the fluid, which keeps them up, should not be retained. This kind of retention is prevented by introducing into the fistula a canula of gum elastic, which is to be secured outwardly by a thread, that is itself fixed upon the skin by means of a small plaster of gum diachylon. These fistulæ should be probed occasionally, because they are frequently kept up only by the presence of a stone coming from the kidneys, or formed in the tract of the fistula. The extraction of these calculi is commonly easy, and we shall describe the manner of doing it in treating of these extraneous bodies.

When the pus of the abscess of the kidneys occupies the surrounding cellular membrane, when it descends along the ureters even into the excavation of the pelvis, and when it corrodes all these parts, death is inevitable. Some resources would remain, if the pus, instead of filtering into the pelvis, should be diffused under the peritonæum along the spermatic vessels, and at length form a tumour at the groin or at the crural arch; however, cures of this kind are so rare, that we are hardly permitted to hope for them. Art can afford no aid but in opening these new abscesses, and perhaps it would even be better to let them burst spontaneously. In fact, much experience has taught that openings, made in internal abscesses, whatever may be their kind, are commonly fatal, when we cannot reach the source of the suppuration. We then see the pus, which was laudable, become serous and fetid; fever supervenes or augments, and the patients sink in a few days. Sometimes also, nature wants energy to effect a rupture, and an opening, made purposely, affords a useful aid.

The sudden return of the matter of these abscesses into the passages of the circulation, is not always an unfortunate termination, unless a metastasis should take place upon the brain, the lungs, liver, &c. In general, it is less to be dreaded, than the remaining of the pus in the place of its formation. This re absorbed fluid may be dissipated insensibly, either by perspiration or stool, and even by the urine, if it had resumed its course. We may presume that this reflux has taken place, when, after well marked signs of inflammation and suppuration of the kidneys, all the symptoms that depended on them disappear, without manifesting any sign of the terminations spoken of above.

If the strength of the patient should keep up, it is

prudent to make no change in the dietetic and medical regimen; but if he grows weaker, and has a tendency to purulent cachexy, his strength should be recruited by the use of cordials, ptisans more eminently aperient or diaphoretic, and finally terminate the cure by moderate purgatives, frequently repeated, and proportioned to the circumstances and particular indications.

The induration of the kidneys is not always a consequence of their inflammation; it happens also from a chronic engorgement, which may be of different kinds. These viscera increase in size, and acquire sometimes an enormous bulk: we have seen them almost fill the whole cavity of the abdomen. They are sometimes soft, and contain an assemblage of small hydatids, sacs full of urine, pus, steatomatous matter, &c.; at other times they are hard and scirrhous. In these last cases, the suppression of urine happens gradually; and even when there is but one kidney affected, we do not often perceive any diminution in the secretion, and the disease exists without being announced by any symptom; there is no fever, no pain, no heat in the region of the kidneys; sometimes the patients experience only a restraint, and complain only of a sense of weight in this part. When the engorgement is considerable, and the tumour voluminous, the anterior threads of the nerves of the first lumbar pairs are compressed by them; the numbness at the groin and anterior part of the thigh of the same side increases sometimes to such a degree, as to prevent the patients from walking.

This induration of the kidneys is seldom cured, and is often followed by ascites. When this is recent, and the patient is young and otherwise in good health, we may attempt the cure by aperient diuretics, and resolvents; but they seldom are successful. If only one kid-

ney is affected, life may exist a long time without much inconvenience.

When inflammation of the kidneys terminates in gangrene, death is always the consequence. The patient thinks himself better; the sharp pains which he experienced, cease suddenly, but the suppression of urine continues; he has cold and urinous sweats, a small, concentrated and intermittent pulse, and a leaden hue; and at length he exhibits the symptoms that are the precursors of approaching death.

§ IV. *Of Suppression of Urine from Spasm of the Kidneys.*

Suppression of urine may also be occasioned by spasm and paralysis of the kidneys. These viscera, like other secretory organs, execute their functions only by virtue of a kind of particular irritability, termed vital power; it is this which gives to the vessels the tone and re-action, that are necessary to the circulation and secretion, which are carried on in these parts. If this power is continually stimulated, there will result, if we may so speak, an excess of action on the part of the vessels; they will enter into a sort of spasmodic contraction and locking, which will oppose the passage of the fluids into the small secretory conduits: if it is too weak, or if it ceases to act, as in palsy, the vessels no longer re-acting, the circulation languishes, and the fluids are no longer propelled into the small filtering places, where the urine is separated.

Spasm of the kidneys may be occasioned by an acrid humour, such as of rheumatism, itch or herpes, fixed upon these viscera. It is also sometimes the effect of grief, fear, anger, and it often takes place in tetanus, and nervous fevers, and especially in hysterical affections; but then this spasm of the kidneys is only a consequence

of the universal spasm, and as has been already observed, the suppression of urine lasts no longer than the principal disease, of which it is a symptom, continues in all its strength; and commonly this suppression terminates in a few days. In hysterical affections we have, however, seen the urine suppressed for more than forty days.

The suppression of urine, which is produced by spasm of the kidneys, generally takes place suddenly. The patients commonly experience pain in the lumbar region, and the pulse is hard and locked; but it is only by the historical signs, that are peculiar to the particular cause of the spasm, that we can well distinguish this kind of suppression.

Relaxing diuretics, bleeding, warm baths, and emollients cataplasms upon the loins, are sometimes sufficient to re-establish the urinary flow. When the spasm proceeds from an acrid humour, fixed upon the kidneys, frequently we cannot succeed but by employing the remedies that are proper to destroy this humour, or by displacing it by a caustic, or seton, or the application of moxa to the lumbar region.

Paralysis of the kidneys may be the effect of old age, of debauchery, of the abuse of diuretics, or frequent retentions of urine, from the distention caused by their regorgement into the small conduits of the kidneys.

§ V. *Of Suppression of Urine from Paralysis of the Kidneys.*

When the suppression of urine proceeds from paralysis of the kidneys, it is always gradual; it is preceded by urine, that is limpid, watery, and almost inodorous; there is no fever, no heat, and no pain in the lumbar region; the pulse is slow and small, the patient feeble, &c.

Tonic remedies, restoring the general strength, are especially indicated in this kind of suppression. Martial waters, decoctions of chincona, and warm diuretics may be given with success. When the paralysis is general, that of the kidneys offers no particular indication.

CHAPTER III.

Of the Depravation of the Urine.

We will not now enter into the detail of all the varieties which the urine may present, without their occasioning an obvious derangement in the health; neither will we detail the different changes, which happens to it in the course of internal diseases; this examination, although very important, would be foreign from the end which we have proposed, namely, the considerations of the diseases of the urinary passages. Adhering to this plan, we will here speak only of those alterations of the urine, which have a direct connection with the preternatural affection of their secretory and excretory organs; and even among these we will examine only the principal alterations, such as bloody, purulent and glairous urine, reserving for a separate article the consideration of the tendency of the urine to form stones.

§ I. *Of Bloody Urine.*

The blood that is discharged with the urine, may come from the kidneys, the ureters, the bladder, or the urethra. That which comes from the kidneys, does not always escape through an accidental opening of the vessels of these viscera; it passes sometimes by anastomosis of the renal arteries into the uriniferous conduits.

In this case the discharge of blood may be occasioned either by the extreme tenuity and dissolution of this fluid, as in the last stage of scurvy; or by the laxity and dilatation of the urinary conduits. Then, if some such cause as a violent exertion, a long walk, a ride on horseback or in a carriage, the use of heating drinks, &c. increases the force of the circulation in the kidneys; the globules of the blood, instead of being stopped at the extremities of the arteries, would be propelled into the urinary conduits and from thence into the bladder. An anatomical remark seems to confirm this theory. It is very common, in fact, in injections that are forcibly propelled, to see the matter injected by the renal arteries, pass immediately into the ureters, and from thence into the bladder, without observing, in dissecting the kidney, any mark of rupture in the vessels, and of subsequent extravasation. There are also indubitable facts to prove that in the bodies of those who were affected during life with bloody urine, no trace of laceration has been found in the vessels of the kidneys. Although several examples of this disposition may be cited, it is however very rare; in general, the bloody urine, that comes from the kidneys, depends upon the accidental opening of some blood-vessel. Thus, when there are one or more stones in the kidneys, the slightest agitation, impressed upon these extraneous bodies, may lacerate some blood-vessel. A violent contusion upon the loins, a fall upon the pelvis, &c. may, by a counter-stroke, occasion the same accident, which we all know to be almost inseparable from wounds that penetrate into the kidneys.

The bloody urine seldom has its source in the ureters. The membranous state and close texture of these canals render them little liable to these kinds of hemorrhage. But it is not so with the bladder: the varicous swelling of the veins, which are spread around the neck of this

viscus; fungi situated in its cavity; mural stones, or other loose ones, which, under certain circumstances, irritate its sides; penetrating wounds, &c., are so many causes, which may produce bloody urine. The same causes acting upon the urethra, would occasion the same accident there. The rupture of the vessels of this canal may also be the effect of a false route and of an inflammatory tension, such as we see happens in the hot urinary chordee. Persons inhabiting hot countries, are particularly subject to bloody urine, which proceeds from varicous vessels of the urethra and the neck of the bladder. We have attended, and cured of this disease by means of elastic catheters, many soldiers that came from the East Indies. In some cases the historical signs are sufficient to designate the place from whence the blood proceeds, and the immediate cause of its effusion; it is thus that, when the urine is bloody in consequence of a wound from a sword, or of any other piercing or cutting instrument, applied to the lumbar or hypogastric region, we cannot doubt but that the wound penetrates into the kidneys or bladder, and that the flowing of the blood must be attributed to this wound. We also have reason to believe that the blood comes by anastomosis of the renal arteries with the secretory conduits of the urine, when the patient has not previously experienced any attack of the nephritic colic, when he has taken violent and long continued exercise, and when there do not remain, although the bloody discharge continues, any heat or pain in the region of the kidneys; symptoms that are always felt with more or less intensity, when an engorgement exists in these organs, or when the rupture of their vessels is produced by a stone, stopped in the urinary canals. We may be certain that the blood has its source in the vessels of the urethra, when it comes pure from this canal without any mixture of urine, and

when it flows, for a certain time, without interruption and without being preceded by desires or attempts to make water. But this disposition does not always take place; and it happens sometimes that the blood, proceeding from the urethra, flows back into the bladder, from whence it escapes only with the urine. A clot formed in the canal, or an obstacle of any other nature, may occasion this reflux. As to the rest, we may know that it is the affection of the urinary organs, which occasions the bloody discharge, by the signs which prove the existence of this affection; signs which will be sufficiently developed in treating of the retention of urine that is caused by the different diseases of these organs.

The blood, that is discharged with the urine, is found in different states. When there are but one or a few small vessels open, and when the bladder contains a certain quantity of urine, it is diluted in this fluid, which assumes a colour more or less deep, like water in which a vein in the foot has been opened. But when the vessels are more numerous and larger, and when the bladder is empty, if the blood preserves its fluidity, it will be expelled almost without any mixture of urine, as soon as it has filled the bladder enough to solicit its contraction. If, on the contrary, it coagulates, the efforts to expel it often become useless, and it then causes a retention of urine in the bladder. Then also the urine is bloody for several days, although the blood no longer escapes from the mouths which furnished it, because it washes and carries out with it a portion of the clots that remain in the bladder.

The bloody discharge is a symptom more or less dangerous, according to the viscus from which it flows, and according to the cause that produced its effusion. The danger is greater when the blood comes from the kidneys, than when it comes from the bladder; and the

cure is more easy and certain, when it is furnished by the vessels of the urethra, than when it proceeds from those of the bladder. In like manner the consequences are more to be dreaded when the bloody discharg is produced by a wound of the kidneys or by stones fixed in these viscera, than when it is occasioned by a long ride on horseback, or by the abuse of heating drinks, and when no preternatural affection exists in the kidneys. Also, the bloody discharge which is caused by a stone in the bladder, is less dangerous than that which depends upon a fungus of this viscus. As to the remainder, it is very rare in these cases, for the loss of blood to be so considerable as for the hemorrhage to destroy the patient. The bloody urine being only the symptom of a disease of the urinary passages, it should be combated by the same means as the disease itself. In the articles of suppression and retention of urine may be seen those methods, which appear to us to be most suitable to destroy the cause of this symptom. We will only add here, that, if the blood is coagulated in the bladder, we must try to evacuate it by means of the catheter; and if these clots cannot flow through this instrument, we must attempt to divide and dilute them by throwing into the bladder injections of warm water or of a very slightly alkaline solution.

The red colour of the urine is not always a mark of the effusion of blood in the kidneys, the ureter, the bladder, or the urethra; several other causes may occasion a deception on this subject. Roux cited the following example. A man passed, every morning, urine of a deep red colour, and exactly analogous to that which is produced by clots of blood in the bladder. Still no bloody deposit was formed at the bottom of the vessel. Roux, being consulted by the man, suspected from this circumstance that there was some other cause than ex-

travasated blood; he learned, in fact, that every night this patient supped upon red beets—he advised him to use white; and from that time the urine, which had been red, became as yellow as citron.

§ II. *Of Purulent Urine.*

Purulent urine does not always indicate a preternatural affection of the urinary passages. Numerous observations prove, that frequently the crisis of acute diseases is marked by the urine, which then assumes a puriform appearance. There are also many facts, which attest that the pus of abscesses, formed in the thorax, in the liver, and in every other part of the body, is carried by metastasis to the kidneys, and evacuated with the urine. Paré relates that a man, in consequence of a wound in the arm from a pistol, had several abscesses, which sometimes discharged much pus, and at others suffered scarcely any to escape; and then he adds, the urine and stools were manifestly charged with it. The same author, citing a similar fact, says that several surgeons, not being able to conceive how the blood could thus arrive at the kidney through the vessels of the circulation, suspected an abscess in the mesentery, or in the cellular membrane surrounding the kidney. The patient died, and on opening his body, it was found that all those regions were sound. As to the rest, we confine ourselves in this article to the examination of urine, that has become purulent from the suppuration of its secretory and excretory organs.

The inflammation of the kidneys and bladder, like that of the urethra in gonorrhœa, may give rise in these parts to a kind of puriform secretion, which will communicate this colour to the urine. Abscesses formed in the kidneys, from a stone fixed in these organs, or from any other cause, sometimes also open into the urinary

conduits. Although this termination leaves some hope of a cure, it is very rare for the patients to survive the suppuration of the kidneys. The urine of persons attacked with stone in the bladder, frequently becomes purulent. The continual contact of this extraneous body produces sometimes, in the interior of this viscus, ulcerations that are, for the most part, very extensive; sometimes also, the pus comes from an abscess opening into the urethra, and which flows back into the bladder, when it meets with any obstacle to its escaping from this canal.

The colour and consistence of the urine vary, in these different cases, according to the quantity and quality of the pus which enters into their mixture; sometimes the urine is white, and similar to whey, and sometimes it is thick, muddy, and deposits a very abundant, flocculent sediment.

Demulcent drinks are the only remedies that can be employed, when the kidneys are in a state of suppuration. To these means may be added, injections that are slightly detergent, when the pus comes from ulcerations of the bladder. In all abscesses of the urethra, catheters of elastic gum are the only resources that can be relied upon.

§ III. *Of Glairous Urine.*

Glairous urine is a symptom peculiar to affections of the bladder. In fact, we are not acquainted with any diseases of the kidneys or urethra, in which these organs separate a sufficient quantity of mucus to make a sensible alteration in the quality of the urine; whilst we know that the bladder, when irritated either by the presence of an extraneous body, or by an acrid humour deposited upon its parietes, such as rheumatism, herpes, itch, gout, furnishes an abundant secretion of the mucus,

which, in the natural state, lines its internal tunic. Thus we perceive the urine of persons, affected with these diseases, deposits a glairous sediment, which is sometimes so thick and tenacious, that it can be drawn out like the white of an egg. Frequently, this glairous matter cannot even pass through the urethra, and causes also a retention of urine.

The extraction of the stone, incisive diuretics, vesicatories, repeated purges, demulcent and detergent injections, are the means which art may employ to remedy this kind of depravation of urine.

CHAPTER IV.

OF URINARY STONES.

§ I. *Of Urinary Stones in general.*

Of all the humours of the human body, the urine is the most disposed to form stony congestions. The secretory and excretory organs of the urine, the kidneys, the ureters, the bladder and the urethra, are not exclusively the seat of these extraneous bodies; they are sometimes found out of the urinary passages, in the perinæum, the scrotum, between the prepuce and glans, and in all the parts where the urine penetrates and remains.

There is no period of life in which man is exempt from calculus. Children, however, are more subject to it than adults, and these less so than old men. It is particularly between the ages of five and nine years, that this disposition to calculus is developed. We have, however, frequently seen infants in the cradle tormented with this disease. Women are also subject to renal stones as well as men; but they are less so to stones in the bladder. The neck of this viscus having less resis-

tance, and the canal of the urethra being shorter and more extensible in the female sex than in man, they allow sand, gravel, and all the small extraneous bodies, which might form or become the nucleus of stones, to escape with the urine; and sometimes the urethra affords a passage to very bulky stones.

We may remark, that persons of a phlegmatic temperament, those who abandon themselves prematurely and excessively to venereal pleasures, and to those of the table, those who live on glutinous aliment, which they digest badly, are most frequently attacked with stone. This disease is also more common in temperate climates than in southern or northern countries. France, England, and Holland, exhibit more examples of calculus than Germany, Sweden and Russia, or than India, Japan, &c. Moist, thick, stagnant air, and marshy places, appear also to contribute to the formation of stone; and we may observe that those who, in a large town, inhabit a street that is narrow and muddy, or situated upon the border of a marsh, or of a river whose course is slow, are more subject to calculus than those who are placed in contrary circumstances. Indolence, and indulgence in sleep, may have an influence upon the formation and growth of stones, by retarding the evacuation of the urine: and on the contrary, we may regard as obstacles to this formation, every thing that favours the discharge of this fluid, as exercise, watching, &c.; such also, would be all the causes that increase the aqueous vehicle of the urine. Sydenham, who was subject to nephritic colic, drank every evening a certain quantity of small beer.

The use of selenite waters, and of the waters of wells, has been regarded as favourable to the formation of calculus. It has been supposed, that these waters, abounding in earthy particles, suffered some particles of it to

be precipitated into the excretory vessels of the kidneys, in the same manner as we see them form deposits along the pipes which convey them; but observation has destroyed this prejudice, and in Paris we do not find more calculous patients amongst those who drink the water of Arcueil, which is strongly impregnated with selenite, than amongst those who use the water of the Seine, which contains much less of this calcareous saline substance. Besides, if the stone depended upon the use of selenite waters, women and men would be equally exposed to it. Children, and especially those in infancy, would be exempt from it; but experience proves the contrary. Childhood is, of all ages, the most subject to calculus: women drink much more water than men, yet they are not more frequently attacked with renal calculus. Finally, chemical analysis proves, that no relation exists between the earthy elements of selenite waters, and those of urinary calculi.

Arthritic and rheumatismal diseases appear to have some influence upon the formation of stone; at least we may observe with calculous old men, that a great number of them have been tormented with gout or rheumatism. Some analogy seems also to exist between diseased ossification and the production of calculus. Most children, that are attacked with calculus, are small, puny, and very ricketty. Although we cannot say that the stone is hereditary, we observe, however, that whole families are attacked by this disease,—which must be attributed to the nature of the urine, and to a particular disposition of the secretory and excretory organs of this fluid.

The number of stones is not the same in all subjects. Sometimes we find only one or two, and sometimes we meet with a very great number. Frequently they exist at the same time, in the kidneys, and in the bladder; their size varies infinitely. There are small, middling,

and very large ones. Their form is not less various; it is sometimes proportioned to the cavity in which they are found, as will be seen more particularly in treating of stones in the kidneys and in the urethra. Very few of them are round or spherical. Most of them are oval, or flattened in the form of an almond; others are cylindrical, triangular or rhomboidal; some exhibit upon their surface a small trench, and we have seen some which were pierced in the middle, for the discharge of the urine. Sometimes they are polished on their surface; sometimes uneven, grainy, studded with points more or less elongated, raised up in tubercles, and in a kind of nipples, like the superficies of a wall, which gives them the name of mural stones. When several stones exist in the same cavity, and when they are in contact, they commonly present polished faces more or less large, in proportion to the extent of their juxta position. These faces should be carefully examined in stones that are extracted from the bladder, because when found, they announce more calculi in this viscus.

Urinary stones do not all have the same colour; some are white, with a plastered and chalky appearance; others are gray, yellow, fawn colour, red, jasper, spotted with white and red. There are some that are green, brown, black, &c.

The weight of stones is proportional to their size and density. Their weight may vary from one grain up to fifteen ounces. The black stones are generally more heavy and more dense than the red and gray. They resist the hammer and saw more than the white; and these are commonly light, porous, tender, and very fragile; they often crush under the forceps. All stones are not free and moveable in the organs which inclose them; there are some which fill up exactly the cavities of these organs; others are encysted or included in cells or parti-

cular membranous sacs. Sometimes we see vascular fungosities insinuate themselves between the inequalities of the surface of these stones, but we have never seen them adhering to the parietes of the cavities which contain them; that is to say, we have never seen vessels or cellular prolongations passing into the substance of these stones.

We cannot well understand the substance of urinary stones, until after they have been sawed or broken. In the greater number of these extraneous bodies, we then remark three distinct substances, the nucleus, the concentric layers, and the cortex. The nucleus comes from the internal or external parts of the body, and has most commonly for its base, a gravel more or less large, proceeding from the kidneys, and seldom from the bladder, sometimes a clot of blood, pus or thickened mucus, a pin, a grain of corn, a ball, a piece of a catheter, bougie, wood, &c.

The nucleus is enveloped in a more or less considerable number of concentric layers, regular or irregular, of very various thickness, gray, yellow, and different shades. The internal layers are less thick and more dense than the external, they are frequently separated from each other, and detached in more or less extensive fragments.

The last or most external layer is what is called the cortex. It is often covered with a viscous coat, and is commonly more delicate, more porous and more friable than the succeeding layers; its surface is sometimes smooth, sometimes rough, unequal, and appears corroded as a bone is by caries. It is sometimes studded with very long points, and at others surmounted with small buttons in the shape of nipples, as in mural stones. These three substances are not distinct in all urinary stones. We have found calculi, which, instead of a

nucleus in the centre, presented a small, oblong cavity, filled with a brownish, pulverulent matter; others were solid through all their thickness, and appeared to be formed of one single mass; some presented nothing but an assemblage of small grains, or shining crystals, adhering to each other.

Urinary stones, recently extracted from the body, or macerated in the water, exhale a very strong urinous smell. When exposed to the fire, or the light of a candle, they never inflame, nor do they strike fire with steel. They are not very soluble in water. The mineral acids, caustic alkalies, pot-ash and soda in their pure state, dissolve them completely. When macerated for some time in lime-water, they form in it a very abundant white precipitate.

Chemical analysis discovers in them a great number of principles, such as an animal, gelatinous matter, a great quantity of elastic gas, a little ammonia, a calcareous substance, and a concrete salt, to which the name of the lithic acid has lately been given.

At the present time there is no more said of all the systems of the ancients and moderns, respecting the formation of urinary stones. Faith is no longer placed in animal magnetism, in the fermentation of white and glutinous glairous matter, in its concretion by volatile alkali, &c.; but we know that the urine of the soundest man contains the rudiments of calculus, and that, when left at rest for some time, it deposits a larger or smaller quantity of crystals, concrete salts and sand. As long as these matters are kept dissolved in the urine, and are not separated in the canals of this fluid, no stone is formed; but the formation is almost inevitable, if this separation takes place in the kidneys, or in the other urinary passages, especially if these canals contain any

extraneous body, which may serve as a nucleus or principle of incrustation to these matters.

When the urinary passages contain nothing but gravel, sand, or small stones, they may be washed out by the urine. If they remain for a long time in any of these canals, they are increased by the successive addition of new layers, and their expulsion becomes more and more difficult or impossible. Frequently, however, we have seen nature alone relieve herself, by different passages of calculi, of a considerable size.

The presence of stones in the urinary organs almost always occasioning dangerous symptoms, and affecting sooner or later the existence of those who are attacked with them, researches have long been made for a remedy, capable of breaking down and dissolving calculous concretions. Frequently it has been supposed to have been found, and its apparent success boasted of. Unhappily, experience has not confirmed the virtue of these pretended lithontriptics or stone-breakers.

It would be superfluous to give in this place, the list of a multitude of remedies, which have been proclaimed, as solvents of the stone, such as the blood of the goat, petroleum, the millepedes, the eyes of the lobster, lemon-juice, onions, &c. The uva ursi, of all the reputed lithontriptic plants, has been the most in vogue. It has not, however, any more than other vegetables, the property of dissolving the stone, or of procuring its expulsion. It is very true, that this remedy, continued for a certain time, has sometimes alleviated the pains that are produced by the presence of the stone; but most medical authors think, that in this case, it acts only as a diuretic and antispasmodic, appeasing, and even in some measure destroying the sensibility of the urinary passages.

Certain mineral waters, those of Luxeuil, Bussang, and lately those of Coutreville, have also been regarded

as excellent lithontriptics; but they have this reputation only from their diuretic virtue: by exciting a more abundant secretion of the urine, they may favour considerably the escape of the gravel, which is contained in the urinary organs; but no experience yet proves that they have ever effected a dissolution.

Of all the pretended lithontriptics, there is none which has made more noise than that of Mrs. Stephens. At first she gave nothing but lime with egg-shells, reduced to a powder; afterwards she added soap, as much to prevent the constipation generally caused by lime, as to augment the virtue of her remedy. In the beginning she made a secret of her composition, and that it might not be discovered, she added to the egg-shells the shells of snails, and at the same time she dissolved with the soap, hartshorn burnt to a coal, camomile, fennel, burdock, and other plants, which she varied and modified at her pleasure. The English parliament purchased the composition of her remedy from Mrs. Stephens, and made it public. It was then stripped of all the substances, which the inventrix had added, in order to disguise he preparation. There were simply given three times, every day, a half dram or two scruples and even a dram of lime with egg-shells, with a draught, moreover, at each dose, of the third part of the solution of two or three ounces of Alicant soap, in eight ounces of water, sweetened with sugar and honey. The dose was proportioned to the age and strength of the patient. This remedy did not produce the same effects in all who used it. In many it occasioned nausea, irritation, heat, fever, and sometimes ardor urinæ. Others were not at all incommoded, although they took very large doses and continued it for a long time. It changed the quality of the urine in a very remarkable manner; it became white, turbid, volatile, strongly odorous, alkaline, and speedily

deposited a mucous matter, mixed with small grains, and scales of a calcareous nature, and sometimes it exhibited gravel, and a kind of calculous fragments. This phenomenon was very capable of causing an imposition, and of exciting a belief in the lithontriptic virtue of this remedy. The error was the more easy, as many of those who had recourse to this mean, were so much relieved by it that they supposed themselves to be entirely freed from the calculus; but this relief was only momentary, and the pains and other symptoms were often renewed with more intensity than before. Stones, contained in the bladder, have never been destroyed; and we have never perceived that they even suffered a sensible alteration.

Common lime water has also been used internally as a solvent of the stone. Its success does not appear to be any greater than that of Mrs. Stephens's remedy, and we are more fully convinced of its insufficiency.

Soap-maker's ley, water impregnated with fixed air, soap pills, have not been more successful than other pretended lithontriptics.

We are not yet acquainted with any true solvent of the stone, while it is contained in the urinary organs. Does any remedy exist, which has this virtue, and may we yet hope for its discovery? If its existence cannot absolutely be denied, it does not at least seem probable. In fact, how can we suppose that substances, the most of which are inert, and whose energy is also weakened by the juices of the digestive organs and by all the humours of the body, with which they are mingled before they reach the urinary passages, can dissolve a concretion, which the most active chemical agents dissolve but slowly, although they may be applied pure and without mixing with any of the substances, which in man may retard or entirely destroy their action?

This last consideration has not escaped the advocates of lithontriptics. They have been sensible that their remedies must lose much of their efficacy in traversing the routes of the general circulation. To obviate this inconvenience, some have proposed, in the case of stones in the bladder, to convey these remedies directly into the bladder. They have, several times, injected into this viscus lime water, acid and alkaline solutions, &c.

Although care was taken to weaken the activity of the substances, which made the base of these injections, by conveying them in an abundant vehicle, the sensibility of the bladder frequently could not endure them; and amongst the patients who continued their use for a long time, none had reason to congratulate himself on his perseverance.

The failure of lithontriptic remedies reduces the indications, which we may hope to accomplish with regard to calculi, to two only; to prevent and alleviate the symptoms, which are commonly occasioned by the presence of calculi; and to facilitate their expulsion or to extract them, when they are situated in places that are accessible to the surgeon's instruments. These two indications will be the objects of our reflections, when we shall have detailed the symptoms which announce the presence of the stone, and its situation.

§ II. *Of Renal Stones.*

Stones in the kidneys are so common, that there is no treatise upon the affections of these viscera, in which we do not find some observations relating to this disease. We will not, therefore, attempt now to prove its existence by new facts.

Besides the stones that are seated in the kidneys, the most of those that are found in the bladder, originate in these organs; it is there that the nucleus, which

is remarked in the greatest number of calculi, is commonly formed. From the kidneys also most frequently proceed the sand, the gravel, and the stones, which are sometimes conveyed in prodigious quantity in the urine of certain persons; which circumstance has caused some authors to remark, that the kidneys were an inexhaustible quarry of urinary calculi.

Stones are not more frequent in the left than in the right kidney. We have no examples of calculous particles being formed in the cortical or external substance of these viscera; they have been found in their tubular and mammary substance; but their most common situation is in the calices and pelvis of the kidneys. Sometimes these concretions are contained in a particular cyst. It is not even unusual to find, in the place of a kidney destroyed by suppuration, a membranous sac, filled with stones and gravel. Sometimes there is but one calculus in the kidneys; and sometimes two, three or four are found there. Boerhaave says that he counted as many as three hundred in the same kidney. Some are of the size of millet or hemp-seed, and are called sand or gravel; others are as large as a pea, a filbert, a pigeon's egg, and a fowl's egg. Some are very bulky, and exceed the fist in magnitude. The greater part are rounded, oval, oblong and flattened, and some present a contraction in the form of a neck. Many are angular, horned, in the shape of corals, with irregular buttons prolonged into the divisions of the pelvis and into the ureter. Some are seen, which have a kind of branches or ramifications, that are continued even into the calices and parenchyma of the kidneys; while others have the form of a triangle, of a regular or irregular quadrilateral, &c.

The surface of renal stones, when they are isolated, is commonly rough, fretted, uneven, with asperities more or less prominent. When several stones are found

in the same cavity, they are generally smooth or polished, with concave or convex surfaces, according to their juxta-position. Stones have been found, which were pierced in the middle, and afforded, through this opening, a passage for the urine into the bladder.

We may observe the same variety in the colour of renal stones, as in that of stones in the bladder. Authors, who have asserted that the former were usually red, and that they could by this colour distinguish them from calculi formed in other parts, have committed an error; for we find in the kidneys, as in other parts, stones that are gray, white, yellow, black, brown, &c.

The structure of renal stones does not also exhibit any difference, that can distinguish them from stones of the bladder. When recently formed, they appear to be composed of grains that are irregular, brilliant, crystalline, and agglutinated to each other, and sometimes re-united in the form of a star or in a groupe. When they are of long standing, and have acquired a certain size, they commonly exhibit several concentric layers, disposed in strata more or less thick; and frequently, like the stones in the bladder, they have for their base a nucleus, that is more or less hard, and of a deeper colour than the external layers.

Renal stones are either moveable or fixed in the kidneys. Those, which are of a small size, rounded or oblong, and without asperities, may descend from the pelvis into the ureter and into the bladder; but stones that are large, tuberculous, and with many branches which are prolonged into the divisions of the pelvis and into the calices of the kidney, are immoveable, fixed, and cannot be extracted without lacerating the substance of this viscus.

The derangements which are produced by stones in the kidneys, depend upon the form and size of these

extraneous bodies. Stones that are unequal, jagged, and pointed, often give rise to laceration of the vessels of the kidneys, and to the inflammation, suppuration, and ulceration of these organs. Those which grow considerably, dilate the cavities that contain them, alter the organization of the kidneys, compress or destroy their parenchymatous texture, and convert them into a kind of sac with several cells, or into a pouch with a single cavity, filled with a mixture of pus, urine, and calculi.

Besides the general causes of stone, the kidneys have particular ones, which depend upon their organization. The urine exuding only in very small drops from the papilli into their calices and into the pelvis of the kidney, cannot carry with it the small saline and earthy-saline particles, which are the rudiments of stones, as it does in the other urinary canals, where this fluid flows in a larger mass, and where its course is more rapid. Thus we see catheters, that are placed permanently in the urethra, incrusted more speedily when they are kept open, and the urine passes through them by drops, than when they are closed and the urine is occasionally let off in full stream and per saltum. The great quantity of fat with which the kidneys are covered, has also been assigned as a predisposing cause of renal stones. It has also been considered that a disposition to calculus is produced by the horizontal position upon the back, in which those persons are laid for several months, who are attacked with paralysis, or fracture of the inferior extremities, or with any other disease, the cure of which makes this horizontal position necessary.

We can have no other than presumptive signs respecting the existence of calculi in the kidneys, and these signs are inferred from the injury of the functions of these organs. But frequently these signs are wanting, and the kidneys are filled with stones, without the cal-

culous persons having felt the slightest pain, or manifested the least symptom of nephritis. It is only after death that we ascertain this affection of the kidneys, which was not even suspected during life. We can rest this assertion upon many observations, made upon a great number of bodies, in which we have found a multitude of renal calculi; although, before death, there had never been remarked any derangement, either in the secretion or excretion of the urine, nor any symptoms, which, it would seem, ought to have accompanied the presence of these bodies in the urinary organs. Although these cases may be very frequent, we should regard them, however, only as exceptions from the common course of nature, whose functions are more or less disturbed by the presence of these extraneous bodies.

The disorders that are caused by renal stones, are almost always proportioned to their bulk, their form, their mobility or immobility, and to the habits of life of the calculous person. When the stone is large, smooth, immoveable, it produces commonly nothing but a sense of weight, and an obtuse pain in the region of the kidneys, without causing any change in the state of the pulse, nor altering in any manner the secretion or excretion of the urine. If, on the contrary, the calculus is small, studded with points, isolated and moveable, the pains are sharp, lancinating and almost constant; they increase when the patients walk or move in bed; they diminish when they keep themselves bent forward or lay upon their side; they are often propagated along the ureter to the bladder, anus, pubis and genital parts; they cause the retraction of the testicle upon the same side, and sometimes its atrophy and spontaneous destruction; they are accompanied with numbness, stupor, tremblings, and a sensation of cold in the thigh and inferior extremities. These patients are extremely agitated; they

are sleepless, have fever, and frequently nausea and vomiting. Very commonly the abdomen becomes painful and tense; sometimes the urine is suppressed, or flows with difficulty and in small quantity. It is sometimes clear and limpid; sometimes hot, red and bloody; and frequently the patients discharge pure blood. This last symptom is very common when they have used violent exercise, when they ride in a carriage, on horseback, &c. The discharge of blood is not commonly of long duration. It seldom lasts for several hours. We have seen it continue however for whole days, and renewed at every slight motion.

In most cases, the other symptoms of calculous nephritis do not thus manifest themselves, but by shorter or longer attacks. When they are not dissipated in a short time, the irritation of the kidneys soon occasions the inflammation of these viscera; suppuration ensues frequently; the parts, in contact with the stone, become ulcerated, from which cause purulent abscesses, that are more or less extensive, are formed in the kidneys.

This state is announced by the continuance and increase of the original symptoms. The fever has exacerbations, that are more marked towards evening than at other parts of the day. These are often preceded by shiverings, which are succeeded by a sharp heat, followed by an abundant sweat. The urine becomes turbid, more or less hot, charged with pus and purulent mucus; it carries with it sometimes grumous blood and small flocculi, resembling portions of putrefied flesh.

When abscesses of the kidneys, proceeding from a renal calculus, are contained in the substance of these viscera, in the calices or in the pelvis, their deep situation in the abdomen, and especially the thickness of the parietes of this cavity in the lumbar region, prevents their being felt externally: and these collections do not

manifest themselves outwardly, unless there should be a fissure in the cavities of the kidneys, through which the urine and the pus may be effused into the cellular membrane, and there form a new abscess, which will consume or partly destroy the abdominal muscles. Then it is not rare to see in the loins, between the false ribs and the edge of the os ilium, a circumscribed tumour, that is more or less bulky. The skin of this part sometimes preserves its natural state, and frequently becomes painful and tense, sometimes with erysipelatous redness, and sometimes with œdema or puffing. Finally, the fluctuation which is felt in this tumour, added to the symptoms of nephritis, which preceded its appearance, leaves little doubt respecting the nature of the disease.

Amongst all the signs that have been just mentioned, as a foundation for a diagnosis of renal stones, there is none that is pathognomonic. Even the union of these signs still leaves much uncertainty respecting the existence of these extraneous bodies. Hysterical attacks, scirrhi in the mesentery, pancreas or spleen, and affections of the kidneys, produced by some other cause than calculous concretions, may occasion the same symptoms, and have frequently imposed upon the most enlightened practitioners. We can there have nothing but presumptive evidence of the presence of stones in the kidneys. But the existence of this disease becomes more probable, when it is supported by the historical signs; for example, when the patient has calculous parents, when he has formerly passed gravel with his urine, when several small calculi have already escaped through the urethra, &c. presumption then acquires almost the character of certainty.

Stones in the kidneys are always attended with extreme danger, even when they do not cause any derange-

ment in the functions of the urinary organs. They are the seeds of death, always ready to be developed, and so much the more fatal, as art cannot destroy them, nor even arrest their development. The small stones sometimes cause as many disorders as those that are large; when they are moveable, they may be carried to the mouth of the ureter, and give rise to suppression and retention of urine in the kidney, where they are seated; produce inflammation of this viscus, and excite in it suppuration and all the symptoms that are the usual consequences. But when the calculi are very small, they may be washed off by the urine, and the patients still have some hope of a radical cure. Besides, the danger of renal stones is always proportioned to the age, temperament of the calculous person, and the particular sensibility of the kidneys.

Renal stones are almost entirely beyond the reach of surgery. There is but one case in which this art can second nature, in performing a radical cure of this disease, and that is when an abscess is formed in the lumbar region, whose focus comprises the portion of the kidney in which the calculus is situated. The opening of this abscess may give vent to the stones that are situated in these viscera, or even permit their extraction, under some circumstances; but, except this case, all the assistance of art is but palliative. For, at this time, there is no person, who, knowing the respective situation of the kidneys, the great number and thickness of the parts which must be divided to arrive at these viscera, the multitude and size of the vessels which would be comprised in this section, the uncertainty of the diagnostic signs of renal stones, and the precise spot which they occupy in the kidneys; and who, knowing that these extraneous bodies may have several branches extending into the calices and pelvis, which

would render their extraction impossible, dangerous, or mortal;—there is, we say, no person, who, convinced of these truths, would not regard nephrotomy, or the section of the kidney, as an operation to be rejected by reason, that is enlightened by general experience.

We know besides, as has been proved in speaking of lithontriptics, of no remedy that is capable of melting or dissolving the stone in the kidneys; from whence it follows, that the only indications to be accomplished in the cure of this disease, are limited, 1st. To opposing the symptoms that are produced by renal stones. 2d. To prevent their growth. 3d. To open the abscesses which they have occasioned, and through these openings, whether performed by nature or art, to extract these extraneous bodies, when it is possible, and does not expose the patient to any imminent danger.

If the presence of stones in the kidneys is manifested by symptoms of irritation, spasm and inflammation of these viscera, we should have recourse to soothing, relaxing, and antiphlogistic remedies. Bleeding is one of the first means that should be employed. The age, the state of the pulse, and the violence of the pain, must regulate the quantity of blood that is to be taken. Patients that are subject to hemorrhoids, often experience more relief from the application of leeches to the margin of the anus, than from bleeding in the arm. Warm baths, emollient injections, and cataplasms, or fomentations of a similar nature, applied to the region of the kidneys and abdomen, should not be neglected.

We cannot insist too much upon the use of moderate and cooling drinks, such as emulsions, whey, veal broth, chicken water, flax-seed tea, flowers of mallows, currants, lemonade, orangeade, &c.; adding twelve or fifteen grains of nitre to each pint of these drinks, and

sometimes also, a little syrup of diacodium, wild-poppies, water-lily, &c.

When the symptoms of the inflammation of the kidney continue with the same intensity for several days, the suppuration of this viscus is to be feared. It is ascertained by pus flowing out with the urine. Demulcent and slightly detergent remedies are then particularly indicated. The patient should be kept in the most profound repose, and live on nothing but mild food, such as asses' and cows' milk, which may be mixed with lime water. These means are not always successful; the greater number of those whose kidneys suppurate, perish with slow fever and marasmus.

When, in consequence of calculous nephritis, an abscess is formed in the lumbar or iliac region, and the fluctuation there is sensible, the opening of it should not be delayed too long; nature may perform it alone, but she will often be insufficient, and there would be reason to fear, that the pus, from remaining too long, might cause many disorders in the part where it would be retained, and might favour the complete destruction of the kidney.

To us, the bistoury appears preferable to other instruments for opening these abscesses. The incisions should not be confined; the larger the opening is, the more easy will it be to search for, and extract the stones. If, in the incision, we should find some blood-vessels, we must attempt to secure them by ligature. The matters contained in these abscesses, are commonly a mixture of pus and urine;—after their evacuation, the finger should be introduced into the focus of the abscess. When stones are found there, if they are moveable and not hard to be disengaged, we must extract them; but if they are fastened in the kidney, it will be

better to leave their expulsion to nature, than to run the risk of lacerating the parts which fix and retain them.

Sometimes abscesses, that depend upon renal stones, have two collections; the one deep, and situated near the kidneys, or in their substance, and the other external, seated between the abdominal muscles, or under the integuments. This latter is only a consequence; it is occasioned by the former, whose pus is diffused between the interstices of the muscles, in order to be conveyed to the skin. Under these circumstances, we do not usually find stones in the exterior collection; but we should attempt to discover the fistulous passage, which forms a communication with the collection in the kidneys. If it is found, a probe should be introduced, to be assured if there is not pus in this place, and if there are no stones. In both cases, this communicating passage between the two collections should be enlarged by the bistoury, and we must then proceed as if there had been but one abscess. In the dressings, care should be taken to tie the pledgets of lint that are inserted into the bottom of these collections, besides keeping separate the edges of the incision by other pledgets; thus opposing too speedy union, shunning by this mean the formation of new collections, and facilitating the expulsion of stones, which might thus be disengaged from the kidneys. When there are no more of these extraneous bodies, and the urine resumes its course through the ureter, the cure observes the ordinary progress of other abscesses; but if there are deep seated calculi, which can neither be extracted nor exposed; if the urine, not flowing freely through the natural channel, passes through the opening of the abscess, this opening will become fistulous. These kinds of fistulæ last sometimes for several years. Frequently they are closed for a while,

but their cure is only in appearance. They form subsequently new abscesses, which re-establish the fistula.

The treatment of these fistulæ, consists in keeping their passage open, in order to allow the escape of stones which may be stopped in the kidneys, to give an easy vent to the pus or urine, and to prevent the retention of these fluids. With this view, it has been proposed to use tents of lint, prepared sponge, and bougies. But none of these means accomplishes the end proposed so completely as canulæ of gum elastic. These may be introduced even to the bottom of the fistula, and may be secured outwardly: neither do they fatigue the patients so much as inflexible canulæ. Besides, these fistulæ should be probed occasionally, to be certain if there are no stones present; if any are felt, their extraction should be attempted. In this case, we may use the forceps with a sheath advantageously. If the stone resists the attempts made for its extraction, and it is also suspected to be fastened in the kidney, the extraction must be delayed, and nature left to herself; but if there are strong presumptions for supposing that the stone is detached and loose in the kidney, and if its extraction is difficult only from the fistula being too narrow, the fistulous passage may be enlarged by means of the bistoury. However, when the stone does not occasion any unpleasant symptom, it is always preferable to wait for its expulsion by the powers of nature. Besides, fistulæ cure themselves, when they are not kept open by the passage of any fluid, nor by the presence of any extraneous body, at least when there is no sinus to retard the cicatrization.

To oppose the growth of calculi, and to prevent the return of this disease, we can employ nothing but slightly diuretic and very copious watery drinks. We may conceive that the urine, when charged with a greater quan-

tity of water, would contain proportionably less calculous matter, and would prevent its molecules from approaching and uniting. But this method is, by no means, infallible; and we see persons whose urine is so disposed to have calculus, that it cannot be preserved from it, whatever may be the regimen of their life.

Abundant drinks have also been advised, to make renal calculi descend into the ureters and bladder. This method may succeed, when the stones are small; and besides, it is attended with no inconvenience. With the same intention it has also been proposed to use vomits, purges, exercise on foot, horse, or in a carriage. But the employment of these means may occasion nephritic attacks; and therefore they should be used with the greatest circumspection.

§ III. *Of Stones in the Ureters.*

The stones that are found in the ureters, usually come from the kidneys. They are seldom formed in these canals, but they may increase there, and acquire a considerable bulk.

When renal stones are small and smooth, they frequently pass through the ureters, without being stopped in their course, without giving any sign, or leaving any trace of their passage. When their bulk exceeds the natural capacity of these canals, it is also possible for them to pass through, on account of the great dilatation of which they are susceptible. Thus, we frequently see calculi as large as a nut, descend into the bladder, without their passage through the ureters occasioning the slightest inconvenience.

The situation of stones in the ureters is not constant. Calculi have been found in almost every point of the extent of these canals. The places, however, where they are most frequently stopped, are the beginning of the

ureters, their middle, the curvature formed by them in entering into the pelvis, and principally the portion comprised between the tunics of the bladder, at their insertion into this viscus.

The number, the size, and the form of these calculi, present many varieties. Sometimes the ureters are dilated in their whole length, and filled with a considerable quantity of gravel and small stones, heaped upon each other. Frequently we find in these canals, a kind of sacs or partial dilatations, in which several stones are included.

When there is only a single calculus in the ureters, if it remains there a long time, it sometimes increases considerably. This increase taking place on the side of the kidneys, where the urine is stopped, commonly gives the stone a form, that is oblong, cylindrical, or like an olive.

Monro says, that in the body of a man, who, during his life, was subject to frequent attacks of the gravel, he found the left kidney forming nothing but a membranous and thin sac, the ureter small, hard, and full of gravel of a brown colour, so pressed against each other, that there was reason to suppose, that for a long time, the urine had not passed through this canal. However, the urine very frequently hollows out a groove upon one of the sides, which prevents the retention of this fluid, or renders it imperfect only.

Calculi of the ureters are sometimes smooth, sometimes uneven, with prolongations and asperities more or less prominent. Otherwise these calculi are not at all different from renal stones, either in colour or structure.

When the ureter contains but one stone, it is almost always fixed firmly; but if several calculi are found there at the same time, and if those which were last de-

tached from the kidneys are smaller than the first, they may be loose in the dilated ureter.

The dilatation of the ureters extends commonly from the place where the stones are stopped, even to the kidneys. It is produced not only by the distension which these canals have suffered, during the passage of the stones, but also by that produced by the urine, when it is detained there. The portion of the ureter, situated between the stone and the bladder, when it has previously afforded a passage to other stones that have descended into the bladder, exhibits a sensible dilatation. These dilatations of the ureters have no limits. They have been seen as large as an intestine, and describing several zig-zags; and cases are even cited in which their capacity surpassed that of the bladder.

The dilatation of the ureters, and the retention of urine in these canals, are not the only disorders that are caused by stones, which are retained there. Frequently the irritation, produced by these extraneous bodies, is followed by spasm, inflammation, ulceration, and splitting open of the ureters, and subsequently by urinous abscesses in the lumbar or iliac regions; symptoms which almost always involve the death of the patients.

The diagnosis of stones, situated in the ureters, is not more certain than that of calculi lodged in the kidneys. The pain along the ureters is the principal sign of the presence of these extraneous bodies; but how many times, after death, have there not been found stones in the ureters, which, during life, were never announced by any sensation of pain? This symptom is, besides, very illusory; for it may depend upon a multitude of affections of every other nature, as well of the ureters as of the neighbouring parts.

Galen confesses, that he had been mistaken in this respect. Feeling a sharp pain in the course of one of the

ureters, he thought that a stone was fixed in this canal. He used emollient injections, passed much glairous matter by the anus, and from thenceforth was free from pain. After this he judged that it did not depend upon the cause which he had suspected. Boerhaave relates that he found himself in a similar situation. Occupied, one day, in botanical observations, he felt suddenly a sharp pain, which extended from the left kidney towards the pubis, following the direction of the ureter. He thought that a stone was descending from the kidney; the nausea and inclination to vomit, which he felt at the same time, confirmed him in his judgment; as also the tenesmi, which he felt in making water. For some days he drank abundantly of emollient drinks; the pain was dissipated, then returned, disappeared again, and finally manifested the character of deeply seated rheumatic pains. Boerhaave concluded to attribute them to this cause.

We may presume that the pains are produced by a calculus, situated in the ureters, when they have been preceded by attacks of nephritis, when the patient has formerly passed small stones with the urine, when he has experienced the same pains in the ureters, when they have ceased suddenly in this region, and have been replaced by symptoms of stone in the bladder. When the stones are displaced and advance from the ureters towards the bladder, the pains also change place with these extraneous bodies, and seem to approach nearer to this viscus. Besides, they are more or less sharp, according as the stones are smooth or rough. They increase when the patients take exercise; as to the rest, they are very analogous to those, produced by renal stones; they are sometimes flying, sometimes severe, extend to the ureter, pubis, groins, genital parts, thighs, and are also accompanied sometimes by fever, spasm, convulsive motions, &c.

Some have also given, as a sign of stones in the ureters, the retention of urine in these canals, in the infundibulum and pelvis of the kidneys; but this is proving the existence of a disease by a symptom that is more obscure and more difficult to be known than the disease itself; for, unless the retention takes place in both ureters, we will not perceive any diminution in the quantity of urine which the patient discharges, the secretion of this fluid increasing proportionally in the kidney of the sound side; and supposing that both ureters were obstructed, we have not then any means of distinguishing this retention, when complete, from the suppression of urine in the kidneys, with which it is confounded. Moreover, the retention of urine in the ureter is not always a consequence of the presence of stones in this canal.

If these extraneous bodies are angular, and covered with asperities, and if they have a groove upon one of their sides, they do not commonly oppose any obstacle to the flow of urine. In several bodies we have even found the ureters full of gravel, through which this fluid filtered, without its excretion being at all hindered.

All the rational signs, therefore, of the existence of stones in the ureters, offer nothing certain. There is but one case in which we can have some positive signs of the presence of these extraneous bodies; that is, when they are stopped in the course of the ureters between the tunics of the bladder. If they are larger, the finger, being introduced into the rectum in man, and into the vagina in woman, may perceive, through the parietes of these canals, the tumours which they form. Still it will be doubtful if this tumour is not produced by another cause, such as a fungus, &c. If the stone, being stopped at the mouth of the ureter in the bladder, presents a naked extremity in this viscus, it may be touched by

the sound, introduced through the urethra. But how are we to distinguish if the extraneous body, that is found, is really situated in the ureter, or if it is not a stone of the bladder encysted in a sac? We cannot obtain this knowledge, until the bladder has been opened by the operation for the stone, and the finger has ascertained the precise spot which the stone occupies.

The danger of stones in the ureters is not always proportional to their size. We have seen very small ones that were stopped in the course of these canals, retain the urine there and occasion death; whilst others as large as a nut, descended freely into the bladder, or remained a long time in the ureter, without occasioning any dangerous symptom.

Art does not afford much more extensive aid to stones of the ureters than to those of the kidneys. If we except those, that are fixed at the insertion of these canals into the bladder, which may be extracted, the others are entirely beyond the reach of instrumental surgery. Then the curative indications may be reduced to opposing the symptoms, which these extraneous bodies occasion, and to facilitating and hastening their descent into the bladder.

Bleeding, baths, relaxing and demulcent drinks, are the principal means, which can be employed to mitigate the pain, irritation, spasm and inflammation of the ureters, which are the effects of the presence of one or more stones. Art is absolutely impotent, with respect to the retention of urine, produced by these extraneous bodies. Diuretic drinks, increasing the secretion of this fluid, would render this disease more dangerous. The patient can hope for a cure, only from the resources of nature. In treating of renal stones, we have pointed out the conduct to be observed, if in consequence of

these retentions of urine, there should appear abscesses or urinary deposits in the iliac or lumbar region.

In order to propel stones, that are stopped in the ureters, and to accelerate their descent into the bladder, it has been advised to use vomits, and exercise on foot or horse; in one word, whatever may excite agitations. These means should be employed with great prudence, and cannot be used, when the patient is weak and experiences pain. It is not so with baths and copious mucilaginous drinks; these means are very proper to facilitate the descent of stones in the ureters, and their use does not expose to any danger, unless there should be a total retention of the urine.

The extraction of stones, that are stopped at the opening of the ureters into the bladder, has unto this day appeared very difficult, even to the most experienced practitioners; they have followed different processes for disengaging these extraneous bodies from the envelope which retains them. All have not ascertained that the stone was encysted, until after the incision was made into the bladder, as in the common operation for the stone. Without this previous incision it is, in fact, impossible to be certain of the precise spot occupied by the extraneous body. Some have then proposed, either to thin the envelope by repeated introductions of the sound, and by a gentle friction of that portion of the bladder and ureter, which covers the stones, or to lacerate, by embracing the tumour with the forceps, and squeezing them gently and repeatedly. These methods are tedious and extremely painful; they hurt and bruise the bladder, give rise to the inflammation and suppuration of this viscus, and put the life of the patients in the greatest danger. Others have had recourse to emollient injections, to disengage stones that were thus encysted. Ledran, who employed these injections, was not able

to extract the stone until they had been used for two months. Besides the tediousness and uncertainty of this process, it occasions a distressing uneasiness to the patients, who generally despair of their cure until the instant of the extraction of the stone. Others have made use of the bistoury to cut, upon the stone, that portion of the sac which retains it. But this incision, with the point of a bistoury upon a surface that is often uneven and rough, sometimes presents great difficulties; besides, the instrument may slip upon the stone, which is commonly round, and pierce the bladder.

The inconveniences attached to these processes, suggested to Desault the idea of employing, for this operation, the instrument to which he has given the name of kiotome. By means of this, we may make with safety and ease the section of that portion of the ureter and bladder which retains the stone.

The manner of using this instrument is very simple. After having ascertained, with the finger introduced into the bladder, the part of the stone which is naked in this viscus, we must engage, in the excavation of the kiotome, the kind of purse which is formed by the membranous reduplication that covers the calculus, and cut this reduplication by pushing the blade of the instrument into the sheath. If this purse is not sufficiently prominent, or if it cannot be engaged in the excavation of the kiotome, there will be no inconvenience in placing this excavation upon the tumour which the stone forms, and in cutting in this place the envelope which fixes it there. The incision may be enlarged at pleasure, by advancing the excavation of the sheath, and repeating the stroke of the blade. It is not always necessary to make this incision of an extent proportioned to the size of the calculus; it is often sufficient to cut some lines of the membranous reduplication, which embraces the

part of the stone corresponding to the bladder, in order to disengage, with ease, this extraneous body, whatever may be its length. We may then make use of the finger, the button or forceps to get the stone out of its collar, and it may afterwards be extracted according to the rules prescribed for calculi of the bladder.

§ IV. *Of Stones in the Bladder.*

In speaking of stones in the kidneys and ureters, we have said that frequently these extraneous bodies, being carried along by the urine and by their own weight, descended into the bladder; and that, when arrived in this cavity, many of them are conveyed into the urethra and expelled. This spontaneous expulsion of stones, contained in the bladder, takes place most frequently in women, whose urethra, being shorter, wider, and more extensible than that of men, sometimes affords vent to calculi as large as a hen's egg. However, we have also several times seen, in men, stones of the size of a nut, pass through this canal. But these examples are so rare, that we cannot reckon upon such a resource. Numberless observations attest that extremely small stones, which had passed the ureters easily and almost without pain, have never been able to get into the urethra, and have remained in the bladder, where they served as a nucleus to larger calculi; for the most of the stones in the bladder have, as a base, a gravel that has descended from the kidneys, around which the urine forms new layers.

Some of these stones, however, originate immediately in the bladder, where several grains of calculous matter are deposited and collected together; these have no distinct nucleus. Others owe their first rudiments to some extraneous body, which, being found in this viscus, becomes the centre of the incrustations. Thus we

have several times seen stones in the bladder having, for a nucleus, a drop of blood, grumous pus, thickened mucus, a pin, a grain of corn, a leaden ball, a tent, a bougie, a piece of catheter, and even, in this hospital, in a woman, a small apple.

The number of stones in the bladder does not vary less than that of renal calculi. Most commonly we find but one stone in the bladder: for example, mural stones are almost always alone; it is not so with cretaceous ones. Frequently we find two or three of them, and sometimes we may even count a hundred. Desault extracted more than two hundred stones in an operation, that was performed upon a curate of Pontoise. The size of these extraneous bodies is proportional to their age, to their number and nature. The longer a stone remains in the bladder, the larger will it grow by the addition of new layers. Those which are found there in great number, are not susceptible of a considerable increase. The mural stones, even when old, never become very large, but the cretaceous increase sometimes very rapidly, and attain an enormous size. We have seen some of these stones, which surpassed the bulk of the two fists, and filled up the whole extent of the bladder, showing nothing but a groove upon one of their sides, through which the urine flowed.

The differences in the figure, colour, density and structure of stones in the bladder have been sufficiently displayed, when a general view was taken of the varieties exhibited by urinary concretions.

Stones in the bladder are not always loose and floating; there are some, as has been said above, that are exactly embraced, and as it were, locked by the parietes of the bladder, which they fill and distend; others are also partly engaged in the ureters, and it is not rare to find some fixed in the neck of the bladder. Frequently

they are lodged in particular sacs, accidentally formed in this viscus. These kinds of cysts are of different capacities. Some are so small and numerous, that the bladders, in which they have been found, are called bladders with cells. Others, that are a little deeper and with an entrance narrower than the bottom, appear to be formed only by the internal coat of the bladder, prolonged between the cellular texture of the fleshy coat, through which it makes a kind of hernia. Other sacs, much more spacious, are formed by all the coats of the bladder. These last are sometimes so considerable, that this viscus seems to be divided into two or more cavities nearly of an equal size. The stones contained in these cavities, sometimes exhibit depressions, into which fungosities of the bladder are received. Frequently also we have seen these vascular prolongations insinuate themselves between the inequalities and prominences of of the surface of these stones. When this disposition exists, in extracting the stone, a portion of these fungosities is often torn off; a circumstance, which, deceiving some practitioners, has induced them to believe that there are stones adhering to the parietes of the bladder; but this adhesion is apparent only; it is, if we may so speak, only a kind of ratchet work, and there is no continuity between the soft parts and the calculi.

We have seen that the diagnosis of stones in the kidneys and ureters does not offer, so to speak, to the practitioner any thing but a steril knowledge; since, in most cases, he can do nothing for the cure of the patients. Therefore we did not dwell upon the exposition of the diagnostic signs of these extraneous bodies. It is not so with the stone in the bladder; the surgeon, when informed of the presence of this extraneous body, may deliver him who is afflicted by it, and thus snatch him from frequently inevitable death; but the operation, which he

is obliged to perform, is surrounded with so many dangers, that it should not be determined upon, until after the fullest conviction of the existence of the calculus. The signs of calculus in the bladder are distinguished into rational and sensible. Amongst the former the historical signs may create presumptive evidence respecting the existence of stone in the bladder. Thus we may learn if the person who experiences symptoms that depend upon the affection of the urinary passages, has before been subject to the symptoms of calculous nephritis; if, as soon as the pains have ceased in the kidneys and ureters, they have been felt in the bladder; if the urine has often carried with it gravel or small stones; or if the patient has been already operated upon, after having suffered symptoms similar to those now experienced; if he has descended from calculous parents, &c.

The most common positive sign of stone in the bladder is, the pain in the region which this organ and its adjacent parts occupy. Sometimes this sign is wanting; calculous patients have, for several years, carried large stones, without being at all incommoded by them; but these cases are rare. The pain produced by stone in the bladder, is not always felt with the same intensity. It is more or less sharp, according to the particular sensibility of the calculous person and the form of the stone. That which is studded with points, occasions much stronger pains than that whose surface is polished. These pains are usually allayed by rest, renewed by motion, and increased especially by exercise on foot, horse, or in a carriage. They are accompanied by a sensation of weight in the perinæum, stupor and numbness in the thighs, retraction and sometimes atrophy of the testicles, &c. The sufferings, experienced by certain calculous persons, are so violent, that they are in a continual agitation, often cross the thighs, walk with stretch-

ed legs, sometimes introduce the finger into the rectum, where they think they feel a hard body, which causes very frequent tenesmus, in consequence of which adults and old persons are often incommoded with the hemorrhoids, and children with prolapsus or inversion of the rectum. Almost all are tormented with involuntary erections; many occasion them by pulling and rubbing the penis, in which they feel an insupportable tickling and itching, especially towards the extremity of the glans. In some we perceive at the orifice of the urethra a slight inflammation, similar to that which takes place in gonorrhœa; they have incessant desires to make water, and cannot satisfy this need without experiencing that to go to stool; and reciprocally the going to stool recalls the desire to make water. When the stone is large and uneven, the pain is sharper after the evacuation of urine, than it was before; because the parietes of the bladder are then applied naked to the extraneous body, which irritates them and excites their contraction; when, on the contrary, the stone is small and light, it is frequently placed near the neck of the bladder; and in this case the efforts, which are made to pass water, are extremely painful and frequently fruitless. It also happens sometimes, by the same mechanism, that the flow of urine is suddenly stopped, and that it is renewed as soon as the calculous persons place themselves in another position to make water, than that in which they were; some cannot even make water unless they lie upon their back or side. A stone, engaged in the neck of the bladder, does not always cause retention of urine; if it is angular, or if it has a groove upon one of its sides, it does not close the mouth of the urethra so exactly as to prevent this fluid from still passing there by drops. Incontinence of urine is also sometimes one of the consequences of the presence of stone in the bladder; this is

the case, when the extraneous body is so large as to fill exactly the capacity of this organ. The urine not being then able to collect there, commonly flows out as fast as it is secreted, by passing into a gutter, which it forms upon one side of the calculus. Otherwise, the urine of calculous persons is, in some, glairous; in others purulent; sometimes bloody, &c. The greater number discharge blood, whenever they take the slightest exercise.

Amidst this multitude of rational signs of stone in the bladder, there is not one which proves in a certain manner the presence of this extraneous body. Even the union of these signs leaves still more uncertainty respecting the existence of this disease, since several other preternatural affections, as well of the bladder as of the urethra, are announced, with some slight difference, by the same symptoms.

The sensible signs of stone in the bladder are acquired by the introduction of the sound into this cavity, and by that of the finger into the rectum in man, and into the vagina in woman.

The finger introduced into the rectum in man, and into the vagina in woman, easily feel through the parietes of these canals and the fundus of the bladder, the tumour which is formed by the stone included in this viscus, when this stone is of a moderate size; but when it is small, it frequently escapes the most accurate researches, especially in calculous persons, whose bladder is very thick, and, as it were, horny. These researches are also impracticable sometimes, as in the case of hemorrhoids, scirrhus, and carcinoma of the rectum. This method is besides very delusive; for the tumour, which is taken for a stone, may be produced by a swelling of the prostate gland, by a fungus of the bladder, or an enlargement of any other nature, which may have its seat in the coats of this organ or in the neighbouring

parts. Sounds of different kinds have been proposed to ascertain the stone in the bladder. The flexible sounds, especially those of gum elastic, are generally rejected for this operation. Amidst the inflexible sounds, some authors prefer, to the common catheters, those which are made of iron or steel, and they recommend that they should be solid, so that, being more weighty, their striking upon the stone may be stronger and more distinct; but the best practitioners, and those most skilful in sounding, employ only the common catheters, and they are never mistaken respecting their contact with a stone. These catheters have, besides, the advantage of solid sounds, in procuring at pleasure the escape of the urine contained in the bladder, and in serving to throw injections into this organ, if they should be judged necessary on the discovery of the calculus.

We will now also mention here the manner of introducing the sound. For this introduction the patient should commonly be laid upon a bed, especially when it is a child. But this embarrassment may often be avoided in persons who submit willingly to this operation, and they may be sounded standing upright.

Frequently the sound meets the stone, as soon as it enters the bladder. A skilful hand recognizes the contact of the two bodies easily and with certainty; sometimes, even in striking lightly with the sound upon the stone, we hear very distinctly the noise that results from their encounter. Then the least experienced practitioner can have no doubt of the existence of the calculus. But this extraneous body does not always present itself so easily; frequently it is sought for a long time before it is found; sometimes it even escapes the most accurate and best directed researches. It is very difficult to prescribe rules for the conducting of the sound into the bladder, in order to be assured of the existence of the

stone. In this case precepts are insufficient; practice in sounding can alone render a surgeon skilful in this operation. On this subject we will however relate some practical remarks, which are the fruit of experience and observation. When the stone does not present itself to the sound, we must direct this instrument gently to all the points of the bladder, depress it as much forward as it can go, then draw it back to the neck of this organ, then depress it again; holding the beak of it, sometimes lowered towards the fundus of this cavity, sometimes elevated in the opposite direction, carry it to the right, left, in short in every possible direction, and occasionally give the sound slight agitations, so as to render the striking of this instrument against the stone more sensible. If, notwithstanding these precautions, we do not find the extraneous body, the position of the patient must be changed; he should be sounded, sometimes laid upon the back, sometimes on the side, then standing up, inclined forwards or bent backward. Frequently, by these changes of situation, the stone is displaced and its discovery made more easy.

It is more advantageous to sound when the bladder is full of urine, than when it is empty. In the first case, the motions of the sound are both more free and less painful. Besides, the bladder being expanded by the fluid which it contains, does not form folds under which the stone may be concealed. Thus we have frequently succeeded, by filling this viscus with an injection, in finding a stone, which before we had sought in vain. Sometimes also the calculus cannot be felt unless the bladder is empty, which happens especially when this sac is large and the extraneous body is small and so light as to float in the urine, and to flee, if we may so speak, before the sound. In this case we find the utility

of hollow sounds, either for filling or evacuating the bladder at pleasure.

Although researches thus directed, may not find the stone, we cannot however pronounce affirmatively respecting its non-existence, when there is a continuance of the symptoms that relate to the presence of this extraneous body. The patient should be sounded repeatedly; frequently the stone escapes a first and second research, and presents itself in a third. It even happens frequently that a surgeon, skilful in the use of the catheter, does not find a calculus, which another practitioner, much less skilful, discovers with great ease.

Several causes may render the discovery of the stone in the bladder difficult. 1st. If this extraneous body is small, there will not only be more trouble to find it with the sound, but when it is touched, it flees before the instrument and thus makes their contact insensible. 2d. If it is found smeared, and as it were covered with glairous matter, the sound may slip over it, without producing upon the hand, which conducts it, the sensation that commonly results from the encounter of these two bodies. 3d. The stone may be concealed behind the wrinkles or under folds of the bladder, or be encysted in such a manner that there will be no point, or but a very small extent of its surface, which would be exposed in this viscus. 4th. It may be contained in a particular sac, such as a hernial prolongation of the bladder, into which the sound cannot penetrate. 5th. The beak of this instrument may be engaged in the dilated ureter, and its movements appear almost as free as if it was in the bladder. In this case the surgeon does not perceive this error of place; he withdraws the sound, persuaded of the non-existence of a stone.

It also happens often, that a stone is supposed to be felt, although none exists. It is thus that the horny

bladder, strictures in this viscus, and callosities in the canal, have been frequent causes of imposition. The strictures which are situated in the bladder, are in particular very delusive; that kind of leaping, which the sound experiences as soon as it has surmounted these obstacles, against which it had first stopped, produces almost the same sensation as if it struck against a stone. A fungus of the bladder, a tumour situated behind the pubis, a polypus, a pessary, or any other extraneous body in the vagina, the scirrhous womb, indurated fæces, a carcinoma of the rectum, &c., may also, by forming a projection into the interior of the bladder, lead into error a practitioner that is inexperienced, or at least make him doubtful of the nature of the tumour which the sound touches. The examination of the rectum in man, that of the vagina in woman, and in both sexes that of all the parts in the neighbourhood of the bladder, will be sufficient to undeceive and dissipate doubt. The kind of guggling which takes place in the sound, when it is not attentively closed during its introduction into the bladder, has also been sometimes taken for the noise which is made by the striking of this instrument against a stone.

The sound serves not only to prove the existence of calculus in the bladder; it may also, in some circumstances, point out the number, size, figure and hardness of these extraneous bodies. Thus we may ascertain that the bladder contains several stones, when they are small, and when, on agitating the sound, we feel and hear a kind of clashing which is produced by their displacement; but when these extraneous bodies have facets, and these are, as it were, articulated with each other by a kind of harmony, the sound then passes from one to the other, without its passage being perceived.

We may suppose that the stone is small, when it disappears as soon as some motion is made with the sound; on the contrary, we may judge that it is very large, when we do not cease to feel it, although the motions of the sound in the bladder should be very extensive. But here three causes of error present themselves: 1st. A very small stone, situated near the neck of the bladder, may appear to be very large; because, when touched by the whole length of the sound, it seems to offer a very large surface to this instrument. 2d. If the sound is applied to both sides of the bladder, the extraneous body, being always seated at the neck of this viscus, and consequently at the centre of the revolutions of the sound, is reputed to be very large, on account of the extent which the beak of the instrument traverses, which is always supposed to answer to the stone. 3d. A very small calculus, that is found upon one of the sides of the sound, may be propelled by this instrument and follow it in the motions which are performed by it. Then these two bodies, always remaining in contact, produce almost the same sensation as if the sound glided upon a very large stone.

We may distinguish with sufficient certainty whether the stone is smooth or rough. In the first case, the sound slips without being stopped by any thing, which is not the case when the calculus is studded with points and asperities.

We may also pronounce with some assurance upon the hardness or softness of the stone, by the more or less distinct shock of the sound against these different extraneous bodies.

The effects produced by the presence of the stone in the bladder, are almost as various as there are calculous persons. We have already said, that in some the increase of the stones was very rapid, whilst in others it

was so slow, that the same calculus scarcely exhibited any difference in size at the end of several years. We have also stated the derangements, caused by these extraneous bodies in the excretion of urine, in proportion to their size, figure and particular situation in the bladder. Except a very small number of calculous persons, who experience very little inconvenience from the presence of the stone, the greater part, harassed day and night by sharp pains, are exposed to frequent inflammations of the bladder, to a kind of horny state of it, to suppuration and ulceration of its parietes. Marasmus and death are sooner or later the consequence of these symptoms.

We will not recapitulate what has been said of lithontriptics. Their inefficacy and the dangers of using them are sufficiently known. When the stone is too large to pass through the urethra, nothing but the extraction of this extraneous body, by the operation for the stone, can effect a radical cure. The history of this operation is foreign to our proposed object. We refer readers to the course of operations published latterly, and in particular to the treatise of M. Deschamps upon this subject

PART SECOND.

Of the Diseases that relate to the Excretion of the Urine.

CHAPTER I.

Of Incontinence of Urine.

THE incontinence is, like the retention, a derangement in the excretion of the urine. In one of these diseases the bladder can not expel the fluid which distends it; in the other this fluid comes away involuntarily, without its being possible to retain it.

Incontinence of urine is particularly a disease of childhood; adults are less subject to it, and it is rare for it to take place in advanced age. This assertion would seem to be an error to those who hear old men complain frequently of not being able to retain their urine, if we did not know that these patients, for an incontinence, often mistake the regorgement of the urine, which is only a symptom of retention. It is the same case with surgeons, who are not exempt from this popular error, and who do not perceive that an involuntary flow may exist at the same time with retention and be the effect of it, as we commonly perceive in the retentions that depend upon the debility or paralysis of the bladder. In this case, the fibres of this organ being distended, re-act upon the urine, which then flows out through the urethra, until the resistance of the sphincter and of the canal are in equilibrium with the expulsive force. Sometimes also the urine escapes continually, which happens every time that the bladder loses its action entirely; for, in this situation, this organ, always remaining full, cannot

receive the urine, which passes through the ureters, without an equal quantity escaping through the urethra. As to the rest, we will not now speak of this kind of false incontinence, the distinguishing signs and cure of which have already been pointed out in speaking of the retentions, which are occasioned by the weakness of the bladder. We will now treat of incontinence, properly so called.

The causes of the incontinence of urine are diametrically opposite to those of the retention. In speaking of this last we will observe, that it happens whenever the bladder becomes more feeble, or when the resistance in the urethra is increased. On the contrary, incontinence proceeds, either from the expulsive force of the bladder being increased without a proportional increase in the urethra, or from its resistance being weakened, the power remaining the same. From this principle, it is easy to explain why this disease is so frequent in children. We know that at this age irritability is much stronger than at any other period of life. We know also that the expulsion of the urine is entirely owing to muscular action; whilst, on the resisting side, there are nothing but the sphincter of the neck of the bladder, the levator muscles of the anus, and perhaps the bulbocavernous muscles, which may be active powers; for the different curvatures of the urethra and the approximation of its sides, oppose but a passive and feeble resistance to the escape of the urine. Thus incontinence takes place in children, because the contraction of the bladder is so quick and strong that the urine escapes almost before they are warned of the occasion to pass it, and without their being able to stop its course. There are also many children, who, through laziness or inattention, do not obey the first excitement to make water, and who, at length pressed by necessity, suffer it to flow

into their clothes. With others the sensation which excites the contraction of the bladder, and accompanies the ejection of the urine, is so weak, that this function is performed without a formal act of the will, without even exciting an impression strong enough to interrupt sleep. This is the case with children, who are troubled with incontinence of urine only during the night. Age, by diminishing the irritability of the bladder, and by making man more attentive to his wants, commonly cures this indisposition; therefore we seldom see it continue to adult age. Some persons, however, are not exempt from it at other periods of life; but then it almost always depends upon a defective resistance to the escape of the urine, and it may be occasioned by the weakness or paralysis of the sphincter of the bladder or the levator muscles of the anus; sometimes it may proceed from the forced dilatation and loss of elasticity in the canal of the urethra, and frequently from all these causes united.

A stone, a fungus, or any other extraneous body of an irregular form, may be engaged in the neck of the bladder, and, not filling up the cavity exactly, may permit the urine to flow by their sides, or it may even groove a kind of gutter.

Frequently also a violent contusion, or a strong distension of the sphincter, have been succeeded by incontinence: this symptom was very common after the operation for the stone by the great apparatus, and still more so in females, after the extraction of the stone by dilatation. The neck of the bladder and the canal of the urethra, being stretched by the passage of the stone, lose their spring, remain dilated and oppose no more resistance to the urine.

Women, who have had laborious parturition, and in whom the head of the child, by compressing the neck of the bladder, has produced a contusion so violent as

to weaken this part, are also subject to a kind of incontinence, which they do not experience in general, except when they laugh or make considerable exertions.

Most authors, who have written upon incontinence, have thought, that persons, attacked with palsy or apoplexy, were very subject to this indisposition; but, as has been observed formerly, they have mistaken, for incontinence, the retention of urine with regorgement. In this case, they have attributed the involuntary flow of the urine to palsy of the sphincter of the bladder; but they have not remarked that the bladder partakes of the same affection; for the sphincter, not being a particular muscle, but a bundle of fleshy fibres, formed by the union of those which compose the internal surface of the muscular coat of the bladder, exhibits, in this case, only a weakness that is common and proportional to that of this viscus. Now we have proved, and all physiologists are of the same opinion, that the action of the bladder is absolutely necessary for the expulsion of the urine, and that the inactivity of this viscus is always succeeded by retention.

The same doubts may also be entertained respecting the observations that have been made of diabetes, complicated with incontinence of urine. These doubts are, in this case, much better founded; because the remedies that have succeeded in this disease, such as vesicatories upon the os sacrum, drastic purges, &c., are those which have been most advantageous in the treatment of retention of urine, produced by the atony of the bladder. Besides, it is difficult to conceive that this organ, continually soaked by the excessive quantity of urine that is secreted in diabetes, should preserve its contractile force, whilst this same force would be annihilated in the sphincter.

Incontinence of urine is not attended with as dan-

gerous symptoms as retention. It is, however, a very disagreeable inconvenience to a man that has to live in society; his clothes, continually wet with urine, diffuse such a strong smell, that he becomes a burden to himself and those who live with him.

Age, as has been stated, commonly cures children of this indisposition. Threats, and even chastisement, when the former are ineffectual, are the most efficacious remedy for those who wet their beds only through inattention or indolence Fear makes them more attentive to the call for making water, and causes them, in a manner, to watch for the first sensation that indicates this need. To this mode of action, we must refer the cures that have been performed by a multitude of means, some more terrifying than others; thus we have seen children for ever delivered from this inconvenience, by making them crush live mice in their hands, assist at a dying-bed, &c.

When the incontinence depends upon an excess of irritability, which provokes the contraction of the bladder as soon as the least quantity of urine is collected in its cavity, and causes it to surmount, involuntarily, the resistance of the urethra, we must then seek to diminish this irritability by the use of warm baths, mucilaginous drinks, &c. When the incontinence takes place only during the night, it may be prevented by making children sup early, so that the urine which is secreted afterwards, may be evacuated before they go to bed, and by waking them up several times in the night, &c.

It is only when the incontinence depends upon a defective re-action on the part of the powers which form the resistance in the urethra, that we ought to employ tonics, as well externally as internally. They seldom succeed when the disease is of long standing; then we must have recourse to palliative means, that is to say,

to machines with which the urethra may be compressed in such a manner as to intercept the passage of the urine.

This compression is very easily made with men; and, without stopping to make a successive examination of all the bandages that have been proposed for this purpose, we will say that rings, or bandages, like pothangers, appear to us to merit the preference, and to fulfil perfectly the object that is proposed.

In women, it is much more difficult to make a suitable and constant compression of the canal of the urethra. Besides, the distress caused by pessaries and other plugs introduced into the vagina, it is very rare for these means to make an efficacious opposition to the flow of the urine. Thus their insufficiency has caused the invention of a great number of machines, some more complicated than others; but that machine, which seems to us to unite the most advantages, is a kind of bandage which makes an elastic circle round the pelvis. In the middle of this circle, which corresponds to the pubis, is a plate upon which is fitted a stem equally elastic, and bent back in such a manner that the extremity opposite to the plate, and to which a small cushion is attached, is placed at the entrance of the vagina and compresses the canal of the urethra; and in order that the compression, exercised by this cushion, may be graduated at pleasure, we may employ a double elastic stem, as in the bandage of Ruffin for compressing the salivary canal of Stenonius; a bandage, the figure of which may be seen in the memoirs of the Academy of Surgery. By the aid of these machines we may, in both sexes, command the urine, and only leave to persons afflicted with incontinence, the disagreeableness of being obliged to have recourse to these artificial means in order to preserve themselves from a still greater inconvenience.

CHAPTER II.

Of Retention of Urine.

The retention of urine is that disease, in which the urine is stopped in some one of the canals, that are destined to convey it out. This definition naturally conducts us to the division of retention into as many species as there are particular canals, in which this fluid may be retained. In men we may distinguish four kinds of it, the first of which will have its seat in the ureters and the infundibulum; the second in the bladder; the third in the canal of the urethra; and the fourth under the prepuce. In this division, we will not consider any thing but the place where we find the obstacle to the course of the urine, and not that where this fluid is diffused; for under this view several kinds are frequently confounded in one only, and the retention exists in several of these cavities at the same time. For example, the urine retained in the urethra, when the retention is of long standing, soon becomes so in the bladder, from thence in the ureters, and progressively in the very substance of the kidneys. In detailing each kind of retention, we should be careful to distinguish that which is primary in particular cavities, from that which is only symptomatic.

Of the Retention of Urine in the Ureters.

Under the title of retention of urine in the ureters, we comprehend not only that which takes place in these canals, but that also which happens in the pelvises of the kidneys and the infundibulum. This disease has been described in most works, as well ancient as modern, under the name of ischury of the ureters. It is very common; we find cases of it in almost all the

authors who have mentioned it. We have also met with it very often in dead bodies. It occurs at every age, and attacks both sexes. Women, however, are more subject to it than men, and children than adults. Sometimes it is simple, that is to say, it exists only on one side; sometimes it is double, and takes place in both sides at the same time. In both cases, it is either complete or incomplete; it is complete, when not a drop of urine escapes from the cavity which includes it; and incomplete, when some little still escapes by regorgement. The quantity of urine retained is greater or smaller, accordingly as the obstacle to its flow is situated more or less near to the kidneys; and the canals, which include it, are more or less extensible. It is astonishing with what force the urine, although separated by drops, acts against the parietes of the cavities which include it. At first it dilates them, and when it can no longer overcome their resistance, it regorges, so to speak, into the vessels which have secreted it, distends them in turn, and makes the size of the kidneys twice and even three times as great as natural. We have often seen the infundibulum contain more than a pint of this fluid, and from its size resemble a second bladder; and the dilated ureters equal the size of the small intestines, even that of the intestine colon, and describe in their course zig-zags or circumvolutions. Sometimes they exhibit a kind of bubbles or partial dilatations, which are separated from each other interiorly by strictures in the form of valves. In every case their coats become more thick and dense, and the cellular membrane, which surrounds them, more firm and, so to speak, like hog's skin. This disposition has been found in the body of an infant, which was opened in the amphitheatre of the Hotel Dieu. The kidneys were suppurated and full of stones, and the ureters of the size of an inch. Towards the middle, on

the right side, there was a stricture of an annular form, which resembled the valve of the pylorus; above there was a considerable dilatation.

The causes of the retention of urine in the ureters are very numerous. They may be distributed into three classes. In the first we may arrange the extraneous bodies, which shut up the cavity, such as stones, hydatids, grumous or clotted blood, worms, pus and thickened mucus; in the second class, we may place those which affect the parietes, as their inflammation, chronic engorgement and spasm; and in the third, we may place those which have their seat in the adjacent parts, and that prevent the flow of the urine only by the pressure which they exercise upon the ureters, or by the change of direction which they cause them to undergo. Such are dropsy, flatulent collections in the intestine colon, tumours in the mesentery, in the right and left mesocolon, fæces collected in the rectum, scirrhi in this intestine, the womb, ovaries, bladder; inflammation of this last organ; fungi seated at the mouth of the ureters, &c. We will not stop to detail the particulars which each of these causes may offer; this knowledge would not be of great use in the treatment of this disease, and it will be sufficient to take a general view of their most remarkable and most striking appearances.

Whatever may be the cause of the retention, the ureters are dilated from the seat of the obstacle to the course of the urine, even to the kidneys. These canals are empty, and even contracted in all the rest of their extent; and when the retention has been subsequent in the ureters, and a consequence of that in the bladder, the valve, which closes their opening into this viscus, is often obliterated, and the communicating opening between these two cavities made large enough to admit the finger. It even happens frequently that the sound, introduced into

the bladder, is engaged in this opening, a circumstance to which we may have occasion to revert. It is especially at the commencement of the ureters, and about their termination in the oblique passage, which they describe through the coats of the bladder, that these extraneous bodies are stopped; it is not rare, however, to find them about the middle of the ureters, in the spot where these are curved in order to enter into the pelvis.

Stones in the kidneys are one of the most frequent causes of retention in the ureters, and the cases of it are so numerous that it would be fastidious to cite new ones. We must not judge of the size of the stones, which may be introduced into the ureters, by the natural size of these canals: frequently they afford a passage to calculi as large as nuts, without any danger resulting from it; but we have also frequently seen very small ones stop in their course and retain the urine. When they remain there a long time, they increase by new layers, which occasions the oblong form that is remarked in most of these extraneous bodies. Sometimes the urine grooves out for itself a gutter upon one of their sides; then, whatever may be the size of the stones, they do not occasion retention, or they produce it only imperfectly.

There are some examples of hydatids occasioning the same disease. Morgagni found an ureter filled with similar vesicles. Desault also prepared, for the Academy of Surgery, a piece which had been extracted from the body of a woman, one of whose kidneys seemed to be nothing but an assemblage of similar hydatids, adhering by a very fine pedicle. The ureter on the same side also contained several of them, as large as the seed of a raisin, which seemed to have been detached from

the kidney and stopped in this canal, where they caused a retention of the urine.

We are not acquainted with any cases, proving that there has ever been a retention of urine in the ureters, which was produced by pus or thickened mucus. We have enumerated these extraneous bodies as causes of this disease, only upon the testimony of several authors; but we can hardly think that pus or mucus can close these canals so firmly, as not to yield to the efforts of the urine and be carried along with it. The same doubts may be entertained respecting the spasm of the ureters, and it may still be regarded as a question to be resolved, whether these canals are susceptible of a spasmodic contraction or stricture, sufficient to intercept the urine in them; for an analogy can not be established between canals of the size of the ureters, and the capillary vessels of the kidneys. In the latter, we may easily conceive that an increase of the tonic or vital force may constrict them sufficiently to efface their cavity; but for the same effect to take place in the ureters, they must be endowed with an irritability almost as extensive as that of the muscles; and we are as far from acknowledging that they have this property, as we are from believing with Hoffman, in their motions of systole and diastole. To us it also appears doubtful that the colon, distended by wind, can exercise upon the ureter a compression strong enough to retain the urine there. In general, all the external causes which might act by compressing the ureters, have little action in the abdomen, because the loose parietes of this cavity yield, and from this there is no compression made upon the ureters. But the retention is often produced by large tumours, situated in the cavity of the pelvis. A body, which was used for anatomical demonstrations, furnished us with an example of it. A scirrhus of the

womb, as large as the fist, was adhering to the posterior part of the bladder. The two dilated ureters were an inch in size, the infundibulum upon the right side was twice as large, and the kidneys about one third larger than in their natural state. We may easily conceive, that in the pelvis, the bony sides of this cavity not being able to yield, the included organ must be compressed whenever a tumour is formed there.

The inflammation of the ureters produces retention, 1st, by contracting their diameter from the swelling of the internal membrane; 2d, by paralyzing their action. We know in fact that an inflamed part is no longer susceptible of motion. From thence proceeds the immobility of the arm in the inflammation of the deltoid; but the flow of the urine in the ureters depends as much upon the organic action of these canals, as upon its weight.

Sometimes we do not ascertain, until after death, that the retention of urine was seated in the ureters. We frequently find it in the body of persons who, during life, never experienced any symptom of an affection of the urinary passages. It affords no sensible sign, and all the rational signs are vague and uncertain. No tumour can be perceived externally; however extensive the dilatation of the ureter and infundibulum may be, it cannot be felt through the parietes of the abdomen. When the retention has taken place only upon one side, there does not appear to be any diminution in the quantity of urine passed by the patient; the secretion, if we may so speak, becoming doubled in the kidney of the opposite side. When the retention exists in both sides at the same time, if it is entire, it becomes confounded with the suppression of urine, which is soon the consequence of it, and it exhibits all the symptoms of it. In this case it is only by the aid of the historical signs, added to those drawn

from the seat and nature of the pain, when there is any, that we can sometimes distinguish them. For example, if a man, after having experienced all the symptoms that are commonly occasioned by stones in the kidneys, then feels a pungent pain, which seems to descend along the ureters, with a sensation of weight and tension, from the place where it was fixed into the region of the kidneys, it may be presumed that there is a retention of urine in the ureter, produced by the presence of a stone in the canal. This presumption becomes more probable, when the patient has formerly passed small stones with his urine, when he has felt the same pains, when they have suddenly ceased in this region and have immediately been replaced by the symptoms of stone in the bladder. In the same manner, if, in consequence of carcinoma of the rectum, womb, &c. the urine should be stopped, without the patient's having before experienced any symptom of affection of the kidneys, we have reason to believe that this fluid is retained in the ureters, by the obstacle which these tumours occasion to its evacuation.

Retention of urine in the ureters is more or less dangerous, according to the cause from which it has proceeded. When it exists at the same time in both canals and is complete, it terminates in the suppression of urine, which is always the consequence of it. When it is on one side only, nature relieving herself through the other kidney, of the quantity of urine, whose evacuation is necessary to health, no danger results from it in this respect. But the urine, which the dilated ureter contains, not being renewed, is corrupted by its stagnation, excites irritation and inflammation in this canal, produces the same effect in the kidney, causes this organ to suppurate, and finally becomes the source of the most fatal evils. Sometimes a crevice is made in the ureter, which

is distended beyond measure; the urine spreads into the neighbouring parts, and causes urinary abscesses there, &c.; or it is effused into the abdomen and occasions a dropsy of a peculiar nature.

Art may console itself, for the obscurity that hangs over the signs of the retention of the urine in the ureters. Even if we were certain of the existence of this disease, we could make no advances with regard to its cure. Medicine has none but feeble means to oppose it, and it is almost always beyond the reach of surgical aid. Still there are some cases, rare it is true, in which this last may act with success. If the retention depended upon indurated fæces, collected in the rectum, their extraction would re-establish the course of the urine immediately. Likewise, if this fluid was retained by a stone, stopped at the opening of the ureter into the bladder, and we should be assured of it, as in the patient who was the subject of a case in the Surgical Journal, it would be easy to extract this extraneous body with safety, by following the process which was then used.

Surgery offers resources also, when, in consequence of these retentions, urinary abscesses are formed in the lumbar region; frequently in these critical circumstances a well-timed opening has saved patients, who seemed to be devoted to certain death. But they have frequently a urinary fistula remaining at this place, unless the same opening should give vent to the extraneous body which obstructed the ureter, and this canal should entirely recover its liberty. As to other cases of retention, the remedies, either internal or external, should be varied according to the cause of the disease and be appropriate to its nature. Sometimes we have employed with success, vomits, exercise on foot or horse, and every thing which may excite agitations, in order to propel the stones that are stopped in the ureter and to hasten their

descent into the bladder. We cannot recur to these means, except when the strength of the patient permits and he suffers little; baths and copious mucilaginous drinks, when there is not a total retention, assuage the pains and even facilitate the descent of the stones. A number of lithontriptic remedies, of which we have spoken in the article of calculi in general, has also been recommended.

Of the Retention of Urine in the Bladder.

The retention of urine in the bladder, is that disease in which the urine cannot be expelled from the bladder. It has been described by the ancients under the generic term of ischury. Some authors have distinguished it from dysury and strangury, and have made these particular diseases, while others have considered them only as retentions of different kinds. They have called that dysury, in which the urine escapes with difficulty and pain; strangury, when it comes out only in drops; and they have reserved the name of ischury for that, in which there is none at all expelled. These different symptoms being only degrees of the same disease, we would substitute, for this division, that of complete and incomplete retention.

The urine, being retained in the bladder, distends its parietes, and when the elasticity of its fleshy fibres is overcome, it opposes but a feeble resistance to its dilatation and sometimes becomes very large. In a child of eighteen months, we have seen it contain a pint of urine, and in adults, from six to seven pints; filling not only the excavation of the pelvis, but rising up into the abdomen above the umbilicus; sometimes even prolonging itself through the abdominal rings, and forming scrotal hernia, or passing under the crural arch, and extending into the groins. It is true, that these prolongations are

rare; however, the Memoirs of the Academy of Surgery furnish several examples of it. In the most common cases of retention of urine, the bladder preserves nearly its natural figure; its dimensions, however, do not all increase in the same proportion; it extends more from below upwards than in any other direction. Its fundus becomes wider and deeper, depresses the perinæum forwards; in women presses the vagina backwards, and the rectum in men, and forms in these canals tumours, which close up their cavities entirely or partially, and oppose the passage of the fæces through the rectum. The posterior side of this organ, which is covered by the peritonæum, pushes the small intestines backwards and upwards, and is prolonged into the abdominal cavity. Its summit, going above the pubis, slips, if we may so speak, between the peritonæum, which it raises up, and the abdominal muscles. The anterior and superior part, forming a tumour in the hypogastric region, is applied naked to the recti and transversales muscles, to which it is united by a loose cellular membrane; a disposition which is important to be known, and by means of which the bladder may be punctured without danger of piercing the peritonæum and giving rise to an effusion of urine. It is not rare to find in bladders which which have suffered these distensions, strictures or columns, formed of bundles of fleshy fibres, and separated by depressions called cells or pouches, in which the calculi are frequently lodged.

When the urine has distended the bladder as much as it can do, without being able to overcome the resistance of the urethra, it is stopped in the ureters, which it dilates in their turn. The valve, which shuts up their opening into the bladder, disappears; and the communicating orifice between the two cavities sometimes acquires nearly an inch in diameter. This remark did not

escape the celebrated J. L. Petit; but he had drawn from it a consequence, which does not seem to be natural. In his posthumous works he says, "that whoever would carefully observe all the variations in the pains, which patients suffer, he would ascertain the moment in which the extremity of the ureter was no longer a valve, from the pain of the bladder becoming more supportable, the urine having more space to extend in." This diminution of the pain could not take place unless the ureters should be emptied and dilated at that moment; and they are then already filled by the urine, which has not ceased to be secreted by the kidneys, and they are also distended, in proportion, as much as the bladder. In short, the urine, after having dilated the ureters is, by closer approaches, retained in the kidneys, whose secretion it suspends.

The diagnosis of this disease is easily found. The signs, which characterize it, may be distinguished into rational and sensible. The rational signs are very numerous, but the most of them are equivocal; such as a deficiency in the evacuation of urine for one or more days; its escape by drops, or in very small quantity at a time; continual desires to make water; the efforts, which precede the exercise of this function; the desire which the patient still feels of making water, after having passed as much as is done in the natural state; the diminution of force or volume in the stream of urine; a sensation of weight in the perinæum; tenesmus, constipation and hemorrhoids. We should also add to these signs, sharp pains in the hypogastric region, propagated along the course of the urethra to the extremity of the glans, and subsequently to the region of the kidneys on one or the other side, accompanied some times with stupor and numbness of the thighs; pains, which increase when the patients walk, cough, or straigh-

ten themselves; and which diminish when, bending themselves, they relax the muscles of the abdomen. In fine, we may add to these signs, fever, nausea, laborious breathing, urinous sweats, and the other symptoms that were detailed in treating of the suppression of urine, which is always the consequence of complete retention, when it lasts some days.

We will not recapitulate each of the rational signs to manifest how vague and uncertain they are. Their assemblage can alone make the existence of retention more or less probable. We cannot be assured of it, but by adding to the above indications, the sensible signs that are furnished by the tumours which the bladder forms, as well above the pubis, as in the intestine rectum in man, or in the vagina in woman. The first of these tumours varies much in its dimensions; sometimes it extends above the umbilicus; it is circumscribed, without any change in the colour of the skin, without hardness at its circumference, wider inferiorly than superiorly, shining, very little sensible to the touch, unless it is strongly pressed, and then the desire to make water is excited or increased, and sometimes a few drops of urine are even made to pass through the urethra.

The tumour in the rectum or vagina, may be easily known by the introduction of the finger into these cavities, it occupies only the anterior part of their parietes; it is, like the hypogastric tumour, shining, uniform, and without particular hardness, in its whole extent. In short, a pathognomonic sign, which merits all the attention of the practitioner, is the fluctuation or rather a kind of undulation, which may be felt from one tumour to the other, when they are pressed alternately between the fingers, applied to each of them; but these tumours do not exist constantly, and we have several times seen very complete retentions, in which the bladder, being

little extensible, hardly contained a few spoonfuls of urine.

The retention of urine in the bladder is always a severe disease. It demands the most speedy assistance, when it is complete; if this is deferred too long, the most fatal consequences result. The bladder, if distended for a long time, loses its elasticity and recovers it with difficulty. Irritated incessantly by the presence of the urine, which is made more acrid and corrosive by stagnating, it inflames and falls into a kind of putrid and gangrenous suppuration.

Sometimes a crevice is made in the bladder, through which the urine is effused and insinuated into the cellular texture of the pelvis; diffusing itself under the peritonæum, even to the region of the kidneys, forming tumours in the perinæum, and reaching to the scrotum, the common integuments of the penis, and the superior part of the thighs. We have even seen the urine insinuate itself sometimes into the thickness of the parietes of the abdomen, up upon the sides of the thorax, and produce abscesses, which are generally succeeded by the gangrene of the parts where they are formed, and by fistulæ. To these symptoms are also commonly added those of the resorption of the urine and its suppression.

The treatment of the retention of the urine, may be reduced to two principal indications. 1st. To give a speedy vent to this fluid, so as to prevent the disorders that have been stated. 2d. To oppose the causes, which hinder its expulsion from the bladder. We can examine here only the first indication; the second will be treated of, as we survey the causes of the retention of urine.

We may give vent to the urine by the operation of drawing it off, which may be considered under two points of view. 1st. When the canal of the urethra, being free, admits the catheter without resistance. 2d. When

there is some obstacle to its introduction. As the history of these obstacles is the same with that of the causes of retention of urine, we also refer the manner of conducting in this case, to the statement of each. The drawing off the water, when the canal is free, shall alone occupy us. In this operation we should consider, 1st. the instrument; 2d. the manner of conducting it; 3d. how it is to be managed after its introduction.

The instruments for drawing off the water are designated under the names of algali or catheter. These are of two sorts, firm or flexible.

Firm catheters were formerly constructed of copper. Celsus was not acquainted with any others; but the inconvenience of their being incrusted with verdigris, soon caused them to be rejected for those of silver, which had already been employed by the Arabs, and have since been preserved in practice; but those of copper would perhaps merit the preference, especially in cases where considerable obstacles were to be overcome; in such, this metal, being more resisting, would allow of a smaller diameter, without being obliged to increase, as in those of silver, the thickness of the sides, and consequently to contract the calibre in order to preserve the firmness.

The length of catheters is various; six inches for adult females, four and a half for young girls; ten inches and a half for adult males, seven and a half for the different ages of childhood; these are the usual lengths. The thickness is not less variable: two lines for women, a line and a half for young girls; two lines and a third for men, a line and a half to one line for inferior ages. In general, whenever the canal is free, prefer large catheters; they enter more easily, efface in entering the folds of the canal, prevent false routes from being made, and give an easier vent to the urine. On the contrary, when there are embarrassments with hardness in the

canal, the small catheters are preferable. In these cases Desault often employed children's catheters for adults; and as, notwithstanding their smallness, they cannot commonly be made to penetrate but by pushing them forcibly, their sides should be made thicker, so that they might not bend.

The form of the catheters is various. Those of Desault had nothing but a slight curvature in the third of their length, which originated insensibly from the straight part, and extended to their beak inclusively. It is every where equal, and represents the curvature of a circle of six inches diameter; it is the same in all catheters, whatever may be their size. Those for females have only a very slight curvature towards their beak; a disposition calculated for the direction of the canal of the urethra.

For the eyes in the form of a cleft, which were formerly made upon the sides of the beak of these algalis, Desault substituted two elliptical openings, whose edges were rounded. Every practitioner had acknowledged the inconvenience of these clefts, in which the internal membrane of the urethra was often engaged, pinched and lacerated, from which proceeded severe pains, and sometimes a copious flow of blood. J. L. Petit thought that this accident could not be avoided but by suppressing these clefts; and he therefore made at the extremity of the algalis a single circular opening, which was closed by a stylet with a button. He soon saw the defect of these new catheters. The stylet which remained in their cavity, deprived them of the advantage of being employed to throw injections into the bladder; besides, it stopped the glairous or clotted blood, which the urine sometimes carried along, and opposed its escape.

Petit invented another catheter, whose end terminated in the form of an olive, pierced at its extremity. He

supposed that by means of this olive shape, he might introduce this catheter open, without the cellular texture of the urethra getting engaged in its orifice and being lacerated by it; but this method, ingenious as it is, has not been sanctioned by experience.

Garengeot advises to close the opening of these catheters by means of a stylet, having at one end an eye similar to that of a needle. Four or five threads are to be passed into this orifice, secured there by knots, and cut off to the length of two or three lines. The stylet is to be pushed into the catheter until the threads have passed through; it is then to be drawn back a little to make these threads upon a level with the orifice of the catheter. The whole is then to be soaked in melted tallow. When we desire to give vent to the urine, we must draw back entirely the stylet, which brings with it the threads and tallow.

It must be allowed that this process is ingenious, but it does not always accomplish the object for which it was invented. When obstacles are found in the canal, the tallow and threads sink into the cavity of the catheter, the edges of the orifice become prominent, and the inconveniences, which it was wished to avoid, return.

It is much more simple and advantageous to give an elliptical form to the eyes of the algalis. Besides, Desault prevented the internal membrane of the urethra from being engaged in these orifices, by filling them with tallow, after having introduced a bougie of gum elastic into the cavity of these catheters. The bougie has here no other object than to prevent the tallow from penetrating into the cavity of the catheter, while it remains in the elliptical orifices, and to bring out the tallow, which closes these orifices, when it is withdrawn, after having penetrated into the bladder.

The invention, by Bernard, of catheters of gum elas-

tic, is one of the most fortunate discoveries which have enriched surgery in the present age.

Practitioners had felt the necessity of flexible catheters, for the treatment of the diseases of the urinary passages; and all that were made before the time of this skilful mechanic, exhibit nothing but imperfection. The catheters of horn, proposed by Vanhelmont, had the inconvenience of being too stiff and incrusting speedily. Those of leather, recommended by Fabricius de Aquapendente, being softened by the urine and the mucus of the urethra, withered of themselves and did not preserve their cavity. The skins, which cover those that are made of silver, thread or leaf twisted spirally, spoil and corrupt quickly; and their beak, being then held to the body of the catheter only by the silver thread that terminates there, is stopped in the neck of the bladder or in some other part of the canal, and may be detached and remain in these cavities.

The catheters of Bernard cannot be reproached with any of these defects; they are formed of a kind of filaments of silk thread or goat's hair, covered over with gum elastic. They have the necessary flexibility to mould themselves to the different curvatures of the urethra, are not softened by the urine, and always preserve the liberty of their canal; their smooth and polished surface also keeps them, as long as the algalis, from earthy incrustations. As these catheters are especially employed in the treatment of diseases of the urethra, where their introduction often becomes difficult, they are furnished with a stylet or mandrin of iron, bent like the algalis. These stylets are preferable to those of copper, because they bend less, and preserve their curvature more accurately.

There are two ways of introducing the catheter; above or below the abdomen, which is called sounding

by the turn of art In both methods, the patient may be erect or lying down; the latter situation is more favourable than the former. Thus, after the patient is placed upon the edge of his bed, the thighs being separated, and the legs a little bent, the surgeon, when he wishes to sound above the abdomen, holds the penis between the ring and middle finger with the hand which answers to the feet of the patient, whilst with the index finger and the thumb applied upon the glans, he exposes the orifice of the urethra. In the other hand, between the index, middle finger and thumb, he holds the catheter, the eyes of which he has been careful to fill with a little tallow, and directing it in such a way that its straight side should be before the abdomen and parallel to the axis of the body, he introduces the end of it into the beginning of the urethra; and at the same time that he extends and elongates the penis, he pushes the catheter gently in until its beak arrives upon a level with the arch of the pubis; then to make it follow the curvature of the canal, he lowers, upon the side of the thighs, the hand which holds the handle of the catheter, and thus conducts it into the bladder.

If the surgeon wishes to introduce the catheter below the abdomen or by the turn of art, he should hold the catheter with the hand which corresponds to the feet of the patient, in such a manner that its convexity should be turned upwards and its straight part should be below the abdomen, in front of the interval of the thighs; he should introduce the end of it into the orifice of the glans and push it into the urethra, whilst with the other hand he extends the penis. When the end of the catheter has arrived at the place where the canal bends under the pubis, he must make it describe a semi-circle with this and the penis, carrying it upon the groin of the opposite side, and from thence upon the abdomen, ob-

serving in this movement that the beak of the catheter should be the centre of it, and that it should be turned only upon itself. He then should lower the hand which holds the catheter, and the rest of the operation is performed in the same way as when it is done above the abdomen.

There is, therefore, no difference between these two methods, excepting that in the one, the same thing is done in two attempts, as is done in the other in one, which prolongs the operation, and makes it more difficult and painful. Therefore, most practitioners do not follow this last process, except when the patients have too large an abdomen, or when, as in the operation for the stone, they are placed in such a manner as to render the introduction of the catheter above the pubis inconvenient.

When there is no embarrassment in the urethra, surgeons who are accustomed to it, ordinarily penetrate into the bladder without difficulty or exertion; but this operation, which is so simple to them, often becomes difficult to young, inexperienced practitioners; who, instead of directing the catheter according to the course of the urethra, create obstacles for themselves, either by pushing the beak against the sides of this canal, or by forming folds in it. In such a case, the catheter must be drawn back a few lines, then pushed in anew, changing its direction a little. If this second attempt is not more fortunate than the first, and the catheter should be stopped at the perinæum, the hand which sustained the penis should be applied below the scrotum, to ascertain on what side the beak of the catheter has wandered, and to give it a proper direction while it is pushed in.

If the instrument cannot pass through that portion of the canal which corresponds to the rectum, we may introduce into this intestine the index finger, with which

the catheter is to be sustained, while the canal is stretched by drawing the rectum downwards and forwards. Finally, if notwithstanding these precautions, the end cannot be obtained, we must change the catheter, taking one that is larger or smaller, or of a different curvature, or even attempt it with a catheter of gum elastic, conducted without the stylet;—but in all these cases we should never push the catheter forcibly, for fear of lacerating the urethra, or making a false passage in it.

We are assured that the catheter is in the bladder, from the depth to which it has been pushed, and from the cessation of the resistance which is experienced at its beak, in making it turn upon its axis, and from the flow of the urine. Should we evacuate immediately all the urine included in the bladder, and should we give vent to it gradually and in small quantities at a time? This last opinion has had some partisans;—they apprehended, that by emptying the bladder entirely, it might fall into langour; but, in following their advice, its fibres not ceasing to be elongated, cannot contract upon themselves. Besides, by evacuating only a part of the urine, the remainder forms at the bottom of the bladder a thick deposit, which becomes putrid from its stagnation, and often makes dangerous impressions upon the parietes of this viscus.

Other practitioners have gone to the opposite extreme; they desired, that by means of the catheter left in the bladder, and always open, the urine should flow out as fast as it arrived in this cavity. This other mode also has its inconveniencies; the fibres of the bladder being always relaxed, cannot recover their spring.

We may add to this inconvenience, that the bladder, if always empty, will press against the end of the catheter, which irritates it, and causes pain, and frequently

ulcerations in the points of contact. Besides, the catheter becomes filled with glair, and is incrusted sooner than when it is closed; and patients are obliged to keep in bed, or they have the disagreeableness of being always soaked by their urine, or carrying constantly a vessel to receive it. We believe, therefore, that it would always be better to evacuate the whole of the urine, and even to throw injections into the bladder, in order to cleanse it from the mucous and puriform matter which might be deposited there; then to close the catheter, and withdraw it, and to evacuate the urine afresh whenever a sufficient quantity shall have been collected to extend the fibres of the bladder moderately. These alternate moderate extensions and relaxations effect, with regard to this organ, what moderate exercise does with other parts of the body.

When a catheter of gum elastic is used, and the patients have to carry it for several days, care must be taken to push it no further than is necessary for the eyes to clear the neck of the bladder; if it is too long, the excess in length should be cut off.

It may then be fixed by several cotton threads, made into cords, with the middle part of which we should make, upon the end of the catheter, several circular knots at the distance of two lines from the glans, placing the last knot highest; the two ends should then be carried above the corona of the glans, where they are to be secured by a single knot. They are then to be brought back upon the sides of the glans unto the loins, and there another single knot secures them. Finally, they are to be returned to the catheter, where a third knot and several circulars are to be made with the superfluous thread.

The catheter may also be secured in the same way, to the skin of the penis, by carrying back the two cords

to it, knotting them there, and then returning them to the catheter, where they are secured in like manner. We may choose sometimes one, and sometimes the other of these two places; the pressure of the thread, continued for a long time in the same place, would produce excoriation and ulceration there.

If an algali of silver is employed, it may be fixed with two ribbands attached to the rings of its handle; and they may be passed under the buttocks, and secured, one on the right and the other on the left, to the lateral parts of a girdle or bandage round the body. It is of no use to employ other cords to secure the catheter in front; for it is only by mounting up in this direction that it can escape from the bladder; but care must be taken that the inferior cords are not too short, and that they do not keep the catheter too low and too much fixed against the scrotum; otherwise its beak, being raised up towards the anterior part of the bladder, might irritate it and cause accidents, whilst the straight part of this instrument, resting constantly upon the part of the urethra which corresponds to the fold of the penis at the side of the scrotum, would occasion inflammation and gangrene there.

We may evacuate the urine every two or three hours, sooner or later, accordingly as it is more abundant, and the urgency to pass it is greater. Nevertheless, we must not always wait for this warning. The bladder, being but little sensible, sometimes permits itself to be distended beyond measure before there is any desire to make water, and nothing prevents it from resuming its natural elasticity so much as these forced distensions. The catheter should be withdrawn every six or eight days, in order to clean it, and to prevent it from becoming incrusted; and as, during its abode, it has moulded itself to the curvature of the canal, it may

often be re-introduced without the stylet, with the greatest ease.

After having thus examined, in a general manner, the principal indication of the retention of urine, that of evacuating this fluid, we must enter into the detail of the particular modifications which this indication undergoes; but, as these modifications are essentially connected with the causes of the disease, it is necessary to consider each of these causes separately. They may be referred to three principal heads: 1st. Some exist in the parietes of the bladder, which have, in different ways, lost their contractile force, as happens in old age, debauchery, the abuse of diuretics, affections of the brain, of the spinal marrow, the distension of the fibres of the bladder, its inflammation, a humour fixed upon it, &c. 2d. Others have their seat in the bladder itself; such would be a fungus, clots of blood, the stone, the increased mucosity of the internal membrane, &c. 3d. In fine, the last causes do not exist in the bladder;—for example, such are the displacement of the neighbouring viscera which compress the urethra, tumours developed in the pelvis, which produce the same effect, &c. We will consider each of these causes in succession.

§ I. *Of the Retention of Urine, produced by old age.*

Old men are so liable to retention of urine, that this disease has been classed among the inconveniencies that are attached to age. Like the other parts of the body, the bladder having become less irritable, is no longer stimulated by the presence of the urine, and is warned of the necessity to pass it, only by the painful sensation which originates from the distension of its parietes; it then contracts, but its elongated fibres have scarcely strength enough to overcome the natural re-action which is opposed to them by the canal of the urethra. There

is almost an equilibrium between the power and the resistance, and the urine is no longer evacuated but by the aid of the violent action of the abdominal muscles. Its expulsion, therefore, is not complete, the bladder having no longer a degree of contractility sufficient to make it return to its former state. No longer able to give that expulsive stroke by which it emptied itself of the last drops of urine, this remains and already constitutes an incipient retention. Its quantity augmenting every day, and the fibres of the bladder getting accustomed to its presence, it at length happens that not more than half of the urine, contained in this sac, is ever evacuated.

All old men are not equally liable to this malady; it attacks particularly those who are of a phlegmatic temperament; plethoric, sedentary and studious persons; those, who, through indolence, negligence, or hurry, do not give themselves time to void the last drops of urine; those who make water in the night, lying upon their side instead of rising up or getting on their knees in bed, &c. The physiology of books will not perhaps avow this last cause of retention, but clinical observations attest it, and we do not doubt its reality. Thus, the history of the patients' lives, their age, their complexion, form so many indications of the existence of this kind of retention, of which we are assured, when to the common signs of retention of urine in the bladder are added the following historical signs.

Patients are certain that they have never had any affection in the urethra nor in the neighbouring parts, capable of impeding the flow of urine, when it is always evacuated freely, and in full stream; but when its jet, although always of the same size, has no longer been propelled with the same force nor to the same distance as formerly; when in short, the urine, instead of form-

ing an arch in evacuation, falls perpendicularly between the legs, so that they make water, as is vulgarly said, in their shoes; when they no longer feel, on ceasing to make water, that last expulsive stroke which they felt in their youth; when, if they attempt to make water, they are obliged to wait a long time before it begins to flow; when in a little while they can no longer evacuate it, without making considerable exertions; when the quantity of urine passed diminishes sensibly every time, and at the same time the desire to make water becomes more frequent; when at length the urine is evacuated only by drops, and incontinence succeeds to retention.

In this state, patients suffer little; the tumour which the bladder forms above the pubis, is generally indolent, and if it is compressed with a little force, a certain quantity of urine is made to pass through the urethra.

The retention which is caused by old age, is seldom complete; the urine, after having filled and distended the bladder, regorges through the urethra, where it does not find any other obstacles than the natural resistance of this canal, and in a given time, patients evacuate as much urine as in a state of health. Therefore, this kind of retention is not usually accompanied by dangerous symptoms; it does not, like complete retentions, involve with it the suppression of urine in the kidneys; the bladder emptying itself in proportion as it is filled, the crackings of this organ, effusions and urinous infiltations, which are the consequence of them, are less to be dreaded. The tumour of the bladder then exists, without the patient experiencing any other inconvenience than from the weight in the pubis and perinæum. Sabatier has seen patients who had, without doubt, been attacked with it for six months. The regorgement has often deceived so much as to cause the nature of the tumour to be mistaken. The same surgeon was con-

sulted by a woman, who was sent to the baths, to dissipate a tumour that had supervened in consequence of parturition, and which was nothing else but the bladder distended by the urine.

We find a number of old persons, who have had these retentions for a long time, which they regard as one of the infirmities natural to their age, and for which they do not even ask for assistance. The urine, however, stagnating in the bladder, putrefies, forms an abundant deposit there, and at length affects the coats of this organ.

To procure the evacuation of the urine, and to restore tone to the bladder, are the two indications which this disease presents; they are both frequently accomplished by the same means. When the retention is incipient, and the bladder, as yet, is only indolent; to recall its action it is often sufficient to apply a cold body either to the hypogastric region or to the thighs; or to go from a warm into a cold place to make water. J. L. Petit states, that he cured a tavernkeeper in a similar case, by directing him to make water in his cellar during the day, and at night to stand on his bare feet, and apply the chamber utensil to his thighs.

The patients should be careful not to resist the first inclination to make water; by not obeying this warning, the bladder becomes full; its stretched fibres lose more and more of their sensibility; the desire passes off, and the retention, which at first consisted only of a few drops of urine, soon becomes complete; it would then be in vain to have recourse to the means that have been pointed out. There is no longer any stimulus that is capable of exciting in the bladder a contraction strong enough to expel the mass of urine which it contains, and we have no other resource than the introduction of the catheter, for evacuating the urine; but evacuation,

thus artificially produced, procures only a momentary relief, the relaxed fibres of the bladder not recovering their natural elasticity for a long time; if the use of the catheter is not continued, the patients soon relapse into the same situation; this makes it necessary, either to leave this instrument in the bladder, or to introduce it every time that the patients have a necessity to make water. If they have always near them a surgeon that is skilful in this operation, or if they can themselves introduce the catheter, the continual presence of this extraneous body being always incommodious, it would be better not to introduce it except when necessary to evacuate the urine: in this case, we may advantageously use an algali of silver, or a catheter of gum elastic; but if it is to remain in the bladder, a catheter of gum elastic, furnished with a mandrin, or stylet of iron, curved like the algalis, is preferable. Which ever of these instruments may be employed, experience teaches, that in old persons, where the canal is in a kind of flaccid state, a large catheter enters more easily, and causes less pain than one of a smaller diameter. As the treatment of this disease is tedious, and as it is rare for the bladder entirely to recover its elasticity in old age, we should teach the patient to use the catheter himself, and he should introduce the instrument whenever he wishes to make water. At length, after some time, he should try to make water without this instrument. If he succeeds, he should assure himself, by the catheter, whether the bladder is emptied of the last drops of urine; if any remains, he should continue the use of the instrument. Without this precaution, the retention would soon arrive to the same degree in which it was when he first had recourse to this mean.

It has been proposed to make injections into the blad-

der, either with the water of Balaruc, or with a slight solution of martial vitriol, a decoction of chincona or some other tonic or astringent substances. We have employed these injections, and never derived any great advantages from them.

It has also been advised to use warm diuretics, balsamics, cold baths, frictions with the tincture of winged cantharides, &c., but at this age these remedies are frequently injurious and seldom useful. As to ourselves, we recommend nothing but the use of the catheter in these kinds of retention of urine; this aid, when well directed, is often sufficient to restore its elasticity to the bladder; and when it has been insufficient, we have not obtained any more success from other means. We will conclude this article by a case which will throw some light upon the manner of conducting, when, in the operation for the stone, the patient is at the same time affected with palsy of the bladder, from the retention of urine that is produced by old age.

CASE.

N. E—, aged eighty-seven years, had laboured for two years under a retention of urine from debility of the bladder, the only infirmity of his long life, when in the month of May, 1794, he began to experience a troublesome itching at the end of the glans; a sensation of weight and pricking in the perinæum; frequent, but often fruitless desires to make water and go to stool; discharges of blood, at first rare and inconsiderable, and then more frequent and copious.*

* This last symptom presents a phenomenon, which, no doubt, has not escaped the attention of the reader. The patient, in his ordinary state, made water only by the assistance of a catheter, which was introduced every time into the bladder. When, on the contrary, the contact of the stone (for on this cause all the symp-

In a little time sharp pains in the region of the bladder were the consequences of the least exercise that he took. The use of aliments that were too acrid, drinks that were too spirituous, and the passions which strongly agitated his mind, produced the same effect.

All these signs announced the presence of an urinary stone. Desault, being at that period called to N. E—, introduced into the bladder an algali of silver to ascertain, with more certainty, the existence of this extraneous body, which he found at the internal orifice of the canal of the urethra.

The operation was the more necessary, as the pains, becoming sharper every day, began to throw the patient into a state of debility and marasmus, that threatened his life. His great age, on the other hand, seemed to promise but little success. Notwithstanding this consideration, Desault determined upon the operation, which exhibited nothing particular but a considerable thickness in the fatty texture, and the wounding of the transverse artery; inconveniencies commonly slight, which he attempted to remedy, after the extraction of the stone, by compressing for several hours the trunk of

toms depended), occasioned the slightest hemorrhage in the parietes of this organ, the forces of nature were sufficient alone to expel from it, both the urine which was retained there, and the blood which was effused. From whence arises this difference in the action of the bladder? In the latter case it appears evidently to be owing to the presence of the blood, which is then a more active stimulant than the urine itself

The irritation, excited in our organs by different bodies, is often relative, not to the nature of these bodies, but to the constitution of our organs. A fluid will powerfully irritate a certain part, which will experience no change from the action of another fluid, that is supposed by us to be more irritating.

From this observation might we not draw some interesting views, respecting the treatment, by injections, of the retentions of urine that depend on debility of the bladder?

the pudica interna, and by keeping open the edges of the wound, which, being too thick, would have impeded the flow of the urine.

Its flow was sufficiently copious the rest of the day and during the night; but the day following it diminished sensibly. The small quantity that escaped, always exhibited a reddish colour, which was the sign of a bloody effusion in the bladder. The patient, besides the pains which are the usual consequences of the operation, began to feel an insupportable weight and anxiety in this part. Fever came on in a short time. Hiccup and vomitings were added to it in the night; a roundish, circumscribed and fluctuating tumour was formed above the pubis.

This last appearance evidently pointed out the source of the symptoms. To remove them, Desault passed into the bladder an elastic catheter, through which there flowed nearly a pint of urine that was bloody and already fetid. Some clots of blood still remained, and coloured the injections that were thrown into the bladder; but these injections, repeated several times, at length removed them entirely, and the patient, delivered from the symptoms occasioned by the retention of urine, progressed rapidly to a cure, which was complete in twenty days. During all this time the catheter was constantly left in the bladder. The urine, escaping in this way, hardly made a slight oozing through the edges of the wound, which was much enlarged outwards, and its extent considerable, on account of the size of the stone. At length, the patient, still affected with his retention of urine, resumed the custom, which he had before the operation, of introducing the catheter only at such times as he felt a desire to make water.

§ II. *Of Retention of Urine from Debauchery.*

This kind of retention is very analogous to that which depends upon old age; both of them do not suppose any pre-existing disease in the bladder, and do not originate from any thing but a state of general langour and exhaustion. They are manifested in the same manner, follow the same course, present the same symptoms, and exhibit no difference except in their predisposing cause, which is, that in one the defect of irritability is the fruit of years, whilst in the other it is that of incontinence. In the first case, the disease depends upon a slow and natural old age; in the second it is the effect of a premature and unnatural old age.

Of all the excesses, to which man may abandon himself, there are none more prejudicial than the pleasures of love. In fact, on the one hand nothing exhausts the strength so quickly as the frequent loss of the seminal liquor; whilst on the other the spasm, which accompanies its emission, enervates the solids and throws the body, in the flower of life, into all the infirmities of declining age.

In his treatise upon onanism, Tissot has given a view of the horrible evils which are occasioned by the abuse of this passion. Like all the other viscera and organs, the bladder becomes less irritable; it no longer has action enough to expel the whole of the urine, and from hence arises retention. We will not here repeat the diagnostic signs of the retention which depends upon this debility of the bladder. The historical signs can alone distinguish it from that which is occasioned by old age. The prognosis is less unfavourable than in the preceding. When the patient has a strong constitution, and has not fallen into the last stage of marasmus, this retention may be radically cured.

The catheter of gum elastic, suffered to remain in the bladder, is also one of the most potent means of cure which we can employ. It has not only the advantage of speedily evacuating the urine, exciting the irritability of the bladder, and facilitating the action of its muscular fibres; but, moreover, its continual presence in the urethra prevents the patients from obeying the depraved propensity which causes their misfortune. This last benefit of the catheter is so much the more worthy of consideration, as we know, by experience, that most of the patients, when they are not restrained by this obstacle, cannot resist the force of habit, although they know the dangers of it. Besides, the irritation, which this catheter excites in the urethra, propagating itself into the ejaculatory canals, restores tone to these parts whose weakness and relaxation cause the loss of the seminal liquor, which is emitted upon the slightest excitement, the most feeble erection, and even at the least effort to go to stool. Under this view alone, the catheters of gum elastic are so useful to prevent and cure the exhaustion which results from these losses, that they ought to be used, even if there were no retention.

Medicated bougies have been employed with the same view, but they have several inconveniencies. 1st. The ointment, which is added to them, is at any rate useless. Experience has taught that the effect, produced by them, was owing to their presence in the urethra as an extraneous body, and not to the nature of the medicament which entered into their composition, excepting, nevertheless, caustic or escharotic bougies. 2d. These bougies, being smallest at the end which goes into the bladder, and not filling up the urethra at the place which corresponds to the insertion of the ejaculating canals, do not so efficaciously oppose the escape of the seminal liquor. 3d. They cannot be worn constantly; they must

be withdrawn to make water, and it is necessary to renew them frequently, which renders the treatment troublesome and expensive. 4th. These bougies may break in the urethra; or, not being firmly secured to the penis, they may detach themselves and slip into the bladder.

In using catheters of gum elastic, none of these dangers are to be dreaded. Whilst by means of these catheters the local affection is remedied, we must besides employ the treatment that is suited to repair the strength of the patient, and to repair the general relaxation and debility of all the parts. Cold baths, martial waters, chincona, ought to form the basis of this treatment; the effect of these means should be seconded by the well directed use of the six non-naturals; such as a pure and cool air, food that is succulent and easily digested, tranquil sleep, almost constant exercise of the body, moderate evacuations, gentle passions, and above all the abstinence from that which has caused the disease.

§ III. *Of Retention of Urine from the abuse of Diuretics.*

Diuretics, both cold and hot, taken immoderately, may also give rise to this disease. The former, by not sufficiently exciting the fibres of the bladder and throwing them into a state of relaxation; the second, by exhausting, if we may so speak, their sensibility. In this case the bladder, accustomed to the impression of irritating diuretics, when these remedies have ceased, no longer finds in the urine a stimulus sufficiently active to excite its contractility, and no longer obeys the call to make water. We acknowledge that this theory is more founded upon reason than upon experience; we also acknowledge that we do not know any example which proves the truth of it; but analogy, drawn from the effect of strong liquors upon the stomach, makes it probable.

The retention, produced by the abuse of diuretics, has no other sign, that can distinguish it from that which is occasioned by old age or debauchery, than the knowledge of the nature and quantity of the drinks, of which the patient has made use before he experienced any derangement in the excretion of the urine.

The local treatment should be the same as that indicated for the retentions, which have been mentioned before. If the well directed use of the catheter should not be sufficient to recall the sensibility of the bladder and excite its contraction, we should have recourse to cold baths, to ice-water thrown upon the abdomen, the perinæum and the upper part of the thighs; to compresses soaked in vinegar, and applied to the same places; to frictions upon the hypogastric region, either dry or made with a mixture of fluor volatile alkali and the oil of sweet almonds, or with the tincture of winged cantharides.

If these means should not succeed in making the bladder recover its contractile force, we should apply a large blistering plaster upon the inferior part of the loins, and the superior part of the os sacrum. As in the use of this vesicatory, we would not propose any thing but to stimulate the fibres of the bladder, we must avoid making a suppuration, by not removing the epidermis at the spot where it was applied, and by covering this part with dry cloths. We might, in a few days, repeat the application of this plaster of cantharides upon the same place. We have never had occasion to employ this remedy for retentions of this kind; but we are persuaded that it might be attempted with success.

§ IV. *Of Retention of Urine from the affection of the Nerves of the Bladder.*

The nerves of the bladder may be affected at their origin or in their course. Injuries of the brain are seldom succeeded by retention of urine; but it often accompanies those of the spinal marrow. The commotion of this medullary substance, from the effect of blows or falls upon the vertebral column; its violent distension in luxations and fractures of the vertebræ, or in a violent curvature of the spine; its compression by blood, pus, or water, effused in the vertebral canal; from the swelling of the bones, which form this canal, or from the perishing and change of form that are caused by the erosion of their bodies, and succeeded by a particular kind of gibbosity, &c.; are so many causes of this disease. This kind of retention may also be the effect of tumours, either scirrhous, or steatomatous, or of any other nature, situated upon the course of the nerves that are distributed to the bladder. For this effect to be produced, it is not necessary that all the nerves, which ramify into this organ, should be affected; the compression of some of the nervous threads is sufficient to weaken the action of the bladder, and to make it impotent against the natural resistance which the urine finds to its passage. When the retention of urine is produced by the affection of the spinal marrow, the insensibility and weakness of the inferior extremities are generally the concomitant symptoms of it. The patients suffer little; most of them are even ignorant of their state, and do not complain of any derangement in the functions of the urinary passages. The surgeon, knowing that this symptom is very common in these kind of diseases, should learn whether the course of the urine is not interrupted, and should assure himself, either by touching

the region of the pubis, or by introducing a catheter into the bladder, if it is not accumulated and retained there.

This kind of retention not supposing any pre-existing disease in the bladder, and being only symptomatic, is in itself of little account; but it is extremely dangerous in relation to the cause which has produced it. Affections of the vertebral column, complicated with injury of the spinal marrow, are often mortal. By means of the catheter it is always easy to supply the deficiency in the contraction of the bladder, and thus to accomplish the only indication which this retention presents, namely, the evacuation of the urine; but this aid is only palliative—the bladder will not recover the faculty of contracting itself, until the cause of its debility shall have ceased. The principal treatment should therefore be directed to this, and it should vary according to the nature and extent of the disorder.

We will not enter here into the detail of the remedies, which the different affections of the vertebral column require; this exposition would carry us too far from the object proposed in this article. However, as the doctrine of Desault upon this point is not known, we will briefly mention that, in falls upon the vertebral column with affection of the spinal marrow, he employed scarification and cupping with the greatest success. He regarded these means, which have perhaps been too much exaggerated by the ancients, but also too much neglected by the moderns, as one of the most powerful revellents possessed by surgery. He applied three or four cups at once upon the spot where the blow was inflicted, and upon the neighbouring parts, and multiplied the scarifications according to the strength of the patient. He repeated the application of these cups sometimes in the same day, and continued their use for several days fol-

lowing. When the weakness of the patient does not permit the repetition of any more local bleedings, or when he judged them to be useless, he applied dry cups.

We will also mention, that in the gibbosity, with caries and destruction of the body of the vertebræ, this surgeon preferred moxa, celebrated as we know with a kind of enthusiasm by Pouteau, to the vesicatories and cauteries recommended by Percival Pott. Let us confirm the doctrine stated in this article.

CASE.

A man was travelling in a post chaise. His carriage was overturned: he fell into a deep ditch; experienced a violent shock through his whole body, and had different contusions in the extremities, back and buttocks. He was bled, and other suitable assistance was given to him. The urine, whose course had been interrupted for twenty-four hours, flowed in small quantity at the time and after attempts to breathe. At the end of six days, the wounded man was able to continue his journey. Having arrived at Paris, he asked advice respecting the tumefaction of his belly, and the difficulty which he had of making water. A soft, indolent tumour, in which a liquid was felt, was remarked above the pubis. The situation and nature of this tumour, the frequency and almost involuntary flow of a small quantity of urine, did not leave any doubt of the accumulation and retention of this humour from the paralysis of the bladder. The use of the catheter was advised. This man, who made water but by regorgement, did not believe that he was attacked by this disease. At length he submitted to the introduction of the catheter, and from the abundant evacuation of urine and the disappearance of the tumour of the abdomen, he acknowledged the justice of the sur-

geon's judgment who attended him. As there was no pre-existing disease in the bladder, nor injuries in the neighbouring parts, and as perhaps all the nerves of this organ had not been affected by the commotion, its contraction was gradually re-established in the space of six weeks, by the aid of the catheter and slightly stimulating injections, with decoction of barley and the waters of Balaruc.

§ V. *Of Retention of Urine from the Distension of the Fibres of the Bladder.*

This kind of retention might be called secondary, since it is always preceded and always produced by a primary retention. It consequently recognizes, as remote causes, all those which may produce the other kinds of retentions; but its proximate cause consists solely in the debility and loss of irritability of the bladder, which are both occasioned by the forced elongation of its fibres. Thus we often see this disease happen to persons who, through shame, laziness, inattention or any other motive, neglect to satisfy the first desire to make water; or who, through an embarrassed passage of the urethra, are unable for some time to perform this function. Although the obstacle, which prevented the evacuation of the urine, may no longer exist, and the bladder may otherwise be sound, yet this organ, debilitated by the excessive dilatation of its parietes, can no longer contract itself with sufficient strength to return to its former state, and to expel the fluid contained in its cavity.

The indication which this disease presents is simple. There is not here any extraneous disease to be combated, as in the other kinds of retentions. The catheter, suffered to remain in the bladder, is usually sufficient to restore to this organ its elasticity and contractility. This

mean may be aided by warm diuretics, tonic injections and the remedies recommended before. The use of the catheter must not cease until we are certain that the bladder can empty itself, without the aid of this instrument, of all the urine which it contains; for we cannot fix the period at which this organ will have recovered the faculty of contracting itself. This period varies according to the standing of the disease, the age and temperament of the patients: in some the cure is accomplished in a few days; in others it is delayed for several weeks and even months; sometimes also the elasticity of the bladder is irrecoverably lost, and the catheter becomes necessary during the remainder of life.

§ VI. *Of the Retention of Urine from the Inflammation of the Bladder.*

Most authors, who have written upon the diseases of the urinary passages, attributing different effects to the inflammation of the neck of the bladder and to that of its body, have placed the first in the number of the causes of retention, and the last among those of incontinence. They have supposed that the inflamed and more sensible bladder, far from being weakened by this state, would acquire more energy, and contract itself with greater force than before; but when we shall have been undeceived by the observation of several retentions of urine, in which there could be no other cause than the inflammation of the bladder, the analogy will have preserved us from this error. We never see an inflamed muscle contract itself, and if it has the power of acting, it can execute only feeble motions. We have also constantly remarked, with those who have opened dead bodies, that, in inflammations of the abdomen, the

inflamed intestines were distended, instead of being contracted and tightened upon themselves.

Plethoric persons, of a sanguineous and bilious temperament, are more particularly subject to this kind of retention. It is also frequently occasioned by an excess of wine or other spirituous liquors, by the abuse of heating diuretics, by the use of cantharides taken internally or applied externally, &c. This kind of retention manifests itself suddenly, and is known, 1st. By the frequent desires to make water: 2d. By the sharp pain which the patient feels in the region of the bladder; a pain that is increased by his efforts to make water, and that extends into the regions of the kidneys and along the urethra, even to the extremity of the glans: 3d. By the frequency and hardness of the pulse, and other symptoms of fever: 4th. By the reduplication of the pain, when the hypogastric region is touched or pressed: 5th. By the easy introduction of the catheter into the bladder: 6th. By the sharp pains, that are excited by the contact of this instrument with the parietes of the organ: 7th. By the red and inflamed colour of the urine: 8th. Lastly, by the absence of the signs, that are peculiar to the other kinds of retention.

This disease requires the most speedy relief. We should immediately evacuate the urine, whose presence is a new cause of irritation. The introduction of the catheter should be very cautious, and care should especially be used that it is not inserted farther than is necessary for the eyes to clear the neck of the bladder, so that the end of this instrument may avoid touching its parietes, whose sensibility is then extreme.

After having evacuated the urine, we should throw gently into the bladder, a mucilaginous injection, such as a decoction of flaxseed or root of marshmallow. This injection may be retained for several minutes—only a

part of it may be suffered to escape, and the rest of it be kept in the bladder to diminish the acrimony of the urine. Then we should withdraw the catheter, which would also be a cause of pain and irritation, and it should be re-introduced every three or four hours, using a demulcent injection every time. The inflammation of the bladder should besides be combated by the most potent antiphlogistic remedies, such as repeated bleedings from the arm, leeches applied to the perinæum, baths, enemata, emollient fomentations of the abdomen; the drinks should he taken from the class of cooling diuretics, as emulsions, ptisans of flaxseed, milk-whey with syrup of violets, veal broth, chicken water, &c. When, notwithstanding these means, the inflammation increases, invades the other viscera of the abdomen, is accompanied with hiccups and vomitings, and continues beyond the sixth day from its attack, the life of the patient is in the most imminent danger, and death almost inevitable.

§ VII. *Of the Retention of Urine, from an acrid humour seated in the Bladder.*

It has been the same case with this retention, as with the inflammation of the bladder; it has also been placed among the causes of incontinence. It has been supposed that the bladder, irritated by the acrimony of the humours, which are deposited in the thickness of its coats, would contract itself as soon as there were a few drops of urine collected in its cavity, and procure their expulsion; but only the irritation of this organ has been considered, without attending to the state of its fibres, whose action is necessarily impeded or prevented by the engorgement, that is inseparable from the alteration of the humours which pass through them.

This kind of retention of urine is very frequent; we have often observed it in persons affected with rheu-

matism and gout; it is also a very usual effect of the herpetic, psoric, venereal disease, &c., deposited upon the bladder.

It is always easy to discern by the historical signs, to which of these diseases the retention owes its origin; it is usually preceded by the disappearance of the disease from the place where it had been fixed before. Thus we see this retention supervene immediately after the cessation of rheumatic pains, in consequence of repelled herpes, suppressed gonorrhœa, &c. It is usually announced by severe pains in the region of the bladder, frequent desires to make water, and most of the symptoms peculiar to the retention of urine, which is occasioned by inflammation of the bladder.

By means of the catheter, which is always easy to be introduced in these circumstances, it is constantly in the power of art to prevent the symptoms that are dependant upon the accumulation of the urine; but the catheter procures only a transitory relief: the affection of the bladder ought to be the principal object of the treatment. There is an urgent necessity to displace the acrid humour that is deposited upon the bladder. In general, this displacement is the more difficult, as the metastasis is of longer standing. Frequently baths, diluting and slightly diaphoretic drinks, are sufficient to recall this humour, either to the skin, or to the parts which it had abandoned. If these means do not succeed, we must have recourse to more active remedies; for example, we should apply upon the place, where the material cause of the disease previously existed, or upon that which it occupied habitually, dry cups, sinapisms, epispastics (in which there are no cantharides), caustics, moxa, or other powerful revellents. If this humour was a contagious humour repelled, such as the psoric, it has even been advised to contract this disease afresh, either

by sleeping with itchy persons, or by wearing their shirt or some of their garments.

After having delivered the bladder from the acrimonious principle, we should try to destroy it by internal medicines, that are suited to each kind of disease. This treatment is also the only one to which we can have recourse, when the acrid humour has remained for a long time in the coats of the bladder, and when we are not able to drive it away. Unfortunately, daily experience teaches how little we can rely upon this resource, and with what slowness we are able to change an acrimonious disposition. It is then much to be feared that the long abode of a diseased humour, may draw upon the bladder the most dangerous evils; from thence may arise obstinate inflammations, fungous ulcerations, purulent suppurations and infiltrations, the horniness and engorgement of the coats of the bladder, &c.; complications, which become new causes of retention of urine, and which cannot but aggravate its termination.

§ VIII. *Of Retention of Urine from Hernia of the Bladder.*

The second volume of the Memoirs of the Academy of Surgery offers a great number of examples of this kind of retention. There we see that it is almost a constant symptom of the hernia of the bladder. But the debility of this organ is not always the sole cause of it; the urethra also opposes a stronger resistance than natural to the escape of the urine; for the fundus of the bladder and its neck, being drawn by the portion of this organ, which is extended in the descent, elongate the commencement of the urethra, bend it by pressing it against the symphysis of the pubis, and thus diminish the calibre of this canal. The urine may besides be stopped in the sac, which forms the hernia, because the

opening, which communicates into the cavity of the body of the bladder, is too narrow. This disposition is also very frequent, and to it are often owing those partial retentions, which take place only in hernial prolongations, without existing in that portion of the bladder which is contained in the pelvis. Sometimes, however, these kinds of retention depend only upon the deficiency of pressure on the part of the abdominal muscles, and on the weakness of the bladder, situated without the abdomen; but it is also very rare that the part of this organ, situated beyond in the pelvis, and considered separately, can expel the last drop of the urine which it contains. It is difficult for it to contract entirely upon itself, and generally the urine is successively retained in both of these cavities.

When the retention, produced by the hernia of the bladder, is complete, and when it takes place both in the portion of this sac, included in the descent, and in that which remains in the pelvis, besides the signs that are common to the retentions caused by the weakness of the bladder, it also offers, in the place where the hernia is seated, a tumour more or less voluminous, without change in the colour of the skin, little sensible to the touch, with a fluctuation that is sometimes obscure and sometimes obvious; a tumour, which, when compressed, excites or increases the desire to make water, and sometimes procures the escape of a few drops of urine by the urethra. To complete the diagnosis we may add, that, after this tumour has been emptied by means of the catheter, that portion of the bladder which is without the pelvis, disappears, by laying down the patient in such a manner that this should be more elevated than the portion of the bladder remaining in the abdomen. The hernial tumour then appears to be formed of membranes that are thick, soft, moveable under

the fingers, difficult or impossible to be reduced; it is also some time without increasing, and presents when it appears again, the same signs as before.

When the retention takes place only in the hernia, and when the opening which communicates with the pelvis is free, the tumour is indolent; it increases when the patient passes the urine that is contained in the other portion of the bladder, sinks in after its discharge, and is immediately accompanied with new desires to make water; so that the water is passed, if we may so speak, at two attempts. But if the opening of the communication into the pelvis is too narrow, we may be informed of it by the incompressibility of the tumour, or by the strong compression that must be exercised to make it disappear. If it is complicated with strangulation, it would be known by the tension of this tumour, with pain, heat and fever, and by the hiccup, succeeded by vomiting.

The first indication presented by these kinds of retention, is to evacuate the urine with the catheter, or by the compression of the hernial tumour; but these means furnish only a palliative cure. When the disease is recent, and the portion of the bladder prolongated in the descent is small and reducible, this may be restrained by a truss, and a perfect cure obtained. When it adheres and is impossible to be reduced, it may be sustained with a suspensory of strong and inelastic cloth, fitted to the figure of the tumour, from which we would evacuate the urine. If by the aid of this suspensory we can approximate the tumour to the opening, which has afforded it a passage, it may then be restrained by a truss, with a cushion that is thick and concave, then thin and convex, in proportion to the diminution or disappearance of the protruded part. It has also been advised to excite an inflammation, that would occasion the com-

plete cohesion of the parietes of that portion of the bladder which forms the hernia, by means of a methodical compression augmented gradually, and which completely opposes the entrance of the urine into this sac, and the secretion of mucus in its parietes. This process may be attempted with prudence, but the success of it appears to us to be very uncertain. Finally, if the retention is with strangulation of that portion of the bladder which forms the descent, and if we cannot, by the taxis, make the urine which it contains return into the bladder, it has been recommended to puncture it with the trocar. But this operation, in many circumstances, for example, when the disease is complicated with an enterocele, which is not rare, exposes the intestine to being pierced at the same time, &c. This danger, which we are not sure of avoiding always, would induce us to prefer laying the bladder bare by an incision made in the teguments, and then piercing it with a bistoury, in order to evacuate the urine which it contains. This incision would serve besides to destroy the strangulation. If it was to be feared that the inflammation might extend into the pelvis, and if we were assured that the opening of the communication into this cavity was obliterated by the adhesions which the parts may have contracted in this place, we might, without risk, cut off that portion of the bladder which is without, and whose sides, thinned and without action, are similar to a cyst that is barely organized.

§ IX. *Of Retention of Urine from the displacement of the Viscera of the Pelvis.*

The displacements of the viscera, which so often produce retention of urine, are the retroversion of the womb, the prolapsus and inversion of this organ, of the vagina and the rectum. When we examine the intimate

connexions of the bladder, as well with the womb and the vagina in woman, as with the rectum in man, we perceive that these parts cannot be displaced, without dragging with them this urinary sac; and, that in this derangement, whatever may be its force of contraction, it can no longer return completely to its former state, and expel the whole of the urine which it contains. To this defect in the action of the bladder is necessarily added an increased resistance on the part of the urethra. The beginning of this canal, dragged down by the bladder, changes its usual direction, and this change cannot take place without the parietes of this canal, which are pressed against each other, opposing a greater or smaller obstacle to the passage of the urine. It is thus, that in the retroversion of the womb, the os tincæ, in passing above the pubis, carries with it the posterior part of the bladder, which by continuity distends the commencement of the urethra, draws it up and increases the curvature which this canal makes below the symphysis pubis, against which it is then strongly pressed.

In the prolapsi and inversions of the womb, vagina and rectum, the posterior part of the bladder, instead of being carried upwards and forwards, is dragged downwards and backwards, and the curvature of the urethra is totally changed. Far from offering a greater concavity below the pubis, as in the retroversion, the bladder presents a convexity there; a disposition which must be kept in view, in the introduction of the catheter;—it informs us respecting the curvature and direction which it is proper to give this instrument, in order to facilitate its introduction.

It is always easy to ascertain and distinguish, from symptoms of the same kind, the retention of urine which is occasioned by the displacement of the viscera; the assemblage of the signs, peculiar to each displacement,

with the signs that are common to retention, makes the diagnosis certain.

If the retroversion of the womb is the cause of this accident, the finger introduced into the vagina, perceives at the anterior part of this cavity, the tumour which is formed by the urine collected in the bladder; the os tincæ is no longer found in its natural position; it is situated above the tumour and turned forwards, whilst the fundus of the womb is directed backwards, against the rectum and the anterior face of the sacrum.

When the retention is complete, and the urinary tumour very voluminous, frequently the finger cannot reach the os tincæ. In this case, we must suspend the judgment of the particular cause of the disease, until the patient has used the catheter, and we can from the disappearance of the tumour, be assured of the state of the womb. But if, instead of finding the os tincæ very high and turned forwards, it is met near the vulva or out of the vagina, there can be no doubt that the retention is produced by the prolapsus of the womb; on the contrary, we will be convinced that it depends upon the inversion of this organ, when, having taken place soon after parturition, or after the expulsion of a uterine polypus, &c. we can touch in the vagina a tumour that is hemispherical, a little painful, uneven, firm, environed superiorly with a kind of purse, which constricts it more or less, and round which the finger may be carried; or when we perceive without the vulva, as in the complete inversion, a tumour large and rounded in its inferior part, without a transverse cleft, red, uneven, and with shallow openings, from which blood flows at the menstrual periods.

We may also know that the retention is owing to the inversion of the vagina, from a tumour sometimes elongated like a pudding, often in the form of a thick

purse, irregularly plaited, reddish, gathered and pierced with a circular opening, through which, with the finger, we may easily feel the neck of the womb, which is commonly situated lower than in the natural state. Finally, we may be certain that the urine is retained by the inversion of the rectum, when the difficulty or impossibility of making water is not manifest until a few hours after the displacement of this organ, without having been preceded by any embarrassment in the urinary passages.

These kinds of retention seldom have dangerous consequences; to cure them, it is generally sufficient to correct, by the reduction of the displaced viscera, the bad disposition of the bladder and the commencement of the urethra, unless the forced distension of the fibres of the bladder has been succeeded by the debility of the parietes of this organ; and in this case we must have recourse to the particular means, which were pointed out when speaking of the retention produced by this cause. The reduction of these viscera is then the first indication to be accomplished.

In the retroversion of the womb, it is not rare to experience the greatest difficulties in returning this viscus to its natural situation. This may be done, however, by lowering the os tincæ by a pressure made above the pubis, and with two fingers introduced into the vagina, whilst the fundus of the womb is pushed back with a finger of the other hand, carried into the rectum. It is not less difficult to keep this part reduced; sometimes a common pessary is sufficient, but it is often unsuccessful. We may succeed better by the aid of a machine, composed of an ivory stalk, four or five inches long, slightly curved, terminating in an olive shape at one end, and fixed by the other to the understrap of a T bandage. This instrument, being introduced into the

rectum, pushes forwards the fundus of the womb, and prevents its inversion backwards.

As to prolapsi of the womb, they may commonly be reduced without trouble. It is not the same case with the inversion of this organ, especially when this inversion is complete, and has continued for some time. The engorgement which then supervenes in the coats of the womb, and the considerable bulk which it acquires, have been considered to this day, as insurmountable obstacles to its reduction, and that there was no other resource than the amputation and ligature of this organ—operations which have sometimes been performed with success; but the experience of the present time has shown, that we may generally, by a methodical compression, dissipate engorgements of this nature, and although we have not any cases peculiar to the womb, nor consequently any direct proof of this possibility, analogy induces us to hope, that by this process we may reduce this organ to its natural size, and that then it would perhaps be possible to make a reduction of it, or at least that it might be pushed back and kept within the vagina, and by this mean we might prevent the accidents which are the almost inevitable consequences of its inversion and escape out of the vulva.

This compression has frequently been employed with the greatest success in ancient prolapsi of the rectum, which could not have been reduced by any other means. A plug of cloth, in the form of a tent, being pushed into this intestine beyond the sphincters of the anus, prevents the return of the disease, and dissipates it entirely.

If we cannot speedily accomplish the reduction of the displaced viscera, or if their reduction should not establish the flow of the urine, and the symptoms depending

on the retention should be severe and urgent, we should have recourse to the catheter.

The reduction frequently becomes more easy after the evacuation of the urine; the tumour which it formed in the pelvis no longer existing, this cavity being more free, permits the easier return of the escaped parts; but the change in the direction of the urethra sometimes makes the introduction of the catheter difficult; and it is only by accommodating this instrument to the diseased curvatures of the canal, if we may so speak, that we can make it penetrate into the bladder. For example, in the retroversion of the womb, we succeed better with a curved catheter than with one that is straight, like the common female catheter.

A curved catheter is equally suitable in the prolapsi and inversions of the womb, &c.; but with this difference, that in the retroversion, we must take care to turn the concavity of the catheter towards the pubis, whilst in the inversion, we must direct it towards the anus; sometimes we cannot succeed but by turning this instrument in the urethra, in the form of a borer; and often, after making useless attempts with a firm catheter, we have made an easy entrance with a flexible one, which adjusts itself better to the curves of the canal.

If it should at last happen, that after many essays, made with all the requisite precaution and dexterity, we cannot reduce the displaced viscera, nor introduce the catheter, (a circumstance which must be very rare), and the bladder should be threatened with rupture, we should then have recourse, as a last resource, to the puncture; an operation which we shall describe with the greatest care in the following articles.

§ X. *Of Retention of Urine from pressure of the Womb or Vagina upon the neck of the Bladder.*

There are two periods in pregnancy, during which women are said to be particularly exposed to retention of urine—the fourth month of gestation, and the time of parturition. To have an accurate idea of this symptom, we must recollect, that in the first months after conception, the womb remains concealed in the pelvis; that it does not rise above this cavity until in the fifth month, and sometimes later; that until this period, its bulk and its weight having increased progressively, it descends lower into the pelvis, and like a wedge, compresses the rectum backwards, and forwards the neck of the bladder and the urethra, which it pushes against the symphysis pubis, sometimes even to the degree of entirely closing the opening of these canals, and stopping the urine there.

From this account of the development of the womb, the mechanism of this kind of retention appears so simple, and, as we may say, so natural, that we should expect to see it supervene frequently in the fourth and fifth months of pregnancy. However, amongst a great number of women, who came to be delivered at the Hotel Dieu, and whom we have interrogated, we have not found any who complained of having experienced this inconvenience.

Nevertheless, we do not pretend, that this symptom cannot take place, but we believe, that the course which the womb follows in its development, ought generally to preserve the neck of the bladder and the urethra from compression. In fact, we know, that the development of this organ commences in its fundus, then extends into its body, and that its neck preserves its bulk and length

until the sixth month, when the womb, becoming too bulky to be contained in the smaller pelvis, is carried above the superior strait.

While this viscus is situated in the excavation of the pelvis, being larger at its fundus than at its neck, it ought rather to compress the ureters and the body of the bladder, than the neck of this viscus and the urethra, above which its largest part is always situated, unless we suppose there is a complete descent of the womb.

Although all authors, who have written upon parturition, have spoken of the retention of urine, that is produced by the wedging of the head of the fœtus, as a common symptom, we can assert, that during eight or ten years, the Hotel Dieu, at Paris, where there are fifteen or sixteen hundred deliveries every year, has not furnished an example of it. We do not conclude, however, from this remark, the fidelity of which we can attest, that this state has not often existed; but we believe that, at least we have a right to infer, it is not so frequent as seems to have been announced.

Women, it is true, often complain of a desire to make water, when the head of the child remains a long time in the passage; and this desire may have imposed upon some inattentive practitioners, who have supposed that it could not be occasioned by any thing but the fulness of the bladder, without thinking that the irritation of this organ might also occasion it.

When we reflect upon the disposition of the head of the child, wedged in the smaller pelvis, and when we consider the relation which it should have with the bladder, it appears that the body of this viscus and the ureters are more exposed to compression than the urethra and the neck of the bladder; and it is very probable that

the urine, instead of collecting in this sac, cannot descend into it, and is retained in the ureters.

This conjecture is so much the more probable, as it is less rare for the retention of urine to be a consequence of the wedging, than to be one of its concomitant symptoms; and this accident then happens, not from the resistance of the canal, but from the debility of the bladder, bruised by the head of the child; a contusion which sometimes terminates in gangrenous eschars at the bottom of this viscus and the corresponding portion of the vagina, and gives rise to urinary fistulæ, that are often incurable, and always very difficult to be cured.

As to the rest, if a retention of urine should happen at one or other of these periods of pregnancy, it would not be difficult to acquire its distinguishing signs. The touch would give information of the state and position of the womb, or of that of the head of the child; and we might learn from the patient if the course of the urine was free before, and if there existed no other cause that could prevent its evacuation.

The frequent desire to make water, and the deficiency in the excretion of urine, are, in this case, very equivocal signs of the retention; for, as was mentioned above, the irritation of the bladder may cause the one, and the other may depend on the compression of the ureters.

If the retention was occasioned by the pressure, which is supposed to be exercised by the womb upon the neck of the bladder and the urethra, at the fourth month of pregnancy, we could not hope to see this indisposition dissipate without returning, until the womb shall have been so much enlarged, that its bulk, exceeding the capacity of the pelvis, it should be forced to rise above this cavity, and not be able to descend into it again. While waiting for this enlargement, we should attempt to evacuate the urine, by separating the womb

from the neck of the bladder and of the urethra, by means of a finger introduced to a sufficient height behind, and a little upon the side of the symphysis pubis; and if this method should not succeed, we must have recourse to the catheter.

If the wedging should be the cause of the retention, we should hasten the termination of the labour, either by changing the bad position of the head of the child, or by extracting it with the forceps or even with the hook, after having been assured of the death of the child, &c.; but, before undertaking this operation, especially if it should be suspected that it would be long and laborious, the urine should be evacuated with the catheter.

For these cases Levret proposed particular catheters; he had them constructed, in imitation of those J. L. Petit, which, instead of being pierced with two eyes upon the side of their beak, had, at their extremity, a circular opening, which was closed with a button supported by a stylet. By this correction he had it in view to avoid the lacerations of the urethra, which were sometimes caused by the eyes in the form of a cleft, with which the catheters of that time were pierced.

The same author also recommended catheters, which should be flat, instead of round, as they commonly are. He supposed this form to be especially preferable, when there was a necessity of introducing the catheter, on account of the prolapsus or inversion of the womb; at the first glance it seems, in fact, to be more easy to introduce these catheters, when the urethra is of itself in a flattened form; but this is only a specious advantage, and is contradicted by experience. Daily practice teaches that in these kinds of embarrassment of the canal, we may succeed better in the introduction of the catheter, when we give it a turn in its insertion, than when it is

pushed directly forwards. It is impossible to make this movement with a flat catheter. If it should be said that, its diameter being less than that of the cylindrical catheters, it can penetrate more easily, it might be replied that among these we could choose one of as small a diameter.

Moreover, granting to these new catheters all the advantages which have been supposed, we regard them as at least useless; for, in comparing the width of the arch of the pubis with the bulk of the womb in the state of pregnancy, or with that of the head of a fœtus at the time of parturition, it seems almost impossible that the canal of the urethra can be so strongly compressed under the symphysis as not to permit the introduction of a common catheter.

It is not only in the state of pregnancy and during parturition, that the womb and the vagina, being distended by the product of conception, may occasion retention of urine; the same accident would happen every time that there is found in these cavities an extraneous body large enough to distend their parietes, or that there is in these a swelling so considerable, that they cannot be contained in the pelvis, without compressing the neck of the bladder and compressing the urine in it. Retention may then also depend upon the tumefaction of the womb from a mole, a polypus, an effusion of water and blood in its cavity; or it may be produced by an inflammatory swelling, and a scirrhous or cancerous engorgement of this organ. It may also be caused by the distension of the vagina, by menstrual blood, by a pessary, cloth plugs, or any other extraneous body introduced into this sheath.

We will not enter here into the detail of all the particular signs, by which it may be known, whether the retention is owing to one or the other of the causes that

have been enumerated; this description would carry us too far from our object: we shall have the compliment of these signs, by adding the signs, common to retention, to those which will prove the existence of one of these causes, and to the absence of every other obstacle to the evacuation of the urine.

This kind of retention being only symptomatic, the prognosis is more or less unfavourable accordingly as the disease, of which it is a symptom, is more or less severe. In itself it is little dangerous; it is always possible to prevent or to arrest the symptoms which it would occasion, by evacuating the urine by means of the catheter; an operation which is seldom attended with great difficulty. Even the introduction of this instrument is not always necessary, as when we can easily remove the cause of the retention, and when the bladder has not lost its elasticity, for example, when the urine is retained only by a pessary, a plug, a collection of blood in the vagina, &c., the extraction or the evacuation of these extraneous bodies restoring to the urethra its natural liberty, the action of the bladder alone is then sufficient to re-establish its flow.

But there are also many cases, in which art can do nothing against the cause of retention, over which nature alone can triumph; it is she alone, that can expel a mole, a polypus, &c. contained in its cavity; and as she is often slow in her operations, we are obliged to use the catheter for the patients, until she terminates this work. Sometimes both art and nature are impotent, as when the vagina and the womb are affected with scirrhus and carcinoma; then we have no other resource but the introduction of the catheter, which often becomes useless from the progress of the disease, for we often see incontinence of urine succeed retention, which happens from the corrosion of the vagina and the fundus of

the bladder, in which openings are formed, and through these the urine falls continually into the vagina. The mixture of this fluid with the cancerous ichor, renders the suppuration so acrid and fetid, that we cannot conceive a more horrible state than that of women who are a prey to this malady.

§ XI. *Of Retention of Urine from the pressure of the Rectum upon the neck of the Bladder.*

This kind of retention has much analogy to that which has been described; the only difference that can be established between them, is that, in the one the compression is exercised by the womb or the vagina, and in the other by the rectum. The mechanism, from which these retentions arise, is perfectly the same. There is besides a very great connexion in the causes which occasion the swelling of these viscera; for, like the womb and the vagina, the rectum may be distended by wind, blood, fungus, plugs of cloth or lint, or be tumefied by the inflammation of its parietes, by their scirrhous or carcinomatous engorgement, by abscesses formed in its coats and in the environs of the anus. This intestine may, moreover, be filled by hemorrhoidal tumours, fæces, stercoraceous stones; and, in these different states, compress the neck of the bladder, and the canal of the urethra. The diagnosis of this retention is drawn from the state of the rectum, from the symptoms which usually accompany the diseases that have been mentioned, from the liberty of the urethra, and from the absence of the other causes of retention.

The prognosis of the kind, which now occupies us, is essentially connected with that of the diseases of the rectum, which gave rise to this symptom; and the radical cure of the one becomes a necessary condition for that of the other.

The conduct to be observed by the surgeon, is also the same as was traced in the preceding article. To destroy immediately the cause of the retention, if this destruction is possible, and does not involve any inconvenience; if this process exposes the patient to some danger, or if the evil is inaccessible to the assistance of art, to content himself with evacuating the urine by the catheter; such are the indications, which he may have to accomplish. For example, if the retention depended upon a collection of blood, fæces, &c. in the rectum, he should not hesitate to extract them immediately; but, if the urine were retained by plugs of lint, introduced into this intestine to stop a hemorrhage there, and which it is apprehended might be renewed by withdrawing these; or if the patient was attacked with a scirrhus or a carcinoma in this part, the use of the catheter is then preferable and even becomes necessary. Its introduction is seldom attended with much difficulty. In these cases it is better to introduce this instrument every time that the patient may have occasion to make water, than to let it remain in the bladder. It would only add also to the pressure already exercised upon the urethra, and it might be apprehended that this canal may be inflamed, and eschars be formed in the places that were too much compressed. We must besides combat the different affections of the rectum, by those means which are suited to the particular nature of the disease.

CASE I.

Jacques Fiot, aged forty-seven years, came to the Hotel Dieu, on the 17th of February, 1792, to get extracted from the intestinum rectum, a china vessel, which had been introduced there eight days before.

Tormented with an obstinate constipation, this man supposed that he could procure an easy passage for the

excrements, by inserting a kind of pipe into the intestine. He found a pot for sweetmeats, broke off the handle, detached the bottom, and filed the asperities very smooth. It was then a firm pipe, three inches long, and so much the better suited to accomplish his object, as it had a conical shape. Having been urged for a long time by an imperious need, which he could not satisfy, this man made an immediate decision, and without taking time to clean the vessel, whose inside was smeared with black pitch, he introduced it into the anus, and pushed the whole of it into the rectum.

Whatever might be the manner of introduction of this pipe, it was found in the rectum, with its widest part turned downwards. The patient had at first attempted himself to extract it with forceps. He had broken its inferior edge, and mutilated the rectum. The blood, which flowed copiously, and the pain which the asperities occasioned, by penetrating into a very sensible part, had forced him to renounce his attempt. He then brought on a looseness, by drinking a mixture of oil and brandy, and concluded with making considerable exertions, in the hope of expelling the extraneous body with the excrements. These efforts had answered no other purpose than to invert and invaginate the superior part of the intestine into the interior of the vase, where it formed a very hard tumour, which filled its whole cavity. Suppuration took place in the lacerations, some of which were so deep that the finger could be laid in them;—at length the looseness, an insupportable stench, and especially the excruciating pain, compelled this unhappy man to have recourse to surgical aid.

The invagination of the rectum, the asperities of the inferior edge of the vessel piercing into the intestine, and the inflammation of the parts, made its extraction very difficult. Desault made the patient lie down upon

his side, then separating, with the finger, the interior part from the parietes of the vessel, he seized it with the forceps, which he pushed up as high as possible, and had held by a pupil. By the aid of this point of support, and with other forceps, introduced in the same manner, he was able to break the vessel, and to draw it out by piecemeal, without wounding the rectum. It is true, that it was necessary to introduce the forceps a great number of times, and at the same time to protect with the finger, the intestine, which the instrument would have bruised and the fragments of the vessel have lacerated, if the greatest precautions had not been taken. When all the fragments had been taken out, he pushed back the inverted portion of the intestine by means of a plug of lint and cloth, six inches long and two and a half inches in diameter, the whole of which he inserted, after having smeared it with cerate, and left in the rectum, in order to facilitate the healing of its parietes, by keeping them continually applied against the neighbouring parts.

Notwithstanding the largeness of the plug, the cavity was not filled, and he was obliged to place also a great number of pledgets of lint about the margin of the anus, and the anterior part of the intestine. He then applied much lint and several compresses without, with a triangular bandage to sustain the whole; and he renewed this dressing twice every day, on account of the looseness, which did not cease until the sixth day. Then the intestine was no longer inverted when the patient went to stool, and it was no longer necessary to sustain it with such large plugs. Even these were left off after the tenth day, when the lacerations were cicatrized, and this man went from the hospital, perfectly cured, fifteen days after the operation.

CASE II.

Jacques Raimond Collot, aged eighteen years, came to the Hotel Dieu, at Paris, on the 25th of December, 1791, for an accident similar to that in the preceding case. In leaping over a billiard table, he struck a queue, which one of the players was holding upright, the point of it being upwards, and the base resting upon the ground.

The small end of the queue pierced the breeches and shirt of Collot, and penetrated six or seven inches deep into the anus. A slight hemorrhage from the rectum appeared immediately; the patient experienced sharp pains in this intestine, in the whole abdomen, and particularly in the right iliac cavity. These pains increased when he wished to make water, which he could not do without great difficulty. Externally nothing was perceived but the traces of a contusion and a small laceration, or rather an excoriation, which was prolonged from the left side of the margin of the anus into the rectum. This part was dressed with a little lint, covered over with a cataplasm moistened with vegeto-mineral water; and an emollient cataplasm was laid over the whole abdomen. Besides, a strict regimen was prescribed, with a diluting and demulcent drink.

The pain of the abdomen was not quite so severe the next day, although it was puffed up and a strong tension already perceived in it. On this day the patient voided, by the anus, a great quantity of bloody matter, and this flux lasted for eight days.

At this last period the anus was healed, and the abdomen relaxed; but fever still remained, and there was remarked to be a tumour, hard and very painful to the touch, which filled all the right iliac cavity. This part was still covered with a cataplasm.

The tumour softened after some days, and became less sensible. It then diminished until the thirtieth day, and at the same time became of a scirrhous hardness, and absolutely insensible.

The young man at length left the hospital on the 15th of February, 1792, forty-five days after his accident. At this time the tumour was yet at least two inches in diameter; but it caused neither pain, nor impediment in moving, nor any other kind of inconvenience.

§ XII. *Of Retention of Urine from Tumours situated in the Bladder.*

Fungi, carcinomata and hydatids of the bladder are the principal tumours which may occasion retention of urine. Of all the diseases of the bladder there are few so dangerous as fungi; happily, they are rare. The opening of bodies has, however, furnished us with some examples, and we have sometimes seen the whole cavity of the bladder filled with these polypous excrescences; sometimes there is only a single fungus, which often acquires a considerable bulk; sometimes the interior of the bladder is, as it were, sprinkled over with a great number of small caruncles. Of these fungi, some grow from a very narrow pedicle, others from a very large base; some are soft, others have more consistence, and of these last there are some which become almost as hard as cartilage. These excrescences are formed indiscriminately upon every point of the bladder. The summit of this organ is not more exempt from them than its fundus; but it is particularly those that grow near its neck, and which some authors have taken for a swelling of the vesical uvula, that occasion the retention of urine.

As to the remainder, every thing in this disease is obscure; we are equally ignorant both of the causes

which produce it, and the signs which might prove its existence. The contact of the sound with these fungi cannot do more than make us suspect their presence. We will easily perceive that this instrument finds something extraordinary; but the horniness of the bladder, strictures in this organ, and tumours of any other nature, formed in the thickness of its parietes, or in the parts which surround it, may impose upon us and render the information of the sound very equivocal.

We have not made more advances in the treatment of these fungi. Internal remedies are impotent; injections into the bladder are either too weak to produce a decided effect, or so strong as to make us apprehensive of their action upon the coats of this organ. There is but one circumstance in which surgery can perform a radical cure. If, upon the suspicion of the existence of this disease, or upon the certainty of a stone in the bladder, an incision should be made, as in the operation for the stone; and if, by the aid of the finger, we should be assured on the one hand of the presence of these fungi, and on the other, that they are attached to the bladder only by a very narrow pedicle, we might then twist them off or tie them. This circumstance occured once at the Hotel Dieu at Paris. A patient had a fungus in the bladder, besides a stone. Desault, after extracting the stone, having ascertained with the finger the existence of the shape of the fungus, seized it with the forceps, and tore it away by twisting its pedicle. This operation was not succeeded by hemorrhage or any other accident, and the patient left the hospital perfectly cured. Besides this single case, art cannot afford any but indirect and palliative assistance, such as the introduction of the catheter into the bladder, to evacuate the urine, and to prevent the symptoms of retention.

Carcinomata of the bladder are another cause of retention, which must not be confounded with fungus. Desault mentioned several examples of it.

CASE I.

A man, who was healthy until then, experienced suddenly in the region of the pubis a dull pain, intermittent at first, in a little time constant and lancinating. He asked advice for it; and many emollients were applied to the diseased part. The pain did not diminish, but on the contrary increased every day. Surgeons were again consulted; they sounded the patient, and thought that they felt a stone, because the tumour, hard and like cartilage, made the patient feel a shock similar to that of this extraneous body.

The patient came to the Hotel Dieu. Desault learned from him that he felt, in the region of the bladder, a fixed and lancinating pain; that he sometimes passed blood; that he experienced a troublesome itching at the end of the penis; that he was subject occasionally to discharge through the urethra portions of flesh, as it were putrefied. This last circumstance was decisive: it indicated the nature of the disease.

Desault passed a catheter into the bladder, prescribed a suitable regimen, and advised the patient to return to his native land. He conformed to this advice, remained at home for some time, but soon returned in a state of things, which it was easy to foresee but not to prevent. The tumour, having become more voluminous, almost filled the bladder; the urine flowed with difficulty, and the introduction of the catheter had become impossible to the country surgeons. Desault passed one, however, and a feeble relief resulted from it; the patient perished with marasmus and tormented with horrible pains. The opening of his body shewed that the tumour, which

was larger than the two fists, originated from the neck of the bladder, which it distended; its nature was the same as that of all other carcinomata.

The canal of the rectum and of the womb may communicate with the bladder by a crack, and injure the expulsion of the urine.

CASE II.

A man, aged fifty years, who was subject to hemorrhoids, felt much pain in the fundament, whenever he went to stool. Different remedies were administered to him, without his obtaining any relief. There did not appear to be any swelled hemorrhoids without the anus, but about an inch distance from this opening there were perceived two tuberculous bodies, of the size of a cherry, hard and painful, and which contracted the rectum to such a degree, that the finger could not be pushed further in without much exertion. The pains increased, and were accompanied with tenesmus, smarting and burning heat in the fundament and in the extent of the sacrum. A serous, yellowish matter flowed through the anus, and so fetid and acrid that it excoriated the edges. The patient had a looseness, fever, and difficulty of making water. The efforts, which he made to pass his urine, increased the pains in the fundament. Its expulsion was often impossible, and the catheter alone could give it vent. He fell into the most distressing marasmus, appeared to be almost skin and bone, and expired, after suffering for six months the most severe pains, both in making water and in going to stool. His body was opened. The rectum exhibited, in its length, six sarcomatous excrescences, of which one adhered to its anterior side; two corresponded to the anus, and had the size and colour of a cherry; they were ulcerated. The others were higher up, smaller, firmer and not ul-

cerated. The internal coat of the intestine was of a livid red, covered with very fetid mucus; its parietes were six lines thick in different points; they were callous and made the cavity so narrow, that the little finger could scarcely pass into it. The cellular membrane which surrounds this intestine on the side of the vesiculæ seminales, bladder and prostate, was hardened and united these parts so intimately that they formed nothing but a single mass of a scirrhous hardness, especially about the base of the prostate or the termination of the vasa deferentia. The bladder did not contain any extraneous body; it was small and near its fundus horny, where its coats appeared disorganized and resembling a hog's skin, seven lines thick. The prostate was larger than in the natural state; it contained several small abscesses or cells filled with a sanious and yellowish humour. The state of thickening, disorganization and intimate adherence of the fundus of the bladder to the anterior side of the rectum, plainly announced that this reservoir participated in the carcinomatous affection of the intestine.

Under the article of retention of urine in the kidneys and ureters, we have already spoken of the hydatids, that are formed in these canals and which fill them. We have also said, that they are sometimes detached from the place where they grew, and that, being carried along into the bladder, they were expelled with the urine; or even stopped in this viscus, when they were too large to enter into the canal of the urethra.

These hydatids do not always come from the kidneys or ureters; similar ones are formed in the interior of the bladder itself: they are commonly very numerous; sometimes detached, and sometimes united together in the form of a bunch of grapes.

It may be suspected that the retention of urine is occasioned by hydatids, when the patients have several times voided these extraneous bodies in making water. Otherwise, it is uncertain whether they come from the kidneys, ureters or bladder; and even if this uncertainty should not exist, we do not perceive that surgery could do any thing to destroy this disease. Nothing but the tearing away or crushing them could promise any success; but to do either, an incision of the bladder would be requisite. Now, who would hazard such an operation upon signs so equivocal as those which are presumptive of the existence and seat of this disease? There remains, therefore, nothing but the catheter, which must be employed as a palliative remedy in this kind of retention.

§ XIII. *Of Retention of Urine from Extraneous Bodies in the Bladder.*

When the urine is stopped by a stone situated in the neck of the bladder, the patients, on changing their situation, often procure the displacement of this extraneous body, and the flow of the urine is immediately re-established. But this method succeeds only when the stone is still loose in the interior of the bladder; it is insufficient, when it remains fixed in the commencement of the urethra. Then we must either push it back into the bladder with the catheter, or extract it, by performing the operation for the stone.

Although we have never found worms in the bladder, the existence of these animalcules is attested by authors, too worthy of credit to be doubted. Tulpius, Schenckius, Bianchi, &c. attest it as ocular witnesses. These observers were too well informed to be imposed upon, and to have taken for worms, filaments that are often seen swimming in the urine, and that are produced

by the blood, pus, thickened mucus, &c. These worms are not all of the same kind; some resemble scarabs, others ascarides, and others lumbricæ. Ruysch and Hagendorn say that they have seen some which had wings, and which flew off as soon as they were discharged with the urine. These worms have been distinguished into urinary and intestinal. The latter received this name, because it was supposed they came from the intestinum rectum, through the parietes of which and those of the bladder they had gnawed and passed. It was not ascertained, however, that these worms had organs proper for gnawing and piercing. It is more probable that the communicating passage between the rectum and bladder is the result of the inflammation, suppuration and final perforation of the adjoining coats. Authors are not agreed with respect to the origin of the former. Some derive them from the kidneys—others make them enter into the bladder through the canal of the urethra. Whatever may become of these different opinions, we conceive that if these worms are very numerous, or if there is but one, and that is large enough to stop up the neck of the bladder, the retention of the urine will result from it.

The historical signs are the only ones, that can induce a suspicion of the cause of this kind of retention. If the patient has already passed worms through the urethra, if he has several times experienced the same difficulty of making water, and this accident has dissipated immediately after the evacuation of these insects, it is probable that it is still those which shut up the passage of the urine.

In this case, we do not see any other indication to be accomplished, than to empty the bladder by means of the catheter, and by the aid of this instrument to make many injections into it, so as to carry out these insects.

The anthelmintics, which might be supposed capable of killing these worms, if introduced into the bladder, appear to us to be dangerous; and perhaps these dead insects might become only more fit nuclei for urinary stones.

The retention of urine that is produced by clots of blood, is so frequent, that it would be superfluous to detail examples of it. This blood comes sometimes from the kidneys, sometimes from the bladder, and sometimes also from the urethra, from which it flows back into the cavity of this viscus. Whatever may be its source, when it is fluid, it may be expelled with the urine; but if it coagulates, its expulsion often becomes impossible to the single forces of nature. In general, whenever the blood comes from the kidneys, it is rare for it to coagulate, either because it is then in a state of decomposition, or because distilling by drops, it is carried out in proportion. Coagulation takes place when it falls in great quantity into the bladder, as in consequence of the operation for the stone, of wounds in that organ, &c.

This kind of retention presents only uncertain signs. The flowing of blood through the penis, and the bloody urine that has preceded it, are sufficient indications for supposing that the urine is stopped by clots of blood, which shut up the neck of the bladder; but we cannot be certain of it except by the introduction of the catheter. If the blood is too thick to flow through this instrument, it must be diluted by making injections into the bladder; these injections are also useful in all cases to wash out this viscus and to clear it from the clots which, without this precaution, might remain in its cavity. This advice supposes that we should besides employ the means that are most fit for stopping these hemorrhages.

We are not acquainted with any accurate observation, which proves the existence of the retention of urine, as produced by thickened pus; but we have sometimes seen this incident occasioned by glair collected in the bladder. The diagnosis of this kind of obstacle is only conjectural. The catheter and injections are here also the most proper means to perform the palliative cure of this disease. However, if the superabundant secretion of this glair was owing to the presence of a stone in the bladder, the extraction of this extraneous body would be soon followed by a radical cure. If this glair depended on the thickening of the humours, or the debility and engorgement of the coats of the bladder, incisive diuretics taken internally, and injections of the same nature, would be the only remedies indicated.

We will not enumerate here all the extraneous bodies that may be introduced through the urethra into the bladder, and cause retention of urine. We will confine ourselves to the falling of bougies into this viscus, and what we shall say of this object, may be easily applied to other bodies. It happens too frequently that whole bougies, which have been neglected to be fixed, are pushed into the bladder. It seems that the urethra possesses a kind of anti-peristaltic motion, by which it tends to draw into the bladder the different bodies which it embraces; for we may constantly observe, that when these bodies are once engaged in the canal, unless they are repelled by the evacuation of the urine, they always advance towards the bladder; a progression which, as it cannot be attributed to their weight, must necessarily proceed from the contraction of the urethra.

Sometimes also it happens that plaster bougies being made of rotten linen are broken, and that a portion of them remains in the bladder. The same accident has taken place with leaden bougies. There are also exam-

ples where the beak of the flexible catheters, that were employed formerly, and which were made of silver thread twisted spirally, has been detached and fallen even into the bladder. We are less exposed to these dangers since the use of gum elastic catheters. These do not, like bougies, grow soft from humidity or from heat, and cannot, like these last, bend upon themselves in different directions, so as to enter entirely into the bladder; their texture is too firm to dread their being broken; and as they have as much strength in the part where the eyes are formed as in other places, since the same number of threads is there as elsewhere, we have little cause to apprehend that the beak may be detached from them.

The falling of these extraneous bodies into the bladder is a very great misfortune, both to the patient and to the surgeon who attends him. The former cannot prevent the accidents which will be produced sooner or later by this extraneous body, except by submitting to a severe and painful operation. The second will be accused as the author of so many evils, and will find it difficult to exculpate himself from the charge of improvidence. When these bougies have gotten into the bladder, they fold upon themselves, and cannot return into the canal, nor consequently be expelled with the urine. They can be evacuated only by art. To avoid the operation for the stone, we may attempt their extraction with forceps, introduced through the urethra into the bladder. With this view, Desault constructed forceps with a sheath, like those which Hunter invented for extraneous bodies in the urethra. These forceps are composed of a silver canula, of the same length and curvature as the common algalis. This canula, being open at its two ends, has one of its extremities terminating like

the canula of the trocar; at its other extremity it supports two rings, which are soldered to the sides of its opening, and intended to secure it with threads. In this canula is received a stylet of iron thread large enough to fill its caliber, and flexible enough to yield to the slightest curvature of the canula. This thread is also terminated at one of its extremities by a ring, which is mounted on a screw, and at the other it is divided, and as it were, split into two elastic branches, whose spring has a constant tendency to separate them from each other. Each of these branches presents at its end a kind of concave forceps spoon, shaped in such a manner that the two branches, being brought together, there results a kind of olive, a little larger than the canula. It is good to have two forceps of this kind, one of which opens according to the curvature of the canula, and the other upon its sides. When the stylet is pushed into the canula, the forceps is shut, and the instrument perfectly resembles Petit's algalis with a button.

This instrument, thus closed, may be introduced quite into the bladder; the bougie is to be sought for, but it is very difficult to find it;—softened by the heat, its contact presents nothing which can plainly distinguish it from the coats of the bladder, when it is not yet covered with earthy incrustations. When it is supposed to be felt, we should endeavour to place the forceps in such a manner that its beak should be found on the upper part of the bougie; the canula is then to be withdrawn, while the stylet is pushed in gently. By this mean, the extraneous body may be embraced by the branches of the forceps, which are separated by their elasticity. Then the stylet is to be held firmly, while the canula is pushed down. The impossibility of pushing it back upon the stylet so far as before, and the patient experiencing no pain, is a proof that the bougie is laid hold of. But if

at the moment when the canula is made to slide upon the stylet, the patient feels a sharp pain, it is a proof that the bladder is pinched; then the canula must be withdrawn again, so as to open the forceps; and then new researches are to be made until we are able to seize the bougie. These attempts, cautiously made, are nowise dangerous; when, at length, the bougie has been secured, we must take great care, in withdrawing the instrument, always to push the canula upon the stylet, so as to tighten the forceps more and more, and not suffer the bougie to escape. We cannot state any example of success obtained by this instrument in a living man; but we can attest, that it has constantly succeeded in the experiments that were repeated upon the dead body, and that we have never failed to extract bougies that were designedly inserted in the bladder. Desault had constructed it with the view of using it on a young man, who, wearing bougies during the night to remedy an involuntary loss of semen, had the extreme imprudence not to secure them; but the great sensibility of the patient hardly permitted him to make the slightest attempts, and made the patient prefer the operation for the stone. If this last operation is performed soon after the falling in of the bougie, and before it is incrusted, it is sometimes difficult, when it is lodged in the fundus of the bladder, to seize it with the forceps. We should succeed better in this case with a blunt hook that has two branches, which might be used to drag it out.

Of Retention of Urine in the Urethra.

Under the name of retention of urine in the urethra, we designate, that whose cause is seated in this canal, whether this cause exists in its parietes, as inflammation, paralysis and lacerations; or whether it is found without its parietes, as the swelling of the prostate, and different external tumours; or whether finally, it is seated in the interior of this canal itself, as strictures, fungosities and extraneous bodies. Let us review in succession these three kinds of causes.

§ XIV. *Of Retention of Urine from Inflammation of the Urethra.*

It is easy to conceive how inflammation of the urethra may occasion retention of urine in the bladder. To acquire the mechanism of it, it is sufficient to recall that axiom of surgical pathology, that no inflammation can exist without a swelling of the inflamed part, and that every tumefaction in the parietes of a canal, necessarily contracts its caliber.

We may distinguish the inflammation of the urethra into erysipelatous and phlegmonous. The former is rarely followed by a complete retention of urine, whilst this accident is very common to the latter. Both may be the effects of the general causes of inflammation, but they depend most frequently upon the particular dispositions of this canal. Thus, the immoderate use of beer, cantharides applied externally, or taken internally, the absorption of the venereal virus that causes gonorrhœa, the unskilful use of the catheter, the introduction of bougies, charged with acrid medicaments, &c. often produce inflammation in this canal.

Whatever may be the cause of the inflammation of the urethra, we can hardly be deceived in its diagnosis.

Besides the general symptoms of inflammation, the patients complain of a burning pain in the urethra; they experience, in making water, smartings that are sometimes insupportable. The penis becomes a little larger and more sensible to the touch; a slight pressure along the urethra is sufficient to excite a sharp pain, and sometimes, when the inflammation is phlegmonous, to exhibit there the tumour that is formed in the thickness of its coats; at the same time, the stream of urine diminishes in size, in a gradual but rapid manner. In a little while the urine is evacuated only like a thread, and for its expulsion it is necessary always to make considerable efforts, which are sometimes impotent, and consequently fruitless.

The treatment of this disease is simple—antiphlogistic remedies are the basis of it; demulcent and diuretic ptisans, bleedings from the arm, leeches to the perinæum, emollient cataplasms upon this region and upon the penis, local baths, either of milk or of a mucilaginous decoction, &c. are usually sufficient to dissipate this inflammation. Demulcent injections into the urethra have also been proposed; but these injections not being able to penetrate into an inflamed and contracted canal, without being forcibly impelled, is it not to be feared, that the irritation, inseparable from this forced distension, may also increase the inflammation?

The introduction of the catheter being painful, we should never have recourse to this mean, unless there is a complete retention of urine. Perhaps it might be employed more frequently if we should compare the pains which the catheter may cause, when it is conducted by a skilful hand, with those that are excited by the passage of the urine over the coats of the inflamed urethra. But the presence of the catheter in the canal becoming also a new cause of inflammation, it must be

re-introduced every time that the desire to make water shall return, which would be very inconvenient both to the patient and the surgeon.

When the inflammation of the urethra is of the phlegmonous nature, if the tumour, formed in the coats of the parietes of the canal, instead of resolving proceeds to suppuration, and the abscess should open internally, the catheter becomes almost absolutely necessary to prevent the urine from penetrating into the cavity which contained the pus, to avoid internal fistulæ, urinary infiltrations or abscesses, &c.; and it should be suffered to remain until the sac of the abscess was perfectly cleansed and cicatrized. These accidents are not to be dreaded, when the inflammation is erysipelatous; in this case the cure is more speedy, and is commonly performed in five or six days, unless the disease should be kept up by a particular affection, such as the venereal; its progress is then different, and the treatment demands new considerations.

§ XV. *Of Gonorrhœa.*

In large towns there is no disease more common than gonorrhœa; there are few upon which so many volumes have been written, and there is perhaps none, which has been less understood. We do not yet know how a gonorrhœa is acquired. We are ignorant of the route of the virus in getting to the urethra: whether it penetrates into the substance of the glans and then deposits itself, by the way of the circulation, upon the coats of the canal; or whether it insinuates itself directly through the urethra, and affects its parietes by an immediate contact. We do not know whether the poisonous quality of the virus is the product of fermentation, or whether it depends upon the action of the solids. It is demonstrated that the matter, which produces gonorrhœa in some

persons, is of the same nature with that which produces chancres in others, and that this difference of action depends only upon the disposition of the subject to contract one disease rather than the other; but it has not yet been explained in a satisfactory manner how the gonorrhœal humour, which is active and contagious enough to affect a sound person in a momentary contact, does not become a perpetual cause of the same disease to one who has been once affected by it? How this humour, continually spread over the glans and prepuce, does not produce chancres there, or does not occasion buboes and other symptoms?

In authors we find nothing but contrariety respecting the seat of gonorrhœa. Some place it in the vesiculæ seminales; others in the prostate gland; others in the bulb of the urethra; and some in Cowper's glands. However, most practitioners at this day are of one opinion, and acknowledge that this disease attacks commonly no other parts than the glands and mucous follicles of the urethra; that it is limited in most cases to the fossa navicularis, and rarely extends three or four fingers breadth beyond. This opinion appears to us the most probable, and we have been confirmed in this idea by what we have observed in a great number of dead bodies at different stages of gonorrhœa. In several of these bodies the urethra, and the parts adjacent to this canal, exhibited no trace of injury. In others we have only remarked a redness and an appearance of phlogosis about the fossa navicularis; in all the urethra was more moist than in the natural state, and on pressing the coats we have caused a transudation through the pores and mucous cryptæ, with which they are lined, of a humour nearly like that which was found in the canal.

Sometimes we have seen ulcerations, but never real ulcers, upon the internal coat of the urethra, although

we have several times found cicatrices, which made us suspect their existence. From these facts we have no longer any doubt, whether the matter, discharged in gonorrhœa, was pus, or whether it was nothing but a mucous humour intended to lubricate the urethra in a state of health, but whose secretion had become more abundant and the colour whiter, on account of the irritation and inflammation of the canal.

The virus of gonorrhœa does not excite, at the moment of its communication, any symptom that announces its presence; it is not commonly until the fourth or fifth day that it causes an itching over the whole glans and about the orifice of the urethra, accompanied with a slight tumefaction of the lips of the meatus urinarius. Sometimes this symptom shows itself sooner. It is said to have been seen within a few hours after the application of the virus; frequently it is apparent on the second or third day; more frequently still it does not appear until the end of eight days, and examples have even been cited in which it was more than six weeks before it manifested itself. This itching, and a slight smarting in making water, are, in some patients, the only sensations which they experience in this part, before and during the duration of the discharge; but most frequently this itching is changed into a sharp and pungent pain about the corona of the glans. This pain is continually increasing; inflammation soon succeeds; the penis enlarges without an erection; the glans is red and swelled; tension is felt along the urethra, and the urine is no longer evacuated in so large a stream. Sometimes this stream is bifurcated, sometimes it twists spirally, and sometimes it falls in sprinkling showers. The patients are tormented by frequent desires to make water, and are not able to satisfy these desires without difficulty and pricking pains. They feel a kind of lassitude in the en-

virons of the pubis, and complain of a disagreeable sensation in the scrotum, testicles, perinæum, anus and hips. The inguinal glands are often affected sympathetically, and even swell a little; but they never come to suppuration, as happens when the absorption of the matter causes these buboes primarily. Erections are very frequent, especially during the night, and so painful, that they do not allow the enjoyment of a moments sleep.

The discharge soon follows the inflammation, and often precedes it. The irritation of the canal alone is sufficient to determine to the glands, which line it, a secretion abundant enough to produce this discharge. Sometimes also this secretion does not take place, which is the case in two opposite circumstances; either because the inflammation is too strong or because it is too weak. These gonorrhœas are called dry gonorrhœas.

The heat, pain, swelling and inflammation go on increasing, and keep up at nearly the same state for six, eight or ten days. They then begin to abate; a disgorgement is made, the discharge becomes more abundant, then it diminishes insensibly until the term of the cure.

When the inflammation is considerable, and when it extends into the spongy texture of the urethra, the engorgement of this part preventing it, during erection, from yielding to the swelling of the corpora cavernosa, the penis is curved to that side and the pain is extreme. The gonorrhœa which is complicated with this symptom, is named hot urinary chordee. In this case it is not rare, in a strong erection, for some vessels of the urethra to be lacerated, which occasions a more or less abundant discharge of blood, that always relieves the patients by producing the disgorgement of the inflamed part.

The matter, which proceeds from the urethra, is not, in all stages of gonorrhœa, of the same consistence or colour; it is thicker in the first stage, and more serous

towards the end of the disease. At first greenish, it then assumes a yellow colour, then a white, and returns gradually to the natural colour of mucus. These changes in the colour of the discharged matter are particularly observed upon the linen. The spots, which they form, have different shades; the matter being thicker and in larger quantity in the middle, the colour is deeper there; whilst it is more pale in the circumference, where its more aqueous parts are diffused.

The discharge has no fixed duration. When the gonorrhœa is suddenly suppressed, and before a perfect disgorgement of the urethra, it has the name of abortive gonorrhœa; it is called chronic or habitual gonorrhœa, when it is not cured in the space of two months, and then we cannot say when it will terminate; sometimes it continues for whole years, and even remains during life.

The discharged matter does not always proceed from the urethra; sometimes it has its source between the prepuce and the glans, and comes from the sebaceous glands that are seated in this place: this is what is called a bastard gonorrhœa. It may be divided into malignant and mild; the first is occasioned, if we may so speak, by an error loci. The venereal virus, which, in other gonorrhœas, has affected the interior of the urethra, fixing itself in this case upon the corona of the glans, produces there the same effect as upon the coats of the canal. The second has no bad character; the sebaceous humour, having become acrid by its delay, excites between the prepuce and the glans an erysipelatous phlogosis, which determines a more abundant secretion of this humour, and makes it puriform.

There is no disease, in which we should be more cautious respecting the prognosis, than in gonorrhœa. We should never fix a period for the cure, even in those

that have the most simple aspect. Whatever may be the docility of the patient in following the advice of the man who enjoys his confidence—whatever may be the talents and merit of the latter, we frequently see gonorrhœas, the most mild in appearance, disconcert both the patient and the surgeon by their obstinacy.

In this uncertainty we have, however, collected a number of observations, from which we may hazard some conjectures; for example, the more abundant the discharge in the second stage of gonorrhœa, the more easy and speedy is its cure: there is no danger of the lues; at least this disease is not so much to be dreaded, when the discharge has passed uninterruptedly through all its stages, and has at length ceased spontaneously, as when it has been several times suppressed, as in abortive gonorrhœas, or when it has been very sparing and long in its establishment, as in dry gonorrhœas.

When we consider and compare the different treatments of gonorrhœa, we see nothing but opposition, and, if we may so speak, contradiction amongst authors. Some employ nothing but antiphlogistics, bleed their patients frequently, make them bathe, gorge them with cooling drinks, &c. Others prescribe the heating regimen from the commencement of the disease, give large doses of balsams, turpentine, capivi, &c. Some think that they cannot cure gonorrhœa radically without the aid of mercury, which is rejected by most practitioners as useless and generally pernicious. There are some, who, to be more methodical, prescribe cooling means during the continuance of inflammation, order detersives in the time of the disgorgement, and afterwards recommend purgatives and balsamics to dry up the discharge. Whole volumes might be formed, if we would relate all the formula of pills, opiates and other preparations, that have been vaunted as infallible for the cure of gonorr-

hœa: there is no petty practitioner, who has not his particular formula; and what is worthy of remark, each of these opposite methods reckons upon an almost equal degree of success.

This observation has determined men of the greatest merit to abandon the cure of this disease entirely to nature, aided only by a proper regimen. When patients are uneasy, and they perceive that they cannot persuade them to be cured without medicines, they deceive their uneasiness by making them take pills of the crumb of bread, or of any other substance that has no virtue. This conduct has at least the advantage of not tormenting the patients by a crowd of drugs, each more disgusting than the other, and especially of not fatiguing the whole body and exposing it to a total derangement of health, for a disease which is only local and destroys itself. It is under this last point of view, that is, as a local disease only, that many authors have considered it, by attacking it only with topical remedies. Some have proposed injections into the urethra, and have distinguished them into several kinds; irritants, sedatives, emollients, astringents, &c. Others have given the preference to bougies, which they have distinguished in the same manner, attributing to them properties analogous to those of injections. Without stopping here to analyze the mode of action of each of these means, the most of them appear to us to be dangerous in a recent gonorrhœa; they can only disturb and counteract nature, which perhaps produces the symptoms that usually accompany this disease, only because they are necessary to the cure. We think, therefore, that it is prudent not to have recourse to them, unless particular symptoms indicate them very manifestly. Thus we have sometimes employed successfully, and suffered to remain in the bladder, a catheter of gum elastic, in cases where the patients

made water with the greatest difficulty, and with intolerable pains. Thus also the same instrument has often succeeded with us in recalling the discharge in abortive gonorrhœas; but, excepting this extraordinary case, we abandon the cure wholly to the cares of nature, and prescribe to our patients nothing but rest and great temperance in diet.

Whatever method may be employed in the treatment of gonorrhœa, whether we be idle spectators of nature in her struggle with the disease, or whether we attempt to aid her by internal and external medicines, the cure is dubious until it is perfected, and we are not more fortunate in pursuing the one rather than the other process. Too frequently we see those cases, which at first promised the most speedy cure, degenerate into chronic and habitual gonorrhœas. Then the most skilful practitioner often finds himself at a loss. He seldoms knows what is the cause of these obstinate discharges, and consequently is ignorant of the indication that ought to be accomplished; he does not know any remedies, upon the efficacy of which he can rely, and he cannot predict the termination of these gonorrhœas. What must be done in this uncertainty? If he takes counsel of his own conscience rather than act blindly, he will still abstain from prescribing any medicine, and will suffer the disease to wear itself out, if I may so speak, and to die of old age. It is better to acknowledge to patients the impotence of the art, than to expose them to be the victims of our ignorance.

All old gonorrhœas do not present the same obscurity with respect to the causes that keep up their discharge. Their obstinacy may depend upon a defect in regimen, on the bad constitution of the patients, on the cold or moist temperature of the climate, on the acrimony or some other particular diseases of the humours; it may

be the effect of lymphatic engorgements situated in the texture of the urethra, or of ulcers formed in the interior of this canal: finally, it may be kept up by the general venereal infection, and sometimes even by a faulty treatment.

The slightest deviations in regimen occasion manifest changes, both in the quantity and in the nature of the gonorrhœal discharge; by renewing or by increasing the inflammation, they make the matter which is formed in the urethra, both more abundant and more virulent, that is to say, more capable of exciting in the parts which it bathes, that mode of action which constitutes gonorrhœa. Thus, exercise on horseback, dancing, the abuse of heating liquors, food that is strongly spiced and acrid, immoderate dalliance with females, &c., are so many causes that are capable of prolonging the continuance of the discharge.

Persons of a phlegmatic temperament, those who have some tendency to scrophula, old persons, and in short all those that are susceptible of a true inflammation, are particularly exposed to chronic gonorrhœas. The vital action being too feeble in them to attenuate and denaturalize, so to speak, the vitiated juices, does not furnish in the whole course of this disease any thing but a sparing serous matter. It occasions little or no disgorgement, and the discharge becomes more or less obstinate.

Here at least we may perceive an indication to be fulfilled; we are sensible that nature may be assisted by excitation with tonic and irritating medicines. In these circumstances we may advantageously employ sudorific and dissolving ptisans, ferruginous mineral waters, martial preparations, balsamics, chincona, cantharides, electricity, &c. In these cases especially, topical irritants have had numerous successes. Injections with fixed

mineral alkali, in the dose of two drachms to a pint of distilled water, have often terminated, in eight or ten days, a discharge which had continued for several months. We have also frequently succeeded by injecting a solution of two grains of mercurial corrosive sublimate, dissolved in eight ounces of distilled water, or rose water, or a mucilaginous decoction. Several authors have also recommended the phagadenic water, weakened by mixture with a strong decoction of root of marsh-mallow. This injection has several times performed, under our inspection, cures for which every other mean had been tried in vain.

Bougies, whatever may be their composition, even those that have very improperly received the name of emollient or demulcent, ought to be considered as topical irritants. Their presence occasions in the coats of the canal, a sort of phlogosis, which is always followed by a more or less abundant disgorgement. The catheters of gum elastic produce the same effect, without having otherwise the inconveniencies that are attached to the use of bougies. We may use either the one or the other, and they should be worn constantly for fifteen days or three weeks; and even at the end of that time it is prudent not to leave them off suddenly, but still to introduce them for some hours in the day or night, and not to relinquish them entirely until the discharge is almost dried up. If the gonorrhœa resists these means, and its obstinacy appears to depend upon the habit which the humours have, of going to the urethra, or upon the laxity and relaxation of the coats of this canal, we may have recourse to astringent injections, and make them either with a solution of alum, green, blue, or white vitriol, or water of rabel; or with a decoction of oak bark, chincona, or tormentil root; or finally, with preparations of the astringent gum-resins, such as dragon's

blood, balsams, turpentine, &c. Although all these injections have nearly the same property, it frequently happens, that after having tried several kinds in vain, a new injection succeeds, and this same injection has no effect upon another patient.

There are many examples of habitual gonorrhœas, that are kept up by a particular disease of the humours, such as rheumatism, herpes, &c. This last especially, has a very great affinity with the virus of gonorrhœa, whose discharge it renders very obstinate. We have reason to suspect these kinds of complications in persons who were originally affected with these diseases of the humours; but we become almost certain of their existence, when the symptoms, which had been felt in some other part of the body, have disappeared or diminished since the appearance and development of the disease of the urethra.

The indication is also manifest in this case; we must combat and destroy these diseases of the humours, by remedies that are suited to their nature, or we must divert them from the urethra, by recalling them to another place. From this kind of revulsion proceed the cures that are performed by the application of a vesicatory to the perinæum, groins and internal surface of the prepuce. The same vesicatory or caustic, applied either to the arm or thigh, has sometimes been sufficient to terminate very ancient gonorrhœas, and which had obstinately resisted other means.

Amongst the numerous causes of the tenacity of gonorrhœas, we may rank callosities or nodosities of the canal as the most frequent. Their seat is in the spongy texture of the urethra; sometimes they are isolated, sometimes in groups, and sometimes disposed in the form of the beads of a rosary. They are distinctly felt with the finger, when the penis is in a state of semi-

erection. These small knots are so many lymphatic engorgements, that form in the canal a kind of phlogosis, which, in its turn, keeps up the discharge. Sometimes this dries up at length, and the callosities remain. The patient thinks himself cured, but sooner or later, embarrassments supervene in the urethra; new urinary tumours develop themselves, of which these little callosities are, so to speak, the germ and the nucleus.

Alkaline injections, local baths, and fomentations of the same nature, are commonly sufficient to produce the dissolution of these callosities. They seldom resist the action of bougies, and that of catheters of gum elastic. The radical cure of the gonorrhœa soon succeeds to their disappearance.

Gonorrhœas, complicated with ulcers in the canal, are not admitted by all practitioners; a great number reject their existence; but as their opinion is supported only by negative proofs, and as we do not find in the organization of the urethra, any disposition that is contrary to the formation of these ulcers, we think that we cannot refuse the testimony of several authors who are worthy of credit, and who assert that they have seen them. We are the more inclined to believe the reality of these ulcers, as we have sometimes met with as above mentioned, cicatrices in the urethra; and as we cannot conceive why ulcers should not be formed in this part, as they are formed in the glans, prepuce, interior of the mouth, &c. If any thing should astonish us, it is that ulcers are not more frequent.

If simple gonorrhœas, properly treated, are never followed by lues, it is not so with those that are complicated with ulcers. These, being continually bathed by the matter of gonorrhœa, assume the character of chancres, which grow upon other parts of the penis, and like

these last, they always convey a general infection. It is therefore prudent, in this case, to administer anti-venereal remedies, at the same time that the local disease is treated. Perhaps these ulcers would heal of themselves, without the general treatment, as we often see happen in chancres, formed upon the penis. If their edges were hard and callous, catheters of gum elastic would be usefully employed in procuring their disgorgement, and in hastening their cicatrization. This is one of the cases in which it has been supposed that medicated bougies were necessary, and for which different kinds have been proposed, detersive, dissolvent, cicatrizing, &c.

It is not always easy, and frequently it is impossible, to decide, when there is no symptom of lues, if a gonorrhœa, which continues for several months, is venereal, that is to say, if it is kept up by the general infection of the humours, or if it is only a local affection. All that has been written upon this subject only increases the difficulty of the diagnosis. The anti-venereals having sometimes succeeded in cases where other means were tried uselessly, it has been concluded that the obstinacy of the discharge was only owing to veneral infection; but we know how liable to error all these kinds of conclusions are. Who can be certain, that the disease would not have got well of itself during the time that the treatment has lasted, and that the remedies which have been used, have acted as anti-venereals? In order to obtain a cure, it would perhaps be sufficient to change the actual disposition of the disease.

The ceasing of the discharge is not always a certain annunciation of the radical cure of habitual gonorrhœa. It frequently happens, that after an interruption of fifteen days, one, two, and even six months, this discharge is renewed, then ceases, and re-appears at the end of a a longer or shorter time. We cannot also always consi-

der the patient as cured, although the gonorrhœa may have disappeared of itself, and may not have returned. When the urine does not flow out in so large a stream as before, sooner or later we shall find in the canal new embarrassments, which will render its excretion more and more difficult, and at length produce retention. Daily experience confirms this assertion. Most of the contractions of the urethra are the remains, or more or less tardy results of old gonorrhœas.

§ XVI. *Of Retention of Urine from laceration of the Urethra.*

CASE I.

Fiacre Tambourg, aged twenty-five years, and of a strong constitution, received a violent contusion in the perinæum, by falling with his thighs separated upon the end of the axletree of a carriage. The severe pain which he felt, did not at first prevent him from continuing his work; but he soon had a retention of urine, and in a little while there appeared at the bruised spot a tumour, which increased rapidly. The swelling extended to the penis and scrotum, and this last was swelled so considerably that, in the evening, it had acquired the size of an adult's head, and was already of a black colour. These symptoms were produced by the infiltration of the urine, which escaped through a crack in that part of the canal corresponding to the perinæum. In this state the patient was brought to the Hotel Dieu, on the 10th of January, 1790.

As this man had not made water since the morning, and as he suffered much, the bladder was first emptied by means of a catheter, which passed easily and which was withdrawn after the operation. Desault then made an incision, which, beginning on the left side of the anterior part of the scrotum, terminated at the perinæum

below the place of the crack in the canal, and left naked the vaginal coat of the left testicle. The edges of the wound, resulting from this operation, looked like brawn, and presented a cellular texture, infiltrated with urine. A large quantity of clots was found in the bottom, along the canal of urethra. The wound did not afford a drop of blood. It was dressed with coarse lint, and covered with compresses, that were soaked in vegeto-mineral water, and applied over the whole scrotum. The patient was then relieved, although the disgorgement at first was hardly sensible. He was put upon a diet, and an infusion of flaxseed was prescribed for him.

The next day there was scarcely any more infiltration, the scrotum had sunk and the patient experienced very slight pain. All the urine then passed through the crack of the perinæum.

On the third day, hardly any more engorgement existed. An emollient cataplasm was then applied to the wound. On the fourth there was no more infiltration, but the edges of the wound were extremely sensible. They were covered with small strips of cloth spread with cerate, and the use of dry lint and the cataplasm was continued.

On the sixth the suppuration, which had been announced two days before by a mucous oozing, was established. The tension of the penis was always nearly the same, and it did not diminish until the sixteenth day.

It was then only that some drops were passed through the urethra; but the greatest part continued to flow through the opening of the perinæum.

From the seventeenth to the nineteenth day, the sensibility of the wound became much less; a greater quantity of urine passed through the canal, and there began to rise up from the bottom and edges of the wound reddish pimples, which were more numerous at the supe-

rior angle of the wound than in the rest of its extent. The edges were kept together by means of small cushions of lint, applied to each side of the scrotum.

In the interval of the nineteenth to the twentieth day, the cicatrix occupied two thirds of the wound and the testicle was entirely covered. The extent of the crack of the canal diminished also, so that very little urine passed through it.

On the twenty-ninth day the urine passed almost entirely through the urethra; but it was then perceived that the patient passed it with difficulty and that it escaped only in a small stream. An algali, that was introduced, was stopped at the place of the cicatrix. A bougie of elastic gum, although of much smaller diameter than the catheter, could not be pushed any further. It is true that no strong attempts were made on this day; but the next day a silver catheter, similar to that commonly employed for children, was conducted to the obstacle, and by making boring motions with the beak, it was made to penetrate into the bladder. This canal was so contracted that, notwithstanding the smallness of the catheter, it could not be introduced without greatly distending the cicatrix, which was a little injured by it. The urine then flowed easily through the catheter; but a little of it always passed through the crack. Towards evening a slight feverish emotion appeared, but it was soon dissipated.

At the end of three days, as the catheter with a single curvature gave pain to the patient, one was introduced, that had the shape of an S, which he bore with more ease, although it was of a greater caliber. From that time he passed less urine through the wound. After three more days, a catheter of gum elastic, which was fixed to remain, was easily introduced. The patient could then raise himself up.

From that period until the forty-second day after the accident, the urine passed through the wound only occasionally. The catheter became loose in the canal, and it was easy to re-introduce it when it was taken out to be cleaned. The patient otherwise felt very well, and the wound of the scrotum was cicatrized, excepting an extent of three lines, at the place of the crack in the canal.

On the fiftieth day suppuration was established in the canal, and the urine ceased to pass through the fistula. On the fifty-eighth there was still a small oozing from the scrotum, accompanied with a slight pain which impeded the patient sometimes in the action of walking. On the sixty-sixth there remained nothing but a fungous prominence, which was easily destroyed by touching it with the lapis infernalis. The next day the patient walked with facility and without pain. However, the catheter was still left in the urethra for three weeks, in order to make the cure more certain. The urine was discharged in full stream and arched, when the patient left the hospital on the eighty-fifth day from his entrance.

In consequence of this case, recorded by Cagnion, we will view with interest another analogous one, inserted in the Surgical Journal by Manoir, where a different mode of treatment was opposed to similar symptoms. If there is any method of properly appreciating the curative processes, employed in different countries, it is, no doubt, that of examining their results in these similar cases.

CASE II.

A soldier, aged about thirty years, in attempting to leap over two chairs, that were placed back to back, fell, with his thighs separated, upon the upper cross pieces, and received so violent a contusion in the peri-

næum, that at the same moment he swooned and remained for some time insensible. Some hours after, having recovered his strength, he was able to attend the parade; but, whilst he was in the ranks, he was seized with a copious hemorrhage through the penis, a very severe pain in the bruised place, and twenty-four hours after with a total retention of urine. Messrs. Walker and Billam attempted in vain to introduce a catheter or a bougie into the bladder; but, they were gratified in seeing the symptoms yield very rapidly to the antiphlogistic regimen alone, and the patient apparently recovered in four days. On the 28th of May, 1775, ten days after the fall, the swelling of the perinæum and of the abdomen re-appeared, and the urine escaped involuntarily. Then the means, which had succeeded so well at first, were no longer successful. It is useful to remark that the observer attributes the relapse, not to the disease itself, which was only palliated, but to the intemperance of the patient. When this soldier was received into the general infirmary at Leeds, on the first of June, he had a painful abscess in the perinæum, accompanied with a circumscribed tumefaction, which extended as far as the umbilicus. The tongue was covered with a whitish slime, the belly constipated, and the urine entirely suppressed. To these symptoms were added an habitual difficulty of breathing, a frequent hiccup and extreme weakness. The patient complained besides of a troublesome itching of the skin, and an intolerable pain in the whole course of the urethra.

To remedy so many evils, by the unanimous advice of a great number who were consulted, the patient was placed as in the operation for the stone, the abscess of the perinæum was opened on the first of June by Mr. Lucas, one of the surgeons of the Infirmary, and discharged much pus. He unsuccessfully attempted to

introduce a small catheter into the urethra through the wound; neither did he succeed better in pushing into this canal, through the natural orifice, a bougie or a catheter, although the patient was then placed in a warm bath. Laxative and opiate injections, cathartics, mercurials, anodynes, &c., were equally fruitless. The urine not escaping at all, the consulters determined upon the puncture of the bladder above the pubis; the patient alone rejected it during nearly forty-eight hours, although his sufferings were extreme. A little urine was evacuted occasionally, but in too small a quantity to diminish the pain sensibly, and to reduce the abdomen, whose tumefaction was then extended to the pit of the stomach. On the third of June, the patient being in agony, manifested a desire of being operated upon, if there still remained any hope, and it was done instantly. The surgeon pushed the trocar into the middle of the hypogastric region two inches above the symphysis pubis, and penetrated into the bladder. He drew off six pounds of urine, left the canula in the place, closed it with a cork stopper, and surrounded it with sponges that were intended to absorb the urine which might escape around the canula; finally, he kept the whole in place by a T bandage, which was sustained by a scapulary. The same evening, on uncorking the canula, he drew off afresh four pints of urine. On the sixth of the same month, the canula having got out of the bladder, could not be introduced again; but at length he inserted a female catheter, which it was deemed proper to leave in the place. On the seventh, there appeared to be painful smartings, having a tendency to expel the urine through the urethra, which induced the surgeon to make new attempts to introduce into this canal a catheter or a probe, either through the meatus urinarius, or through the wound of the perinæum; but the pains which they occasioned, compelled

him to desist. On the twentieth, the urine escaped by drops through the wound of the perinæum, which was already so contracted that it scarcely admitted the end of the smallest probe. On the twenty-sixth, he was able to introduce into the bladder through the meatus urinarius, a bougie of the smallest diameter, by means of which the urine flowed abundantly. He would have left this bougie in its place, if the excessive pain which followed its introduction, had not compelled him to withdraw it. It was then resolved to let the urine accumulate in the bladder, so as to solicit it to disembarrass itself, either by the natural passage, or by the wound of the perinæum, and nevertheless it was determined by way of precaution, that the female catheter would be left in its place. On the 20th of July, the bladder having recovered the faculty of emptying itself entirely, either by the fistula or by the meatus urinarius, and principally by this latter, the catheter was withdrawn. The patient recovered strength gradually, and went from the Infirmary perfectly cured on the 18th of August. He returned there a year afterwards with a fistula in perinæo. He received the attention that was requisite for his new condition, and was in the way of being cured, when, continuing to abandon himself to that excess of intemperance which had brought back the fistula, the administrators found themselves compelled to expel him from the hospital.

The patients who are the subjects of the preceding cases, were both young and vigorous. The first had a very severe and extensive contusion, with a crack in the canal of the urethra; it was immediately followed by a considerable effusion of blood, an infiltration and a retention of urine, and the scrotum was already threatened with gangrene twelve hours after the accident.

The English soldier felt at the moment of the fall an extremely sharp pain, which was soon appeased, since the wounded man attended the parade some hours after his accident. He then had there a hemorrhage from the penis; but it caused no effusion nor infiltration into the perinæum. The retention of urine and the other symptoms disappeared, even rapidly, although they were combated only by regimen. The contusion terminated, however, in suppuration; and the symptoms which came on at the tenth day, seem to have been caused by the abscess which was then obscurely formed, rather than by the intemperance of the patient.

The opening of this gave vent to a quantity of pus; but the observer does not speak of any effusion or infiltration of urine, which proves that the canal was sound. From this state of things, it is not astonishing that they could not conduct a small catheter through the wound into the bladder. What is more difficult to be conceived, is the pretended impossibility of passing the catheter through the natural orifice of the penis, especially after the dissolution of the callosities and the opening of the abscess, which ought to have re-established the liberty of the canal to a certain degree. We cannot have a better conception of the motive which caused the prescription of warm baths, purging injections, medicines of every kind, &c.

Whatever this may have been, the bladder suffered an enormous distension, and the urine was evacuated only by regorgement; the life of the patient was speedily in the greatest danger, and without doubt he would have sunk, if the urine had not been evacuated in some way.

The French carter experienced nothing like this. From the moment of his arrival at the Hotel Dieu in Paris, the bladder had been emptied by means of a ca-

theter, which penetrated easily; because in the beginning of such accidents the swelling of the parts cannot as yet oppose a great resistance. The incision that was afterwards made in the perinæum and scrotum, permitted the urine to escape freely through the crack of the canal; the symptoms also ceased immediately from the first days of the treatment.

A month after, when it was perceived that the cicatrization contracted the canal, a catheter was pushed into the urethra, and the cicatrix then made upon it.

In fact, the English patient was saved by the puncture; but this operation only removed the imminent danger, and did not re-establish the natural flow of the urine. This also induced Mr. Lucas to make many new attempts to introduce a catheter, a bougie, or even a probe into the bladder, either through the natural orifice of the penis, or through the wound of the perinæum. The crack which was at length made in the canal, and which permitted the urine to escape by drops through the wound, was perhaps the effect of these attempts; unless it may have been occasioned by the collection of urine in the bladder, or perhaps by the erosion of the canal, near which the smallness of the external opening caused the pus to stagnate.

He was at length able to get a bougie into the bladder; and this circumstance proves that he might have passed as well, and perhaps more easily, a small catheter, whose presence is not usually very inconvenient to the patient.

I will not make any reflections upon the project formed by the English surgeons, of soliciting the contraction of the bladder by retaining the urine in it. This method would have produced an effect absolutely contrary to that which they expected from it, if the presence of the catheter, which was still in the wound made by the

puncture and the crack of the canal, had not permitted the constant escape of the urine.

At the end of three months the patient left the hospital, no doubt with a considerable contraction of the canal, although the observer does not mention it; and what seems to demonstrate it is the urinary fistula, that afterwards occurred in the perinæum, and for which this soldier returned to the hospital in the year following.

As to the rest, it is not astonishing that in 1775 they should employ so defective a treatment in England: it was then most generally adopted. Catheters of gum elastic were not in use; and besides, most practitioners were not yet acquainted with all the advantage that might be derived from these catheters in particular, nor from the introduction of the catheter in general; nor finally, with the effect which would be produced by the constant compression of a catheter upon the parietes of the urethra.

A concluding reflection which may present itself to all our readers is, that art, applied in all the perfection which it had enjoyed for fifteen years, should after three months treatment permit the continuance of, and perhaps occasion an urinary fistula; and that this same art, applied fifteen years later in a similar case, should prevent fistula, and restore an individual to society in a state of soundness, and with all his functions perfectly re-established.

§ XVII. *Of Retention from Tumours situated in the Perinæum, Scrotum, or along the Penis.*

There cannot be a tumour of some size in any of these regions, without its exercising a compression more or less strong upon the canal of the urethra: whether this tumour consists of a simple engorgement of the parts, or whether it be produced by some humour

effused into an abscess, or whether it be formed by the presence of an extraneous body, its effect will be the same. We have seen retention of urine manifest itself in consequence of an inflammatory engorgement, of a phlegmonous abscess, of an effusion of blood, of urinary tumours and stones, formed in the perinæum or in the scrotum. We have seen it occasioned also by a sarcocele, a hydrocele, a voluminous scrotal hernia, an aneurism of the corpora cavernosa, a ligature upon the penis, &c.

We will not repeat here what has been said before, in speaking of the signs of the retention that is produced by affections of the rectum. We will know that the urine is retained by one of the causes just mentioned, if the patients had not ceased to make water freely until this cause declared itself, and if there exists no other obstacle besides to the escape of the urine. Neither will we say any thing further respecting the particular treatment which would be demanded for the radical cure of each of these kinds of retention, since we cannot hope to see them cease but by destroying the diseases, of which they are only symptomatic; diseases, of which we purpose to give a separate description. We will only mention here, that until the cause of the retention can be destroyed, the urine must be evacuated by means of the catheter. Catheters of gum elastic commonly enter with more ease than those of silver; their flexibility accommodates itself better to the deviation, which the canal of the urethra sometimes experiences. They should be chosen of a moderate size, and should be introduced armed with their stylet, until they are stopped in the course of the canal; then the stylet is to be drawn back about an inch in length, so as to leave the beak of the catheter free, and to permit it to follow the curvature of the urethra; then both the catheter and the stylet are to

be pushed in, observing always to keep the latter drawn back in such a way that it does not reach quite to the end of the catheter. By this precaution, it may always be gotten into the bladder. If this introduction should be neither painful nor difficult, we should spare the patient the inconvenience of wearing the catheter constantly in the bladder, unless its presence in the urethra may be necessary to destroy the cause of the retention, as it would be in urinary tumours, the treatment of which will be resumed in the following article.

§ XVIII. *Of Retention of Urine from the Swelling of the Prostate.*

It would be superfluous to seek examples, as proofs of the existence of this kind of retention. If it should not be proved by numerous observations, it would be sufficient to be acquainted with the relation of the prostate to the commencement of the urethra, and to know that this part of the canal is formed of nothing but a very thin membrane, in order to conceive that the swelling of the gland can scarcely occur, without contracting, in some measure, that portion of the canal which it embraces.

The tumefaction of the prostate may depend upon the inflammation, abscesses, and stones formed in its substance, upon the varicous swelling of the vessels which run over it, upon the engorgement and scirrhous induration of this gland, &c.

The diagnosis of the retention of urine, produced by either of these causes, may be derived from the knowledge of the signs that are peculiar to each of them, added to that of the general signs of retention.

When this accident is produced by the inflammation of the prostate, it is soon manifested and progresses rapidly. At first, the patient experiences a sensation of

heat and weight about the perinæum and anus; and in a little while he complains of a continual and throbbing pain, which he refers to the neck of the bladder. This pain increases when he goes to stool, or when he attempts to perform this function; he is tormented with tenesmi, and frequently desires to make water; he seems as if he always had a great plug of fæces ready to escape from the rectum. The finger, introduced into this intestine, perceives at its anterior part, the prominence which is made by the prostate. J. L. Petit also gives a new sign of the swelling of the prostate. He says, that "if we are so curious as to observe the patients at stool, when they void hard excrements, we will find that the interior part of the mass, formed by the fæces, will be hollowed, as having passed over the prominence, which the prostate forms in the anterior part of the rectum." If the prominence hollows out a gutter upon the excrements, will not this gutter disappear in passing through the anus, where the contraction of the muscles must give a new form to the fæces? Otherwise this remark proves with what zeal, superior to every disgust, Petit made his observations, and with what care he devoted himself entirely to the completion of his art. If the patient attempts to make water, he is a long time waiting for the first drops of urine, and if he makes exertions to accelerate its evacuation, he adds a new obstacle to it, by pushing the tumour of the prostate more forcibly against the neck of the bladder, whose opening it then closes, and he is enabled to make water only by suspending his efforts. The stream, formed by the urine, is finer, and the pains caused by its passage more severe, in proportion as the inflammation of the prostate is more considerable. We might also add, as a sign peculiar to this kind of retention, that if we attempt to introduce a catheter into the bladder, it penetrates easily and without

meeting any obstacle as far as the prostate, where it is stopped and where the contact becomes very painful. Besides, the patient has a hard, frequent pulse; he is disordered, and experienees all the general symptoms of inflammation.

This kind of retention, as also all those that are produeed by the swelling of the prostate, or by other embarrassments of the canal, are generally more dangerous in themselves than those which have no other cause than the debility of the bladder. In these, the eraeking of this organ is little to be apprehended.

The eanal being free, its parietes may not toueh so exactly that they cannot be separated by the urine, which, after having filled and distended the bladder, press in proportion to their weight, augmented by the re-action of this viscus, and by the action of the abdominal museles. Thus, in these kinds of retention, we generally see the urine escape by regorgement, and patients pass many years in this state, without the result of any dangerous symptom. It is not the same ease when the cause of the retention consists in a contraetion of the canal; for, besides the natural resistanee of this conduit, the urine has moreover to surmount the accidental obstacles that originate from this contraction; and these obstacles frequently offer more resistance than the coats of the bladder, which have only a certain degree of extensibility, beyond which they are lacerated. Besides, the retention produced by the inflammation of the prostate, is more or less dangerous, accordingly as the inflammation is more or less violent, more or less obstinate.

The indieation of this case is manifest. As in inflammations of other parts, resolution being the most favourable termination, all the means of cure should be directed towards it. Thus bleedings from the arm, leeches

to the margin of the anus, baths, emollient injections, cataplasms of the same nature applied to the perinæum, are the principal remedies to be employed.

Antiphlogistic drinks, which are so efficacious a succour in inflammatory diseases, would be in this circumstance more pernicious than useful,—by augmenting the secretion of the urine, they would only accelerate and increase the symptoms. Thus, instead of making the patients drink abundantly, it will be better to elude their thirst, either by making them suck some slices of orange, or by giving them, in spoonfuls, a ptisan of flax-seed, dog's-tooth, &c., or some other cooling drink. But whatever may be the efficacy of the means mentioned, their effect is often too slow, and the symptoms are too urgent to wait for the urine to resume its natural course of itself. Frequently also, the elasticity of the bladder is too much weakened, by the excessive distension of its fibres, to perform its expulsion. We must then have recourse to the catheter; but the contraction of that portion of the urethra, which traverses the prostate, sometimes renders the introduction of this instrument very difficult and always very painful.

We may commonly succeed better with a large catheter than with a small one. This may be either of silver, or gum elastic; that of gum elastic, preferable when it ought to remain in the bladder, has the inconvenience of not affording sufficient solidity, although furnished with an iron stylet, to overcome the resistance of the canal; that of silver adds this advantage. As to the rest, which ever of these catheters may be chosen, it commonly enters with facility as far as the prostate, where it is stopped, not only by the narrowness of the canal, but also by the natural curvature of this conduit. For the prostate cannot swell without pushing both forwards and upwards, or upon one side, that part of the

urethra, behind which it is situated; a consideration which should never be lost sight of in the length and direction that is given to the beak of the catheter, which ought also to be longer, and to have a more considerable curvature, or to be kept more elevated during its introduction, than in the other embarrassments of the canal.

After having attained all possible certainty, that the end of the catheter corresponds exactly with the direction of the urethra, and that the obstacle to its entrance into the bladder depends only upon the narrowness of the passage, we may, without being too much afraid of making a false passage, push the catheter forcibly; it is certain, that it will sooner dilate a canal that already exists, and in whose direction it is pushed, than make itself a new passage. We confess, however, that it would be dangerous for young, inexperienced practitioners to be desirous of following this precept—to use the catheter boldly belongs only to those, who, joining to a perfect knowledge of the different curvatures of the canal, a great skill in performing this operation, have at length acquired that just coup d'œil, which prevents them from ever losing sight of the situation and direction of the beak of the catheter; for if, while they are pushing this instrument forcibly, they should keep the beak too low, or incline it to one side, &c. they would not fail to make a false route, by lacerating the membranous part of the urethra—an accident always dangerous in this circumstance, and which cannot but augment the inflammation of the prostate, and render the introduction of the catheter still more difficult.

Perhaps it would then be better to puncture the bladder above the pubis, than to expose the patient to this danger. The observations of Noel, recorded in the Surgical Journal, attest, with many others, the advantages of this operation, when performed in the hypogastric

region. Besides, the inflammation of the prostate, is one of the cases in which we may expect the most success from this puncture; for, as it is the nature of inflammations to terminate themselves in a few days, if resolution takes place, we are not obliged to leave the canula a long time in the bladder; and the canal becoming free again, if the catheter is still necessary, the obstacle that opposed its entrance no longer existing, it penetrates with the greatest ease.

However, notwithstanding the numerous successes that have followed the puncture, we should always regard it as an operation that has its dangers, and not perform it until repeated attempts have been made to introduce the catheter into the bladder, and until we have tried whether the presence of a bougie, fixed for several hours in the urethra, would not determine the flow of the urine—a happy event, which it has often procured, although it may not have overcome the obstacle. It is also the duty of the surgeon, before he undertakes this operation, to call in another practitioner, especially if in the same place there is one who is more skilful in the introduction of the catheter.

Finally, if the one consulted is not more fortunate, he should not hesitate to make the puncture; but if the catheter can be got into the bladder, after having evacuated the urine, ought it to be withdrawn, or to be left there? It is certain that its presence in the portion of the urethra, that is embraced by the prostate, will only add still more to the inflammation of that gland. On the other hand, it is to be feared, that if withdrawn, it cannot be introduced again. Here any general precept is difficult to be applied. We cannot determine for either part, but from the difficulties that have been experienced in the introduction of the catheter, and the confidence which may be entertained of skill in the use of it, pro-

vided this confidence is founded upon constant success in analogous cases.

When the inflammation of the prostate does not terminate by resolution, suppuration is frequently the result. This suppuration does not appear to attack the body of the gland itself, but to take place only in its envelops, and in the cellular texture that unites the lobes which compose it; this, at least, is what we have perceived in several bodies that were publicly opened in the amphitheatre of the Hotel Dieu. Although we have seen very extensive abscesses in this gland, we have never yet found it dissolved and destroyed by the suppuration. On the contrary, we have always observed, that it remained entire, and frequently larger than in the natural state. We have frequently remarked its cellular texture, as it were, soaked with purulent matter; sometimes also we have found in it several small sacs or follicles, filled with pus, and placed between its lobes; and when we have met with inconsiderable abscesses, these have generally been situated at the exterior of this gland, either between it and the bladder, or at the side of the rectum.

We may ascertain that the retention of urine is kept up by the swelling of the prostate in a state of suppuration, when the symptoms of inflammation have continued beyond the eighth day from its attack; when, after having always been increasing until this period, they have then seemed to diminish in order to increase afresh; when the fever has exacerbations towards evening, and those often preceded by shiverings. These signs clearly announce the suppuration of the prostate; but there are none which show whether the pus has infiltrated into this gland, whether it has formed an abscess there, and in this last case, what is the precise place occupied by the abscess.

The prognosis of this disease is not the same in each of these kinds of suppuration. In general, when an abscess has been formed, and has its seat in the envelops of the prostate, the diagnosis is less unfavourable than when the whole cellular texture of this gland is macerated by the pus, or when there are several foci of suppuration established. In this latter case, it is very rare for the patients to be cured.

The pus being, so to speak, disseminated in every point of the gland, cannot make an external vent for itself, and the deficiency of the positive signs that indicate this disposition, does not permit us to attempt an incision into the prostate to facilitate its disgorgement. Besides, it appears to us very doubtful whether any advantage would be derived from this incision; it might be more favourable for the evacuation of the matter which might lie near its edges, but would contribute little to the evacuation of that which would be remote from them. There is, therefore, nothing but the reabsorption of the pus, which can disembarrass this gland, and nature seldom bestows this favour. It is not the same when there is only one focus of suppuration, and when it is situated in the cellular envelop of the prostate; if it is placed between the gland and the neck of the bladder, it often opens itself spontaneously into this viscus, or it may be opened into it by the beak of the catheter. Then the pus, being conducted outwards by the aid of this instrument, or expelled with the urine, opposes no more obstacles to the cleansing and cicatrization of the sac which contained it. If the abscess is seated about the rectum and perinæum, and if the touch indicates its existence and position clearly, a large opening made in this place, would accelerate the cure of it.

The indications that are to be accomplished, are not therefore the same in these different cases; but in all the catheter becomes necessary, sometimes even indispensable for the evacuation of the urine; and as it ought to remain for some time in the bladder, the catheter of gum elastic is preferable to that of silver. Its introduction should be made with all the precautions, that are recommended under the article of the inflammation of the prostate.

When an abscess is formed, and when it points in the urethra or at the entrance of the bladder, it may frequently be pierced by introducing the catheter into it, whose beak is then engaged in the sac which contains the pus. We are informed of this by the escape of a larger or smaller quantity of this fluid, without any mixture of urine. In this case, we must wait until no more pus comes through the catheter, in order to draw it back a few lines and disengage it from this false route; then it must be inserted afresh, with the attention of raising up the beak more, so as to avoid its taking the same route, and thus conduct it into the bladder.

When the abscess opens of itself, the pus that escapes is mixed with urine, and is evacuated with it. Whether this opening be made into the urethra, or whether it correspond with the bladder, it is proper to let the catheter remain, and to continue the use of it until the urine ceases to be purulent. In the first case it is needed, in order to prevent the urine, in its passage through the urethra, from entering into the cavity of the abscess, opposing its consolidation, and forming stony concretions there. In the second case, it is useful to throw into the bladder injections that are slightly detergent; injections that should be made twice every day, and with several repetitions at each time, permitting also the escape of the first ones, which serve only

to dilute the pus, and cleanse both the bladder and the sac of the abscess; but preserving the last one, which is intended to diminish by its mixture, the acrimony of the urine, and to render it less irritating. For these injections, we employ commonly a light decoction of barley, and with the same view we prescribe a demulcent diuretic ptisan.

The retentions of urine that are produced by stony concretions formed in the prostate, have not escaped the pathological researches of the celebrated Morgagni. He found these stones several times in bodies, and he cites a great number of similar observations that were made by his predecessors. These extraneous bodies presented much variety in their number, situation, bulk, figure and internal organization. Sometimes several calculi have been found in the same gland.

In some subjects they were contained in cavities of the shape of a sinus, hollowed in the prostate; in others they were exhibited at the mouth and along the course of the ejaculatory canals. We have seen some that were hardly as large as a millet-seed; we have also found some that exceeded the size of a large cherry; sometimes smooth and rounded—sometimes elongated, and unequal at their surface.

Some appear to be composed of a matter similar to sand-stone, and they were placed in the middle of the gland; others seem to be nothing but a thickened and concrete spermatic substance, and had their seat in the ejaculatory canals; but the greatest number were of the nature of true urinary calculi, lodged in the sinuses, which we mentioned. The formation of those always supposes a crack of the urethra or bladder, in consequence of abscesses or old retentions of urine, for which the patients had neglected to use catheters during a long time. The urine in passing through this opening is

effused into the sac of the abscess, or is insinuated into the texture of the cells of the prostate, and by its decomposition, or by a simple spontaneous precipitation, deposits there the elements of these stony concretions.

These calculi also supervene after the operation for the stone by the great lateral apparatus, when the wound has closed externally before its internal union; from whence there results a kind of internal fistula, in which the urine by its presence and stagnation, forms a saline earthy deposit, which by the addition of new layers, is susceptible of a considerable increase.

The presence of stony concretions in the prostate is not announced by any pathognomonic sign. The retention of urine, and the prevention of the emission of semen, are only common symptoms to several other affections of the prostate and of the urethra. The finger introduced into the rectum, may clearly ascertain the increased size of this gland, but cannot distinguish the nature or cause of this increase.

When the stone imbedded in the prostate, presents a portion of its surface naked in the urethra, the shock of the catheter upon this concretion, clearly proves the existence of an extraneous body; but it still leaves much uncertainty with respect to the place occupied by this extraneous body; it still remains to be determined whether it belongs to the bladder or to the prostate; for, supposing that the catheter may be stopped by a projecting portion of the stone encysted in the prostate, it may be doubted if that which is touched is not a calculus of the bladder engaged in the urethra; and on the supposition of the catheter, instead of being stopped, slipping over a naked point of the surface of the stone, it is equally doubtful whether this is in the fundus of the bladder near its neck, or whether it is really lodged in the prostate.

As to the rest, this uncertainty in the diagnosis does not occasion any in the indication that is to be accomplished. In fact, whether the calculus has its seat in the prostate or in the bladder, or whether it be engaged in the neck of this viscus, we should endeavour to extract it, and the same operation is suitable to both cases. This operation consists in making an incision in the perinæum and in the prostate, such as is made in the operation for the stone by the great lateral apparatus. If the stone is in the bladder, this incision makes its extraction easy. If the extraneous body is encysted in the prostate, this incision is the only thing that is favourable to disengage it and procure its evacuation. It may happen, it is true, that the wound may not correspond exactly to the place occupied by the stone in the prostate; but in this case, after having been assured of its true situation by the finger introduced into the wound, we may cut with the point of the bistoury, the kind of partition that is comprised between the incision and the cyst of the stone, then disengage it, and extract it easily.

Another more frequent cause of the tumefaction of the prostate, is the varicous swelling of its vessels, and of those that are spread over the cellular texture, which unites it to the neck of the bladder, and to the commencement of the urethra. We know from anatomy, that these vessels form a plexus very sensible to the eye, even in the natural state, and without the aid of injections. This vascular plexus is susceptible of a considerable dilatation, and frequently it presents a kind of nodosities projecting into the neck of the bladder, and similar to those that are formed by varices situated in the other parts of the body.

In this disease, the prostate increases less in size proportionally than its envelops. Their texture is sometimes soft and spongy, sometimes thick and hard,

accordingly as the engorgement is recent or ancient: finally, this varicous swelling of the prostate presents the same varieties as the hemorrhoidal tumours, with which it has much analogy, and which are frequently complicated with it. Both of these preternatural states are as often the effect as the cause of the retention of urine and constipation; nothing contributes so much to their origin, as the efforts made by patients in passing their water and when at stool.

The violent contraction of the abdominal muscles, by strongly compressing the viscera contained in the abdomen, and thus rendering difficult the return of the blood through the iliac and mesenteric vessels, produces a sanguineous stagnation in the veins of the perinæum, and, by a necessary consequence, the engorgement of all the viscera that are situated in this region. Now, in this case, the varicous swelling of the prostate is subsequent to the retention of urine, which it keeps up in its turn. Frequently also the tumefaction of this gland precedes the retention of urine, of which it is the primitive cause. This disposition is not rare in old persons, and even in young people, who have abandoned themselves to excess in venereal pleasures, or in the abuse of spirituous liquors. It is also very frequent in persons who have had several gonorrhœas, and with those who have had hemorrhoids complicated with obstructions in the abdomen.

We may ascertain that the retention of urine is owing only to the varicous state of the prostate, 1st. By the union of the signs that are common to the tumefaction of this gland. 2d. By the slowness of this retention, which is commonly preceded by difficulty, whose progressive increase has been marked by a kind of paroxysm, more or less considerable, every time that the patient rides on horseback or in a carriage, or when he

takes any exercise; or finally when he makes use of heating liquors or food, that is capable of producing the same effect. 3d. By the indolence or the insensibility of the tumour formed by the prostate; a disposition that may be ascertained by compressing this gland with the finger introduced into the rectum. 4th. By the absence of smarting when the urine passes through the canal, and by the signs that are peculiar to the other kinds of swellings of the prostate, and by the presence of some one of these predisposing causes, which were mentioned above.

When the retention of urine is complete, there is an urgent necessity to give it vent by the introduction of the catheter; but this operation is not always easy, even to the most skilful hand. The rules and precautions that have been laid down in the case of the inflammation of the prostate, may also be applied here; especially when the swelling of this gland is varicous, we should prefer large to small catheters, and those of gum elastic to the algalis, which are less exempt from inconveniencies when they have to remain in the bladder.

When the catheter is stopped by the contraction of that portion of the urethra which the prostate embraces, instead of drawing it back to make new attempts, it will be better, when we are certain that its beak corresponds with the direction of the axis of the canal, to press it forcibly against the obstacle, and to keep it in this position: the pressure which the beak makes upon the parietes of the tumefied urethra, withers them by dissipating the humour that engorges them, and makes it easy to push the catheter more forward in a second attempt. By persevering thus, we get it into the bladder sooner or later. It is with the same view that bougies of catgut are used. After having introduced one of these bougies into the canal, even to the contracted part, i.

may be fixed by the known methods. Being swelled by the humidity of the urethra, it separates and compresses the parietes of this canal, and permits a new bougie to penetrate further. Before Desault had acquired that great skill in the use of the catheter, which enabled him with safety to break through all embarrassments of this nature, he used, and even with success, bougies of catgut. But they have the inconvenience, 1st, of acting too slowly, especially when the symptoms depending on retention are urgent; 2d, of being too stiff when they are introduced, and of yielding with difficulty to the curvatures of the urethra, which sometimes makes their introduction painful; 3d, of not being capable of being used twice in succession; 4th, of being obliged to be drawn out and to be renewed every time that the patient desires to make water, which requires the employment of a great number of these catheters and much assiduity on the part of the surgeon.

It sometimes happens that the catheter, by striking against some dilated vessels in the canal, lacerates them and produces a more or less abundant flow of blood. This accident, far from being injurious, is often useful; it is a local bleeding, which disgorges these vessels and makes the entrance of the catheter more easy. When this discharge of blood from the urethra does not occur, and when we cannot succeed in introducing the catheter, it is advised to apply leeches to the perinæum, or in some measure to empty the vessels by one or two bleedings from the arms. These means, without having the same efficacy as if the blood had been drawn directly from the engorged part, have however been sometimes employed with success.

After having evacuated the urine by means of the catheter, it must be suffered to remain in the bladder. Its presence in the urethra becomes necessary, to dissi-

pate the engorgement of the prostate, and that of the portion of the canal which traverses it. Its use should even be continued for a long time; it should be cleaned every eight or ten days, and replaced with a new one, every time that it is injured or incrusted with earthy deposits. We can scarcely hope for a perfect cure before a treatment of six weeks or two months, and we ought not to forget that the disease is liable to return. To prevent this, it is prudent not to interrupt the use of the catheter suddenly; and to secure the patients, by their still wearing them for some time in the night, even after their apparent cure.

When we reflect upon the analogy that exists between the varicous swelling of the prostate and the engorgement of the same nature, which occurs so frequently in the legs, we perceive that the same principles are applicable to their treatment. Now experience has proved that this can be cured only by compression, that is very accurate and long continued. It is also in part by the same mechanism that catheters act. This consideration induced the contrivance of leaden bougies. It was thought that, being heavier, they ought to compress more strongly; and that their effect would be both more speedy and more marked. But these bougies cannot, like the catheters of gum elastic, afford a passage to the urine; they have not solidity enough to overcome the obstacles of the canal; and although flexible, they are too hard to mould themselves accurately to the curvatures of the urethra. Besides, it is to be feared that, by compressing some points of this canal too much, they may produce in it eschars, which would soon become gangrenous.

Moreover, the success of the catheters is not owing to compression alone; their presence in the canal excites, in this part and in the prostate, a kind of phlogosis,

which may contribute much to their disgorgement. In fact this slight inflammation is soon followed by a puriform discharge, more or less copious, from which perhaps results the withering and obliteration of the dilated vessels and cells, whilst the catheter, holding the urethra dilated during this work of nature, keeps up and preserves the liberty of this canal. However, we give this explanation only as a conjecture, that is not deficient in semblance or probability.

The swelling and scirrhous induration of the prostate, is another disease, that is very common to old men and to those who have had a great many gonorrhœas. It is not, however, always the product of the venereal disease. The dartrous and psoric diseases may also occasion it; it is even sometimes the latent effect of a scrophulous disposition. The size and hardness of this gland vary much, according to the nature of the engorgement. Frequently it has been found almost as hard as cartilage; more frequently its texture has the appearance of hog-skin, and seems to be filled with a kind of thickened lymph; sometimes it presents a size double and triple of what is natural. J. L. Petit says, that he has even seen it as large as the fist. Sometimes we find only a portion of this gland scirrhous; sometimes its whole body is affected with the same induration.

The diagnosis of this disease is drawn from the signs that are common to the tumefaction of the prostate, added to the historical signs of the remote and proximate causes of its engorgement. The finger, introduced into the anus, may also enable us to distinguish the hardness of this gland, and this introduction causes very little pain.

When this engorgement is not very ancient, and when its cause is venereal, the prognosis is less dangerous than when the disease is complicated with scrophula, or

than when it depends upon any other humoral cause, that is difficult to combat. When the gland becomes as hard as cartilage, its organization is destroyed and there is no hope of cure.

The retention of urine being a common symptom of scirrhi of the prostate, the introduction of the catheter becomes also necessary in this case, and this operation is often attended with more difficulty than in the other kinds of swelling of the prostate. The hardness of the gland not permitting it, in this circumstance, to yield to the compression, catheters of a small diameter may succeed better than those that are larger: it even happens frequently, that we are obliged to employ much force to separate the parieties of the canal; and the stylet, with which the catheters of gum elastic are furnished, not offering sufficient solidity, the surgeon is compelled to make use of a silver algali of the size of those that are employed for children. Sometimes, notwithstanding the smallness of the algali, we cannot make it penetrate but by turning it like a borer in the canal of the urethra; but, in executing this motion, it is very essential not to lose sight of the direction of the canal, to which the beak of the catheter should always correspond. When this instrument has got into the bladder, it must be secured in it by two chords, attached to the rings of its handle, which are to be made to pass under the buttocks, to be there secured, one at the right and the other at the left, to the lateral parts of a bandage round the body. It is useless to employ other cords to draw the catheter forwards, for it is only by mounting up in this direction that it can escape from the bladder.

After wearing this algali two or three days, the canal, being already more free, commonly allows it to be replaced by a small catheter of gum elastic. This is introduced more easily, when furnished with its stylet. It

may be fixed by cotton threads, tied upon the skin of the penis or upon the glans. This new catheter may remain four or five days, at the end of which time we may place a third, that is larger, and after the same space of time a fourth and even a fifth, which ought to be progressively larger, until the natural diameter of the canal is restored. Finally, we should not cease using these catheters until the kind of suppuration, that is established in the urethra, has dried up; and until we perceive, by the finger introduced into the rectum, that the prostate is reduced to its natural size; which does not happen until about the thirtieth or fortieth day of the treatment, and sometimes later. Besides, we should employ internally the resolving remedies, that are suited to the known cause of the disease, such as anti-venereal, anti-scrophulous, anti-dartrous, &c.

We will not here speak of the pretended resolving bougies, proposed for these kinds of engorgements. 1st. Because we believe them to be useless and insufficient. 2d. Because we intend a separate article for them, in which we shall compare them with the catheters of gum elastic.

§ XIX. *Of Retention of Urine from tumours of the parietes of the Urethra.*

Under the name of tumours of the parietes of the urethra, we comprehend the callosities, nodosities, abscesses, and urinary infiltrations, that are formed in the coats of this canal. We have already announced, under the article of gonorrhœa, that this disease is frequently succeeded by callosities in the canal. In the beginning these callosities are nothing but small lymphatic engorgements, which can hardly be felt by the finger. They do not then cause any other derangement in the excretion of the urine, than a diminution of the size of

the stream. As these callosities are indolent, patients feel no uneasiness about them, and do nothing for their cure. Sometimes they remain in this state for several years; but sooner or later, they develop themselves and grow in a slow and almost insensible manner. The diameter of the urethra diminishes, the urine escapes with difficulty and in a very fine thread-like stream, which is sometimes bifurcated, sometimes sprinkles in showers, and at others is twisted in a spiral form. The violent efforts, required for its expulsion, also add to the engorgement of the urethra. The tumours, that result from it, acquire more size; the finger, carried along the penis and over the perinæum, may then distinguish them easily; the expulsion of the urine becomes more and more laborious, and is finally converted into a true retention.

These kinds of engorgement change their nature sometimes. The matter that forms them having become acrid by its stagnation, irritates the part in which it is deposited, and causes pain there. It is seized with inflammation; more or less considerable abscesses are formed; the pus makes its way to the canal, from which it is carried outwards to the perinæum or scrotum, and sometimes it makes one opening into the canal, and another outwards. When the opening is internal, and when it is situated beyond the obstacle that retains the urine, this penetrates into the cavity of the abscess, infiltrates or spreads into the neighbouring parts, and produces effusions that extend to a distance, and generally cause great ravages, by inducing mortification in the parts which they soak.

Tumours, formed in the coats of the urethra, are not always the remains of old gonorrhœas. We have seen them arise spontaneously, and without our being able to accuse any particular cause, in persons who never had diseases in the canal, which is, however, very rare.

Blows and falls upon the perinæum have often occasioned these kinds of tumours. The contusion, which is the consequence of these accidents, may be extended even to the membranes of the urethra, weaken their elasticity, and permit the lymphatic juices to collect there; or if the blood is effused or infiltrated into the texture of this part, its resolution may be imperfect; then the portion of the blood that has not been re-absorbed, becomes the nucleus of a subsequent engorgement. Finally, this contusion may excite in the urethra an inflammation, which, being too feeble to attenuate the humours that are fixed in the inflamed parts, only adds to their thickening, and becomes the remote source of the engorgements, of which we have spoken.

As to the rest, whatever may be the cause of these tumours, they observe the same progress, and occasion the same accidents, as those which owe their origin to gonorrhœa. The remedies that are suited to the one, are equally so to the other. In all cases, we should consider the disease only as a local affection; even those cases of callosities that succeed gonorrhœa, require not any particular treatment, although they might still contain a venereal germ. If the humours are otherwise sound, and if there exists no other symptom of lues, we are persuaded that catheters, remaining in the canal, can, by the action which they determine to this part, denaturalize this germ, and procure its destruction.

Under the article of gonorrhœa, we pointed out the topical remedies, which, applied to the exterior of the penis or in the canal, had sometimes dissipated the nodosities that were disseminated in the coats of this canal. We should expect the same success from these means in vain, when the tumours in question are old and voluminous. Besides, supposing that these means could still succeed, their effect is too slow for them to be used

in cases where the disease would be complicated with retention of urine. Then, as there is an urgent necessity to evacuate this fluid, and as the catheter, remaining in the canal, is of all the means which we know, that which unites the most advantages, which is the most favourable to the resolution of these tumours; the first and only aid that should be administered to the patient, is to seek to introduce this instrument into the bladder, and to fix it there. Flexible catheters are preferable to algalis; but we are often obliged to commence the treatment with the latter, in order to prepare for and facilitate the entrance of the former; for this case is one of those in which the introduction of the catheter is attended with the most difficulty; unless much force is employed, it is not often that we are able to overcome the obstacles which these tumours form. For this purpose we must choose an algali that is very firm, and of the size of those that are used for children. In introducing it, we must also use the precautions, and follow the rules prescribed in the preceding articles.

When there are several of these tumours along the urethra, after having overcome the first, we are stopped by the second, and this is not less difficult to be conquered. The catheter, locked in the part of the canal which it has cleared, does not yield itself so well as before, to the boring motions and to the different directions, without which we cannot sometimes surmount this new obstacle. In the same manner, as the second obstacle is more difficult to be surmounted than the first, the third is more so than the second; and the farther we advance, the more does this difficulty go on increasing; so that, without great skill in the use of the catheter, we can rarely get it into the bladder at the first attempts; but with patience and a little dexterity, we may generally attain our end by methodical and reite-

rated trials. The efforts that are made when false routes are not opened, are not in vain—they often determine the flow of the urine. This flow may, besides, be excited by the presence of a bougie, substituted for the silver catheter, and pushed to the obstacle. In procuring the escape of the urine by this mean, we prevent or moderate the symptoms depending on the retention; and we gain a precious time, during which we may, by reiterated attempts, cause the catheter to penetrate into the bladder.

There are practitioners, who, discouraged by the obstacles which they meet, and taking a momentary want of success for an impossibility of introducing the catheter, do not hesitate to puncture the bladder. But, unless they have acquired proof, that a bougie, left in the canal, cannot determine the escape of the urine, and unless the symptoms depending on retention are very urgent, we think that this operation should be delayed, and should not be performed until the last extremity. For, not to speak of the dangers to which it always exposes the patient, it is a pure loss as to the cure of the disease of the urethra. We will always have to return to the introduction of the catheter, and the difficulties that are found in the first attempts would not diminish from the puncture of the bladder.

The operation known under the name of *la boutonnière*,* although apparently better adapted to the nature of the disease, is generally either useless or dangerous. It is useless, if, in order to perform it, there be a necessity to pass a sound or a grooved staff into the contracted part of the canal, since a hollow catheter could be applied there in the same manner. It is dangerous, if we cannot be guided by these instruments, since we must then make incisions with hazard, and may miss the canal and

* An operation which consists in an incision made into the urethra or the neck of the bladder.

divide parts, whose injury is succeeded by more or less dangerous symptoms.

The caustics, recommended by Hunter, appear to us to be always uncertain in their effect, and very dangerous in their consequences. Although this practitioner assures us, that he obtained from them success that exceeded his hopes, we have never dared to make use of these means. The caustic which he employed, is the lapis infernalis. To apply it immediately to the contracted part of the canal, he invented a canula, nearly similar to the algalis, with a button, which were proposed by Petit. After having introduced this canula, closed by a stylet with a button, as far as the obstacle, he withdraws the stylet, and substitutes for it another, terminated at its extremity by a kind of port-crayon, into which the lapis infernalis is fixed; he then pushes in this latter to the end of the canula. In this manner the caustic can act only upon that part of the canal where the tube is stopped. He recommends that it should be applied only for a minute, then be withdrawn, and water immediately injected through the same canula, to carry out all the parts of the caustic which may have been dissolved in the canal, and which might irritate it. He repeats this application every day, or every two days, accordingly as the eschar is longer or shorter in separating, and he continues the use of it until the catheter can penetrate into the bladder. Finally, he terminates the cure with bougies.

We cannot deny that this method is very ingenious; but who will insure that this caustic will always act in the direction of the canal, that it will not pierce this conduit, and form false routes? Hunter perceives this inconvenience, and is not uneasy about it, provided we can enter into the urethra, and get bougies into the bladder. He considers this new conduit to be quite as

fit for the passage of the urine, as the natural canal. We believe also, that if the use of the bougies is continued for a long time, this factitious portion of the canal would, during their use, remain dilated enough for the urine to pass through it freely; but it seems to us doubtful whether this new route would always preserve the same state, and whether it would not in the end form a contraction, more difficult to be overcome than the first. Besides, might it not be feared, that when the caustic shall once have gotten out of the canal, we might not be able to bring it back in the direction of this conduit? and then the farther we advance, the more aggravated will be the disease.

These considerations confirm us more and more in the precept which we have laid down, of not recurring to these means until the last extremity; and until we have been convinced, by multiplied attempts, that the introduction of the catheter is impossible, which must be infinitely rare to a hand, skilled in these operations. When we have penetrated into the bladder with the silver catheter, it should be left in its place for four or five days, at the end of which we may substitute for it another catheter of gum elastic, which is larger, and this may be replaced by a third, &c. Besides, in the replacement of these catheters, we must follow the rules that were recommended for their use, under the article of the swelling of the prostate.

The catheters, left in the urethra, produce the dissipation of the callosities situated in its parietes, as much by the compression which they exercise upon these tumours, as by the kind of suppuration which they excite in this canal. To be convinced of all the advantages which compression must have here, it is sufficient to recollect that by it alone we perform the cure of the lymphatic engorgements of the legs, that of scirrhosities of

the rectum, &c. The analogy that exists between both of these diseases, hardly permits us to doubt that they may yield to the same means. But, besides the compression, the presence of the catheters, by exciting in the coats of the urethra, and particularly in the place corresponding to the tumour, a sort of phlogosis, that is followed by a more or less abundant puriform suppuration, contributes much to hasten the disgorgement of this part; thus we generally see the well directed use of these catheters produce in the space of a month the resolution of very hard tumours, that had existed for several years. The termination, however, is not always thus; sometimes these callosities inflame and terminate in suppuration.

The abscesses produced by the suppuration of tumours, formed in the coats of the urethra, do not always observe the same progress. Some that resemble abscesses from congestion, form but slowly; others make rapid progress and assume a phlegmonous character. The seat of these abscesses varies, like that of the tumours which occasioned them; they are situated sometimes along the penis, sometimes about the root of this organ; frequently they correspond with the scrotum, more frequently with the perinæum, &c. Moreover, their bulk is not alike; there are some that are scarcely as large as a nut, others equal to the size of the fist.

The formation of these abscesses is announced by the pain and heat, which appear in the places where the callosities of the canal existed; these augment in size, and become sensible to the sight and touch; external pressure makes the pains in them more severe; fever is kindled; the penis enlarges and remains in a state of semi-erection; the skin which covers it, and especially that of the prepuce, is infiltrated; the pains become throbbing, the swelling extends outwards, and some-

times the inflammation reaches even to the skin. The tumour, which during its increase was hard and shining, becomes soft, and we soon perceive the fluctuation in it.

If the abscess is already formed, when the patient calls for the assistance of art, we should nevertheless attempt to introduce the catheter into the bladder. Its presence, it is true, might augment the inflammation; but it will also prevent the symptoms of retention, and will hinder the exertions, which the patient would make to pass his water,—exertions which are more apt to increase the swelling and inflammation, than the irritation produced by the catheter. For the same reason, this instrument should not be withdrawn from the bladder, if it were introduced before the formation of the abscess, since then it would be certain to determine its formation. Some authors recommend the external opening of these abscesses, as soon as we are certain of their existence, fearing that the pus may proceed towards the canal and make a passage there. On the contrary, we do not think that we should have recourse to this operation until the latest possible period; we are even persuaded that, unless the abscess is very considerable, and does not tend to open itself externally, it is always more advantageous not to attack it with instruments and to leave it to the cares of nature. This opinion is grounded upon experience, and is supported by numerous observations.

We have frequently seen very considerable abscesses, in which we obviously felt a fluctuation, terminate at length by re-absorption, and the patients cured perfectly without any other assistance but the catheter. The opening, which would have been made in such cases, would at least be useless. Frequently these abscesses open of themselves into the canal; but, far from regarding this event as dangerous, we have always predicted well as to

the cure: the pus being able to spread between the catheter and the canal, the sac, which contains it, is emptied gradually, nature performs its detersion and the cicatrization soon follows. If it happens sometimes that the pus, not having a sufficiently free vent, remains in too great quantity in the cavity of the abscess, to permit its parietes to cleanse and contract themselves, the consequences of it have never been dangerous. Then, either the pus proceeds towards the skin, pierces it, and forms a new vent outwards, or art is obliged to come to the aid of nature, and to open the abscess externally. In either circumstance we have lost nothing but the time, and the cure is not attended with more difficulty than if we had performed, at an early period, the incision, to which we are at length compelled to have recourse. The catheter, that is in the canal, affording a passage to the urine, prevents it from penetrating into the cavity of the abscess, and permits the cicatrix to be made as easily as if there had been only an external opening. Besides, by opening these abscesses at an early period, we do not always prevent their opening into the urethra; the pus, collecting itself in the coats of this conduit, separates them from each other, destroys a part of the vessels that nourish them, and forms in some points an eschar, which extends even into the canal.

Under this view we do not, therefore, derive any advantage from opening abscesses, that are formed in the thickness of the parietes of the urethra; and the opening that is made frequently even retards rather than hastens the cure. This truth is also the fruit of experience; we have constantly observed that whenever the abscess was situated near the symphysis pubis, and about the root of the penis, or when it extended into the scrotum, the openings that were made in this part, cicatrized with difficulty and often remained fistulous.

This inconvenience may be avoided by abstaining from opening these abscesses, and they are cured more speedily and more surely. There are some cases, however, in which it may be useful to have recourse to this operation, such as that, in which there may have been a considerable collection of pus, when it points in the perinæum, and when there is but little intervening space to pass into the focus of the abscess. Even in this case the opening must not be too large; one of a moderate size is more easily cured, and is always sufficient to facilitate the escape of the pus, and to wait with safety until the cleansing and cicatrization of the cavity of the abscess are completely ended. There are therefore very few cases, in which we cannot cure both the callosities and abscesses, that are formed in the coats of the canal, by the sole use of catheters of gum elastic. But this treatment, although apparently simple, requires the greatest care on the part both of the patient and surgeon; he must watch with the most scrupulous attention that the catheter is not deranged, that it should always be in the bladder, and that it is not obstructed by any extraneous body. A moment's negligence may cause the greatest evils; for example, if the beak of the catheter has escaped from the bladder, or if, although remaining in its place, its cavity should be found filled either by glair, or by clots of blood, stony incrustations, &c., the urine would pass between it and the canal, might enter through the internal opening of the abscess, and occasion urinary effusions or infiltrations, which would render the disease more severe. We will treat in a separate article of these symptoms, and of urinary fistulæ, which are sometimes occasioned by tumours in the parietes of the canal of the urethra.

Let us confirm by two cases, the doctrine established

above, the one is taken from Chopart's treatise; the other is recorded at the Hotel Dieu by Cagnion.

CASE I.

A young man, aged twenty-one years, fell from a window, received a violent contusion in the perinæum, without any external wound, and discharged much blood from the penis. The day after his fall he had a retention of urine. The catheter was introduced, and blood and urine were evacuated; some hours after this young man, not being able to satisfy a fresh inclination to make water it was attempted to use the catheter again, but in vain. He was carried three leagues from thence in a carriage, whose joltings increased his pains, and, however, occasioned him to pass a little water. The bleedings were repeated; and resolvents were constantly applied to the perinæum and scrotum, which were very much swelled. The urine flowed by drops and not without exertion. The tenth day a small abscess appeared in the perinæum and was opened. The swelling of the genitals diminished; the urine resumed its course through the urethra, and the fistulous opening was cured. Its ejection was then made without pain, but with difficulty. Recourse was had to bougies and to the catheter, but it was impossible to make them penetrate into the bladder.

Two years after, this young man came to the Hospital of the College of Surgery. His urine escaped without efforts, at first by drops, and then by a very fine thread; sometimes it flowed involuntarily. A small hard tumour was perceived in the perinæum, near the branch of the ischium of the right side. No kind of catheter could be introduced into the bladder; they were all constantly stopped at the membranous part of the urethra, in front of the tumefied prostate. The obstacle seemed invincible, and the patient determined to submit to the opera-

tion of *la boutonnière*, which Chopart, who was then chief surgeon, performed in the usual manner.

In vain did he attempt to make the catheter penetrate into the bladder; every effort was useless: the operation was suspended, hoping that the disgorgement of the thickened parts of the urethra and prostate would render the introduction of the catheter less difficult. The urine took its course through the wound; it suppurated and gave vent to some flocculi of grumous matter; when its edges began to wither, Chopart attempted to pass the catheter into the bladder, but his attempts were unsuccessful. A cicatrix was formed, but a fistula remained at the superior angle of the incision, and the urine was divided between this fistula and the incision. Desault was then invited to come to the hospital, to attempt the introduction of the catheter. Not being able to get into the bladder a small algali, similar to that which is used for children, he took one that was longer, slightly curved, very slender, but strong and made of silver. After carrying it into the urethra as far as the obstacle, he pushed the index of the left hand deeply into the rectum, and having lowered towards the scrotum the handle of the catheter, which he held with the palm of the right hand, the thumb resting upon the ring of the mandrin, he pushed the algali with great force, according to the axis of the body and the curvature of the urethra under the pubis, sustaining and directing it by means of the finger that was applied in the anterior side of the rectum. Having got into the bladder, he withdrew the mandrin, which filled up the cavity of the algali, and the urine escaped. This catheter was so locked by the parietes of the urethra which the prostate embraces, that it was almost impossible to move it in the bladder, nor to push it in, nor even to draw it a little forwards. It was stopped and secured by two ban-

dages passed under the thighs. Emollient injections were made into this viscus. The patient rested in the horizontal position in which the catheter had been used. The sharp pains which he experienced during the introduction of the catheter, were allayed. Some hours after they became very violent in the kidneys, in the neck of the bladder, and the region of the anus. He had fever. The next day, notwithstanding the use of injections, demulcent drinks and fomentations, the hypogastric region was tense. On the third day, the catheter was but little locked, or more moveable, the urine escaped without pain, and the fever continued. On the fourth, the diminution of the symptoms was sensible, the catheter came out of the bladder, and not being able to replace it, he left it in the urethra; the urine flowed, after many efforts to discharge it, between the catheter and the canal, and principally through the fistula of the perinæum. The patient was put into the bath and found himself relieved. Desault substituted for the algali a catheter of gum elastic of small diameter, and introduced it with little difficulty. The patient found himself better. On the sixth, he still had a tense belly, without its being painful, and the tongue furred with yellow mucosities; he took a drink of tamarinds and Glauber's salts, and continued it for three days; the fever diminished.

During the night of the tenth day, the catheter again escaped from the bladder, and the patient experiencing sharp pains in making water, the house-surgeon of the hospital attempted in vain to introduce it again. These attempts were very painful; blood flowed from the urethra, and this canal became swelled and tense. The patient, however, passed urine through the fistula, and was put into the bath. Desault was requested to come and replace his catheter. He had much more trouble to

introduce it into the bladder than at first, and did not succeed until after a half hour's trial, then forcing the resistance. The patient was very much fatigued by this operation; he had fever: however, the symptoms of irritation were less violent than on the first day of the use of the catheter, and on the day after he was able to take rice broth, although his debility was great. Much purulent matter escaped through the fistula of the perinæum, and through the orifice of the glans; the swelling of the urethra diminished gradually. The urine continued to flow freely through the catheter, which, being well secured to the penis, was not displaced any more. On the twelfth day, Desault withdrew it, and put in one that was much larger. The patient recovered his strength; he could get up, and had the courage at the end of ten days, to walk to the Hotel Dieu, that the surgeon might introduce a new catheter for him. Notwithstanding the use of this instrument, the urine escaped continually through the fistula. Six weeks elapsed without any apparent change in this disease. The catheter was more easily charged with gravel, caused pain, and required to be drawn out more frequently in order to be cleansed. Chopart, as well as several other surgeons, attempted to introduce it again; but their attempts were always unsuccessful. Desault alone could replace it; and he returned it with facility, after having himself drawn it out of the canal, less easily when it had been taken out some time, and also with more difficulty, when other surgeons had attempted to introduce it again. One day the young man, being fatigued by the catheter, drew it out of the bladder, and remained forty-eight hours without it. The urine escaped at first freely and in full stream; during its ejection, by compressing the fistula with a compress sustained by the fingers, only a few drops passed through the fistulous orifice. At length the difficulty of

making water recommencing, he was obliged to return to Desault, who had some difficulty in replacing the catheter. Another day, having taken out this instrument at six o'clock in the morning, he went at nine to the surgeon, who, experiencing more difficulty than at the last time, was disposed to discontinue the attempts for the re-introduction, when all at once and by a direct movement, he got the catheter into the bladder. After that time it was only taken out every five or six days, in order to cleanse it, or to substitute a new one immediately. The patient still remained for a month at the hospital. He then determined to go to the Hotel Dieu, that he might be nearer to Desault's aid. When he came there, Desault observing that the urine deposited much gravelly and glairous matter, withdrew the catheter every three or four days, and did not experience any difficulty in replacing it. He continued this treatment for six weeks; then the fistula discharged no more urine, but only purulent matter, and at length it closed up. Some days after, Desault determined to take away the catheter in the morning, and to replace it in the evening; the cure appeared to be complete: however, he persuaded this young man to remain a month longer at the hospital. The urine at first flowed in a large and full stream for eight days, then the stream diminished a little in size and rapidity; it was at length reduced to one third of its former size, and remained in that state.

CASE II.

Pierre Noel Gisors, aged fifty-seven years, entered into the Hotel Dieu on the 10th of June, 1790, to be there treated for a complete retention of urine, and for small callosities along the canal of the urethra. This man, in his youth, had had four gonorrhœas and dis-

charges of blood. He had, however, as he said, always made water in full stream, except two days before he came to the hospital. From the introduction of the catheter, it was found that he had not given a true account of his situation, for the urethra was remarkably contracted and full of callosities.

A surgeon of the town had attempted to use the catheter for this patient, without being able to get it into the bladder. Desault also experienced difficulty; but, by making use of a catheter of moderate thickness, and with a single curvature, and by conducting it in the true direction of the urethra, by pressing strongly, and making some rotatory motions, he overcame two principal resistances, the one at the root of the penis, the other about the membranous portion of the canal, and penetrated into the bladder.

After the complete evacuation of the urine, Desault withdrew this catheter, although it was tightly locked in the canal, to substitute a catheter in the form of an S, which patients can bear more easily. Although he introduced this with more ease than the former, it was still necessary, however, to employ a certain force about the bulb, where the greatest obstacle was.

The presence of this extraneous body in the urethra and bladder occasioned very little inconvenience to the patient. The callosities that occupied nearly the whole extent of the canal, diminished speedily; so that on the eleventh day, he was able to substitute for the silver catheter, one of gum elastic, of moderate size, which he introduced very easily by the aid of an iron stylet. He fixed it with cotton threads to the root of the glans. The presence of this catheter increased the irritation and the phlogosis, which the former had produced in the interior of the canal, and three days after, there was a suppuration, which soon became very abundant.

The patient, however, was not incommoded by it, and hardly experienced any restraint in walking. The catheter was taken out every six days, to clean it, and prevent incrustations, and it was afterwards replaced without difficulty.

The patient thus attained the twentieth day of his treatment; but at this last period, the callosities that existed at the root of the penis, and at the exterior of the canal, became more considerable; and even but a few hours were necessary for the formation of a tumour at the root of the penis, and an inflammatory engorgement in the scrotum. This accident could not be attributed to the retention of urine in the bladder, nor to its passage through the canal, round the catheter; for this latter permitted it to flow easily, without the bladder's being even obliged to contract itself. But the patient had at this time an incipient disturbance of the primæ viæ, which obliged him to adhere to a more strict regimen than he had followed until then; at the same time, an emollient cataplasm was applied to the engorged parts.

The pain diminished, and likewise the size of the scrotum. It was not the same case with the tumour at the root of the penis; it made a crack in the canal, at the place of the obstacle; the presence of some drops of urine determined the formation of an abscess in that spot; the tumour increased, and four days after the fluctuation became very sensible, the skin red and already thinned.

The next day, Desault made an opening there, which commenced on the left side of the penis, an inch from its root, and continued to the root itself, upon a level with the anterior part of the scrotum; this opening gave vent to a mixture of pus and urine. He placed a little lint between the edges of this wound, in order to retard

its union, and he continued the application of the cataplasm, which was renewed twice every day. The wound disgorged itself, its edges thinned and almost disorganized, were destroyed; and on the eighth day from this opening, although some drops of urine passed occasionally, he saw a commencement of cicatrization at its inferior angle.

The engorgement of the scrotum, which had diminished at first, remained for several days in the same state; but on the seventeenth from its formation, it became much more considerable, and in a little while a deep-seated fluctuation was perceived upon the right side. The formation of this abscess, which we may attribute to the infiltration of some drops of urine, had not prevented the wound at the root of the penis from cicatrizing almost entirely. There only remained a small opening at the superior angle; but this opening was fistulous, surrounded with many callosities, and was continued interiorly as far as the crack of the canal, which still existed, and suffered the urine to escape in pretty large quantity, although the catheter was large enough to give it a speedy and easy vent. All the precautions that could be taken, could not prevent a small portion of the urine which passed through the crack, from infiltrating into the cellular texture of the scrotum.

There were successively formed callosities, and then abscesses, which, without having any thing dangerous, retarded the cure considerably.

Finally, on the hundred and eighteenth day of the treatment, the fistula was much more narrow; some callosities were hardly perceived in it; the urine passed but rarely through it, and at more remote distances of time. On compressing the root of the penis, only a slight oozing could be perceived; it was still, however, necessary to wait fifty days for the entire dissolution of the

callosities, and the complete cure of the fistulous opening. It was then only that he ceased from using the catheter, which the existence of the fistula had not permitted to be withdrawn, until the canal had recovered its diameter and its natural suppleness.

From that period the patient made water in full stream, and the oozing at the place of the fistula did not re-appear during one month, which he still passed at the hospital, to be more certain of his cure.

§ XX. *Of Retention of Urine from Strictures in the Urethra.*

The contraction of the urethra, caused by strictures in the interior of this canal, is a very common disease; it has been known and described by several authors. Morgagni relates several openings of bodies, in which he found a species of cords in the urethra, some placed according to the direction of this canal, others extending obliquely from one side to the other, and some going transversely. Sharp, in his critical researches upon the present state of surgery, asserts, that in the urethra of a dead body, he found, near the verumontanum, a filament that extended across in the urethra, and which had prevented the catheter from penetrating, from which a mortal retention of urine resulted. Goulard, in his Treatise on the Diseases of the Urethra, considers these strictures as reduplications of the internal membrane of this canal, and says, that several times, at the opening of bodies, he had seen these reduplications perfectly resembling the valves of veins. Hunter speaks of contractions, in which this canal seems to be surrounded with a packthread, and he adds, that in the several cases the contracted part exhibited a resemblance of it.

These strictures do not always occupy the whole circumference of the urethra,—sometimes they are found

only in the half, sometimes only in the third of its extent. Frequently we meet with several, at distances more or less remote from each other. Every part of the urethra does not seem to be equally liable to these contractions; there is one that seems to be much more so than all the rest of the canal, and that is the part adjoining the bulb. We sometimes, however, find them before the bulb, but very rarely beyond it; for we do not consider, as a cause of contraction, the valves which cover the orifice of the ejaculatory canals upon the sides of the verumontanum, under which the beak of the catheter is sometimes engaged; these valves may certainly stop this instrument, and prove an obstacle to its introduction into the bladder; but, unless they should be swelled, they can never oppose the flow of the urine.

The part of the urethra, in which these strictures are formed, is of a whiter colour than the other parts of this canal,—it is also of a consistence that is much harder, and sometimes approaching to the hardness of cartilage.

These contractions seem to be formed by the cicatrices of old ulcers of the canal,—these are frequently the consequences of gonorrhœa with chordee, and especially of those that have been accompanied with hemorrhagies. We may also conceive that a violent inflammation of the urethra, with ulceration of its parietes, may favour their development; the ulcerated parts that are in contact, unite to each other, in the same manner as we see two fingers unite, when the skin between them has been ulcerated, and when no care has been taken to interpose between them a small rag or some other extraneous substance, that may prevent the union.

The catheter alone can ascertain the existence of these strictures. The rational signs are only presumptuous, and leave us doubtful, whether the obstacles that

stop the urine, are not engorgements of the canal, or embarrassments of any other kind; still we cannot, with the catheter, acquire any certainty respecting the nature of these kinds of contractions, until we have broken through them. The moment that we pass over these strictures, we perceive something similar to the resistance which a cord would make; and as soon as we have surmounted them, if the catheter is pushed with force, it enters, so to speak, per saltum, and penetrates with facility into the space that remains to be passed over. But it is only by great skill in the use of the catheter, that we thus learn to distinguish the different kinds of embarrassments of the canal.

The destruction of these strictures is performed in two ways, either by ulceration and corrosion; or by compression, aided by inflammation. To accomplish the first of these indications, great boasting has been made of escharotic bougies; but, besides the inconveniencies that are common to all bougies, they have that of occasioning sharp pains, of not confining their effect to the contracted part of the canal, and of extending it to the sound parts.

The caustics, employed by Hunter, seem to be more advantageous. Applied immediately to the stricture, they may speedily cause its destruction; but, it is always to be feared that they may not act in the direction of the canal, and may produce an eschar of the whole thickness of the parietes of this conduit. None of these dangers are to be apprehended in making use of catheters of gum elastic, and experience teaches that they are always sufficient to perform a complete cure. The compression, which they exercise upon these strictures, withers them, and the inflammation which they excite in the compressed place, produces a strong adhesion of the portion of the canal, that formed the contraction

with the adjacent parts; an adhesion which prevents the return of the disease. Besides, if these strictures are are too strong to yield to compression, the long continued contact of the catheters causes an ulceration in this part. The new cicatrix, that succeeds, forming itself upon the catheter remaining in the canal, necessarily becomes flattened, instead of being prominent like the first.

The only difficulty of this treatment consists in the introduction of the first catheter. It is especially in these kinds of embarrassments that we have observed how much the entrance of this instrument is facilitated, by making it turn like a borer in the canal. By this movement its beak, being directed every way, disengages itself from the stricture, under which it is stopped, and at length finds the opening of the urethra. It is also in this case that it has been recommended, when we could not succeed in introducing the catheter above the abdomen, to introduce it by the turn of art. The success, obtained by this last process, is equally owing to the change of direction that was given to the beak of the catheter. Our manner of using it, in making boring motions, approaches very near to this, and is deduced from the same principle. The length of the treatment ought to be proportioned to the age and hardness of these strictures.

We must not cease to use the catheters, until ten or twelve days after there seems to be no resistance in the canal; and to prevent the return of the disease, it is even prudent still to wear them for some time, at least during the night.

CASE.

Charles Michel, of a bilious temperament and a bad constitution, had, at the age of forty years, a virulent gonorrhœa whose discharge disappeared gradually, after a methodical treatment of six weeks. This man thought himself cured; there remained, however, along the urethra, some smartings, slight at first, which increased insensibly during almost a year, and at length became very severe. The discharge was not renewed, but the patient soon remarked that he had to take more time and to make more exertion than usual to empty the bladder, and that the size of the stream of urine had diminished. This new symptom made him the less uneasy, as the flow of urine then appeared to him to be nearly in the same state, during a long space of time. In fact, it diminished very slowly; and the difficulty of expelling this excrement increasing only in the same proportion, the patient accustomed himself gradually and almost imperceptibly, to the necessary efforts for disembarrassing the bladder of the fluid that filled it.

Michel made water for a long time only in a very fine thread. At length the urine only fell by drops, sometimes by regorgement and involuntarily, but most frequently by the aid of a violent contraction of the muscles of the abdomen, accompanied with very severe pains. Complete retention at length took place, and the patient had not passed a drop of urine for more than twenty-four hours, when he went to the Hotel Dieu, on the 26th of November, 1790, at the age of fifty-six years, and sixteen years after the gonorrhœa, which had been the origin of his disease. He suffered at this time extreme pain, and the tumour which was formed by the bladder above the pubis, seemed to occupy a great part of the abdominal cavity.

In this state of things, there was an urgent necessity for evacuating the urine. For this purpose Desault employed a silver catheter with a single curvature and of a moderate size, with which he easily passed through about one third of the urethra. He then found a resistance, which he could not overcome, but by a strong pressure. The canal was then considerably contracted as far as its membranous portion, where he found a new obstacle, that was much more difficult to overcome than the first. The algali penetrated, however, by the aid of a strong pressure and rotatory or boring motions, and gave vent to more than three pounds of urine. He retained it in place by fixing it to a girdle by means of a ribband, and recommended to the patient to unclose it every hour, so as not to allow much urine to collect in the bladder, weakened by long distention.

This man bore the presence of the algali easily; he only complained of the smartings that were occasioned by the oozing of the urine upon the glans, when he neglected to replace the stopper of the catheter, immediately after making water.

On the fourth day the algali was already sufficiently free to be replaced by a catheter in the form of an S, which was passed without difficulty, and was taken away only five days after, to substitute for it a catheter of gum elastic of moderate size. This was introduced by the aid of an iron stylet, and then fixed to the root of the glans with cotton threads, which were carefully changed every day. The patient could then get up and walk without difficulty. Suppuration was established in the canal, which became more free every day, from the dissolution of the callosities; so that he could soon use a very large catheter.

Things were in this state, when this man, naturally melancholy, and accustomed besides to a very active life

and gross food, fell into despondency and such low spirits, that he no longer left his bed, unless a kind of violence was used towards him. This state was the index and perhaps the effect of a disturbance of the primæ viæ, which manifested itself on the twenty-first day of his treatment by loathing, nausea, bitterness of the mouth, and fever.

These symptoms indicated the necessity of evacuants, to which recourse was had, and which appeared to unload the primæ viæ.

But on the same evening an engorgement appeared in the scrotum; the callosities of the canal were swelled, and a tumour appeared in the perinæum, at the place of the obstacle. As in the preceding case, emollients were employed externally. The scrotum disgorged itself, but the tumour of the perinæum progressed; in a few days after shewed a fluctuation, and having been opened, it gave vent to a mixture of pus and urine. This circumstance announced a crack in the canal, which in fact had taken place a little before the obstacle. There resulted from it a fistula, which exhibited nearly the same phenomena as that in the preceding case, which was treated in the same manner, and which, with a few days difference in the time of the cure, had the same results.

§ XXI. *Of Retention of Urine from excrescences of the Urethra.*

The existence of carnosities or excrescences of the urethra is still problematical. The reading of authors, both ancient and modern, leaves nothing but uncertainty respecting this object. If we could rely upon the tone of assurance, with which many practitioners speak of these carnosities, we should not have any doubt of their reality. But if we judge by the contrary assertions of their antagonists, the carnosities are only imaginary. A remark

which we have made, in contradiction of these authors, is that these excrescences have been admitted almost unanimously by those, who make an exclusive use of bougies for the treatment of diseases of the urethra; and that they have been rejected by most of those who have sought to convince themselves of the fact by the opening of bodies. Morgagni says that he never met with them in his dissections. They have not been more manifest in the researches, which we have made. If from these negative proofs we cannot conclude that they never have existed, we at least have a right to infer that they must be extremely rare.

Admitting the existence of these carnosities, we do not see by what signs we can ascertain and distinguish them from strictures and other embarrassments of the urethra. Moreover, this knowledge becomes of small importance, and we are persuaded that these excrescencies would yield to the same means, which we employ to destroy the different kinds of contractions of the canal.

§ XXII. *Of Retention of Urine from Extraneous Bodies in the Urethra.*

Most of the extraneous bodies, which, when contained in the bladder, occasion retention of urine, may cause the same accident by being engaged and stopped in the urethra. Thus stones, bougies, &c., fixed in this canal, are also new causes of retention. The catheter introduced into the urethra, and the finger carried along the canal, will ascertain the seat of these extraneous bodies. The means recommended to procure their expulsion, are very numerous. Some authors advise the injection of greasy substances into the canal, so as to render it more slippery; others seek to dilate it by bougies of catgut. There are also some who wish to introduce into

the urethra, by the aid of a catheter, an end of a gut that is empty and tied at one end, which is then to be filled with air, so as to distend and enlarge the canal. The ancients also recommended suction. But all these methods are insufficient, when the extraneous body is embraced forcibly by the coats of the urethra. Then, if we cannot make it advance by pushing it with the fingers through the parietes of the canal, we must try to extract it with Hunter's forceps in a sheath. These forceps do not differ from those, which we described in the article of retention of urine by extraneous bodies in the bladder, except that they are not so long, and that they are straight, instead of being curved. Otherwise the manner of using them is absolutely the same. If we cannot succeed with these forceps, there is no other method to be used than to cut the canal upon the extraneous body, that it may be extracted. The wound resulting from this operation, is closed speedily, when we take the precaution of preventing the urine from passing into it, by making the patient wear a catheter until the cicatrization is completed. When a stone is stopped in the fossula navicularis, we may often disengage it with a small *curette*,* or else it is sufficient to enlarge the orifice of the canal a little with the point of a bistoury, in order to expel it.

CASE I.

A country curate came to consult Desault for a retention of urine. For several years he had passed gravel of a different size and form, and of a grayish colour. Some had formerly stopped in the canal, in which they caused very severe pain, permitting the urine to escape only by drops, until the patient made efforts to disengage and expel them. At length, two days before his

* A species of scoop used in the operation of lithotomy.

last accident, the urine which often carried off small gravel, stopped suddenly, after flowing very freely. The patient strenuously renewed the efforts that had succeeded formerly; but they were fruitless, and increased the pains which he experienced in the bladder and in the penis. From this statement, the cause of the retention of urine was easily conjectured. Desault assured himself of it, by means of a stylet introduced into the urethra; feeling a stone, engaged in the middle of the length of this canal, he introduced Hunter's forceps with a sheath, seized the stone, and drew it out with ease, although it was pretty large. It weighed a drachm, had an oval form, and its small extremity was turned forwards. Immediately after the extraction, the patient passed more than a pint and a half of urine, that was turbid and charged with some gravel.

CASE II.

A labourer consulted Desault for a difficulty in making water, which he had had for six months. The evening before he had introduced into the urethra a pin, which he had suffered to escape, and which was pushed very forward. Since that time he had experienced considerable pains in the bladder, which were propagated along the penis; he added that he frequently passed some drops of urine, mingled with blood. Desault assured himself of the existence of this extraneous body, by gently pressing that portion of the canal which corresponds to the scrotum, and by introducing into it a very blunt probe, which served besides to ascertain the depth to which the pin had penetrated; it seemed to him that the point was at about an inch and a half of the fossula navicularis. To extract it, he introduced into the urethra, some lines beyond this point, the forceps with a sheath: but the form of the pin did not permit him to

seize it in a firm manner; it escaped at the least effort which was made to draw it out; besides, the point being engaged in the parietes of the canal, it seemed impossible to extract it with this instrument. Then Desault thought of an expedient, which proved successful; he pressed one finger strongly upon the inferior part of the urethra, to which the point of the pin corresponded, which he fixed by this method; then having pushed the branches of the forceps more forwards, he seized the pin at about an inch from the point, curved it in the form of a goose's neck by drawing it to him, and extracted it immediately. It was not a common sized pin, as the patient had said; for it was about six and a half inches long, and of a proportionate thickness. Although in the operation the point of the pin had pierced through the canal of the urethra and the skin, the patient still asserted that he had not experienced very severe pains. No accident supervened; the urine ceased to be bloody, and resumed the same course which it had before the introduction of the pin.

§ XXIII. *Of Retention of Urine with Dilatation of the Urethra.*

This disease, in which the dilated canal presents a sac where the urine stagnates, is not a very rare accident; it always supposes an obstacle in this canal. It then happens that the urine, impelled by the action of the bladder and retained by this obstacle, distends the parietes of the canal, and makes it lose its spring. If some portion of the urethra is found weaker, either from mal-conformation, or from the effect of a violent contusion, &c., the dilatation becomes proportionally greater in this place, and a particular cavity is formed there. The membranous part of the urethra is, more than any other, susceptible of these kinds of dilatations. Some-

times also, in consequence of a crack of the canal, either from a forced distention of its coats, or from the opening of an abscess, the urine forms a sac in the adjacent parts, from whence it flows back through the crack of the urethra.

The causes of this disease are the same as those that produce retention of urine in the bladder, and which, it was said, have their seat in the canal, or in the surrounding parts, such as callosities, strictures, &c. The imperforation of the urethra may also produce retention. This mal-conformation has been observed several times in children. In some there is no opening at all; in others there was an imperceptible one, through which the urine escaped by a thread so fine that it was scarcely perceived, and lost itself in a kind of shower. In these cases, we see the canal fill itself up to the spot where the defect in the opening exists, and in the efforts which the patients make to pass water, the penis passes into a state of semi-erection. It is rare for this defect in the canal to be extensive. If an opening exists, however small it may be, we may accomplish its enlargement by introducing into it at first a small probe, and then substituting for this method bougies of catgut, whose size may be increased progressively. If there is no opening, we may make one by beginning with the point of the bistoury a small incision, of the extent and direction of that of the orifice of the urethra; we may then finish the perforation thus commenced, with a needle or a kind of a trocar, and proceed afterwards as in the preceding case.

The other kinds of retention of urine in the canal may be easily known. They are almost all preceded by, and are also complicated with retention in the bladder. The patients make water with difficulty; the jet of urine, shorter than in the natural state, falls almost between

the legs. Before the urine escapes from the canal, a tumour is formed along this conduit. This tumour subsists during and after its evacuation, and if the patient presses it after having ceased to make water, he again discharges a larger or smaller quantity of urine; or if he neglects to empty it, the urine oozes into his clothes.

The treatment should be the same here as that which was pointed out for the different embarrassments of the urethra. In this case, we must, moreover, take care to empty this urinary tumour before the catheter is introduced. The urine passing through this instrument, cannot any longer fill the sac that contained it; this contracts upon itself, is effaced, and the canal resumes its natural diameter.

Retention of Urine in the Prepuce.

This kind of retention is very frequent in children, whose prepuce is sometimes imperforated, or frequently has only a very narrow opening; adults are not exempt from this small deformity. The agglutination and union of the edges of the opening of the prepuce, in consequence of their ulceration, may occasion it. The signs of it are little equivocal. The tumour that is formed in the prepuce at the moment when the patient attempts to pass his water, or the increase of this tumour when it is permanent, does not permit us to entertain any doubts of its nature. If any existed, the defect or the narrowness of the opening of the prepuce would be sufficient to dissipate them.

The stagnation of urine in this sac sometimes occasions the formation of stones that are larger or smaller. We have seen these stones form a kind of border, which enveloped the glans in its whole extent.

The indication presented by this disease is easily seized; it may be reduced, either to the making an

opening in the prepuce, or else enlarging that which already exists. The operation for the phymosis, either by circumcision, when the prepuce is too narrow and too long, or by simple incision, when it has only the natural extent, fulfils this indication completely.

Urinary Abscesses.

After having stated all the disorders that are caused by the urine being retained in its canals, we have yet to mention the symptoms which it produces, when it escapes from its natural passages, to be diffused in some other part of the body.

We give the generic name of urinary abscesses to every tumour that is formed by the effusion of the urine. But this extravasated fluid may be under three different states. It may be collected in a particular sac, and this is what is termed effusion of urine, properly so called; or it may be spread abroad, and as it were disseminated in the cellular texture, into which it infiltrates; or it may finally present itself under a purulent form, after having excited in the part where it is found inflammation and an abscess, which is termed an urinary abscess.

These kinds of urinary abscesses always suppose a crack in some one of the excretory canals of the urine, either in the kidneys or the ureters, the bladder or the urethra. This solution of continuity may be the product of several causes. It is most frequently the effect of the forced distention of these canals, which is itself produced by the retention of the urine. Phlegmonous abscesses, formed in the thickness of the parietes of these conduits, or along their passage, also determine this rupture sometimes. This solution of continuity may also be made by a sword or by any other extrane-

ous body, that may have penetrated into these parts. We also have examples of these urinary abscesses depending on the displacement of the canula or trocar, after the puncture of the bladder. We have seen several, and they are even very frequent, occasioned by false routes in the urethra; and we have some cases of similar abscesses supervening from a violent contusion of the perinæum, with laceration of the canal.

The ravages that are caused by the escape of the urine from its natural passages, are commonly greater and more extensive when it infiltrates into the cellular texture, than when it is effused into a particular sac; and they are less when the excretory canals are free, than when they are shut up by some obstacle, as in retention. The more or less loose texture of the parts in which these abscesses are formed, makes also a great difference in their progress and development. As to the place which they occupy, it is commonly determined by the situation of the crack which has afforded a passage to the urine. If this crack takes place in the pelvis of the kidneys, in the infundibulum or at the commencement of the ureters, the abscess is usually formed in the loins and the iliac fossæ, between the peritonæum and the adjacent parts. If it exists at the end of the ureter, or in the bladder near its fundus, the infiltration is very commonly contained in the pelvis.

But if this laceration exists in the anterior side of the bladder near its summit, and especially if it was made when this viscus was extremely distended and dilated, the urine is then effused behind and above the pubis, sometimes rises even into the epigastric region between the peritonæum and the abdominal muscles, and after having passed over the course of the spermatic vessels, often escapes through the rings, to be effused into the groins and the scrotum. It frequently extends itself as

far as the penis and the upper parts of the thighs; is also sometimes propagated under the skin of the abdomen as far as the hypochondria and upon the sides of the thorax. Such is the most constant progress which the urine observes, when it quits its natural routes; but the slightest circumstance may change this progress, and occasion effusions into several other parts of the body.

There is no fluid in the animal economy whose effusion is so dangerous as that of the urine. If it is not speedily evacuated, it soon excites a putrid suppuration in the cellular texture that contains it, and causes it to corrupt, occasions in the skin a gangrenous inflammation, and at length generally occasions mortification in the parts which it soaks.

As long as the effusion of urine is confined in the interior of the pelvis and in the lumbar and iliac regions, without manifesting itself externally, there is no certain sign of its existence; the historical signs, added to the symptoms which the patient experiences, may however induce a suspicion of this effusion. Thus, when in consequence of a retention of urine in the ureters or in the bladder, the patient suddenly experiences a decided relief without the urine having flowed through the natural passages; when he has felt at the same time a kind of creeping in the loins or in the pelvis; when the calm, which he has enjoyed only a few hours, has been succeeded by symptoms more severe than before, such as a burning fever, hiccups, vomiting, &c., we have grounds to believe that there is an internal effusion. Moreover, this uncertainty in the diagnostic signs is of small consequence, since art can do nothing against a similar disorder; and since, even if its existence should be proved, we should nevertheless be compelled to abandon the patient to the resources of nature, whose efforts are generally impotent.

This uncertainty in the diagnosis disappears as soon as the effusion manifests itself externally. It is then announced by signs that seldom deceive. The retention of urine which has preceded; the sudden appearance of the urinary tumour; the rapid progress of this tumour; the kind of crepitation or trembling that is felt there, similar to what which takes place in emphysema; the tension of the skin, which is œdematous and shining, as in leucophlegmatia; the diminution of the symptoms depending on the retention: such are the first symptoms that manifest themselves, when the inflammation becomes a little considerable.

If the patient is not speedily assisted, and the urine continues to be effused, the tumour extends more and more; the skin assumes a red or violet colour; gangrenous eschars are formed in it, the falling of which gives vent to a very fetid sanies, and in which the urinous odour is easily distinguished. This sanies soon conveys shreds of corrupted cellular texture; the ulcerated part enlarges, and the apparel is continually soiled by the urine.

The indications that are to be fulfilled are not the same in all urinary abscesses; they vary according to the canal which is pierced, and the particular situation and extent of the abscess. When the crack exists in the ureters, and when an urinary abscess is formed in the loins, the aid which can be expected from surgery, is limited to the opening of this abscess, as soon as it manifests itself externally. It is then beyond the power of art to re-establish the natural course of the urine, to prevent it from being carried into the wound, and this from degenerating into a fistula. There are, however, some circumstances in which we may concur efficaciously to a radical cure; for example, if the abscess was occasioned by a stone stopped in the in-

fundibulum or the ureter, and which we can recognize and seize with the forceps introduced through the opening of the abscess, the extraction of this extraneous body, by restoring freedom to the natural passage of the urine, would favour the cicatrization of the ulcer.

When the crack through which the effusion is made is found in the bladder or in the urethra, we may then fulfil one indication more than in the preceding case, and give vent to the urine by means of the catheter introduced and fixed in the bladder. By this aid, we not only arrest immediately the progress of the abscess, but we attack the disease even in its cause, and remove the obstacles that opposed the natural course of the urine. The introduction of the catheter is therefore in this case also a mean of primary importance. This operation is often attended with the greatest difficulties. Besides the usual embarrassments of the canal, we have moreover to surmount the obstacles that are opposed to the passage of the catheter by urinary tumours placed upon the course of the urethra. If these tumours should be considerable, they must be opened before the catheter is used. The disgorgement that would result, would render the introduction of the catheter more easy. Besides, we repeat it again, and our practical journal confirms us more and more in this opinion, that with a little address, skill in using the catheter, and patience, we will always be able to make the catheter penetrate into the bladder. If, however, it should happen that we cannot succeed to stop the effusion of the urine, must we puncture the bladder, or perform the operation known under the name of *la boutonnière?*

Both of these operations are proposed by the ancients, and also by many moderns, as a certain resource against this accident; but let us appreciate the methods. In performing the puncture we do not combat the cause of

the disease, and we do not by any means remedy the disorder which is caused, and which may yet be caused, by the effused urine; we are not dispensed from making incisions in the places where this fluid will be effused; finally, as long as the liberty of the canal shall not be re-established, it will be necessary for the patient to be subjected to wearing a canula constantly in the bladder, or he will not be cured without an urinary fistula. *La boutonnière* seems to be more advantageous; but the difficulties, which it offers in its performance, added to the uncertainty of success, are sufficient for its rejection.

We ought not to confound, with *la boutonnierè*, the opening of an urinary abscess in the perinæum, which is situated between an obstacle that is in the canal and the neck of the bladder. We may also find the urethra in the bottom of the abscess, and it is easy to introduce through the crack that is made in this canal, a canula or a grooved sound, and if it be desired, to divide this canal even into the bladder. But this operation is no longer *la boutonnière*, such as has been described and recommended by authors. We see in it nothing but the usual opening of an abscess. We do not attack the canal in the place where the obstacle is, that has prevented the urine and the catheter from passing into the canal; we have not to search out and follow the direction of the urethra, through contractions, which leave hardly any traces of it, and render the operation of *la boutonnière*, always difficult and often impracticable.

From these considerations we think, that it would be more simple and more advantageous, if we cannot introduce the catheter into the bladder, to content ourselves with only opening the urinary abscesses externally. Their opening procuring a vent to the urine, the effusion would stop of itself, and under this view would answer

for both the puncture and *la boutonnière*. This opening is besides often useful, and sometimes indispensable, to stop those symptoms which are occasioned by the effusion and stagnation of the urine. There are nevertheless some cases, in which, when we have been able to introduce the catheter, this opening becomes not only useless, but even injurious; for example, when the urinary tumour is confined, when it has its seat in the thickness of the parietes of the canal or along its track, it generally dissipates itself by the sole use of the catheter. It is very rare, however, for this tumour, however small it may be, to terminate by resolution; it generally suppurates; but the crack, that exists in the urethra, permits the pus to escape of itself, between this canal and the catheter, and supplies the place of the opening, which would have been made externally. Experience teaches us also, that when this tumour corresponds with the scrotum, or when it is situated between the root of the penis and the symphysis pubis, we may cicatrise incisions that are made in these parts; that there also often remains a fistula, which is not cured without much trouble. If these particular cases are excepted, we ought always to open urinary abscesses.

The manner of opening these abscesses varies, accordingly as the urine is collected in a single focus, or as it is infiltrated into the cellular texture. In the first case, a simple incision into the whole length of the sac of the abscess is sufficient to facilitate its detersion and cicatrization. In the second, if the infiltration is very extensive, the incisions must be multiplied. Vain would be the attempt to save some parts; those, which have once been soaked by the urine, scarcely ever escape gangrene. The incisions that are made, seldom preserve them; but, by hastening the evacuation of the putrid and urinous sanies, retained in these parts, they prevent the

symptoms which would arise from its remaining. However, if these incisions were made a few hours after the effusion and before the formation of the abscess, we might obtain a complete disgorgement, and the preservation of the parts that were engorged. If these operations are deferred ever so little time, the destruction of these parts is inevitable. We are warned of their approaching mortification by a kind of crepitation or trembling which is felt under the bistoury, and which a good deal resembles the noise of parchment, when it is torn. The extent and depth of these incisions should be proportioned to that of the abscesses. If the effusion occupies and fills the scrotum, we must not hesitate to make long and deep scarifications upon the skin of the scrotum and upon the dartos, to extend them upon the penis, and in a word to prolong them to all the parts in which the urine may be effused.

Practitioners, who are not accustomed to see these kinds of diseases, might be alarmed at the extent of the ulcers, resulting from the fall of these eschars. Sometimes the whole scrotum, the skin of the penis, that of the groins, the perinæum and the upper part of the thighs, fall into a gangrenous state, and the naked testicles remain suspended to the spermatic cords, and float in the midst of this enormous ulcer. We can hardly conceive how a cicatrix can be formed upon naked testicles; but nature has unlimited resources. She will unite the testicles and their cords to the subjacent parts, and drawing the skin of the circumference of the ulcer towards the centre, she will cover these organs afresh, and furnish them with a new envelope in the form of a scrotum. This assertion is founded upon a great number of facts, in which we have always seen nature observe this progress. The cicatrization of this ulcer is also much more speedy than its extent would seem to announce.

What does art do in all this work? If we except the introduction of the catheter, which in truth is absolutely necessary to the radical cure, its aid is very limited and almost nothing in most patients; for, when these are not exhausted by the length of the disease, when they have a good constitution and are in the flower of their age, they are cured as speedily and as certainly by the aid of a good regimen and simple dressings, as when internal remedies are administered to them, and topical compound medicines are employed. The practice that is observed at the Hotel Dieu, is confined to the application of relaxing cataplasms, which are to be continued until the falling of the eschars. Then the ulcer is sometimes to be dressed with pledgets charged with styrax; but frequently nothing but dry lint is used, and this is employed until the end of the treatment. If any complication appears during the cure, we must try to combat it by the means that relate to the indications which it presents. It is thus that in cases of the prostration of the strength, and of tendency to putridity, we give internally chincona or some other cordial and antiseptic. But in all cases the catheter is the essential means of cure; without it the cure is generally imperfect, and the ulcer does not cicatrize without leaving one or more urinary fistulæ.

Urinary Fistulæ.

By an urinary fistula, properly so called, we understand a long and narrow ulcer, opening into some one of the urinary passages; but we give this name also to sinuous ulcers, which, without opening into these canals, terminate in some point of their track. Thus, with regard to the urinary passages, we would distinguish three kinds of fistulæ, and we would give to the first the name of the external blind fistula, because it has only an external opening; to the second, that of the internal blind

fistula, because it opens only into the urinary passages; finally, we would call the third, complete, because, penetrating by an opening into the urinary canals, it has also one or more at the surface of the body, or in some one of these cavities.

Amongst the external blind fistulæ, we will speak only of those that terminated near the urethra, seeing that these are the only ones, respecting which we have collected sufficiently numerous observations to furnish a solid basis for some precept that relate to their treatment. The first cause of all these fistulæ is an abscess formed near the urethra; and we have seen, under the article of abscesses situated along this canal, that they themselves often depend upon a disease of the canal. As to the rest, whatever may be the cause of these fistulæ, whenever the pus proceeds towards the scrotum or the perinæum, and vents itself externally, it is not rare for the ulcer, which results from it, to become sinuous and to resist the resources of nature, which are commonly so powerful in effecting the union of solutions of continuity. This kind of fistula may be kept up by the thinning and denudation of the parietes of the urethra; a disposition that is very common, when the abscess has its seat at the root of the penis, and about the part of the canal that is situated above the scrotum, on account of their weight tending continually to separate them from the urethra. The too small opening of this fistula, its orifice being more elevated than its bottom, its narrow and tortuous passage, may also, by opposing the free evacuation of the pus, occasion sinuses, and make this ulcer difficult to be cured. It may also be complicated with hardness and callosity, with caries in the bones of the pelvis, with an affection of the tendons of the muscles of the perinæum, &c. Now we know that these different complications are so many obstacles

to the cure of sinuous ulcers. It is easy to distinguish these kinds of fistulæ from those that terminate near the rectum. Besides the historical signs, which would be sufficient to mark their difference, we feel with the finger, carried along the fistulous passage, a hardness in the form of a cord, which seems to continue towards the urethra. A probe, introduced into the fistula, follows the direction of this cord and finds itself stopped by the parietes of the canal. We will assure ourselves besides that it does not communicate with the urethra, by the following considerations: 1st. No urine has passed through the fistula nor pus through the canal. 2d. The probe, which is used for sounding, can neither find nor give a naked touch to an algali introduced into the urethra. These signs are not infallible, however; for it happens sometimes in complete fistulæ, when the internal opening is narrow and when there is no embarrassment in the canal, that the whole of the urine escapes by this conduit. Frequently also the probe is stopped in the turnings of the fistulous passage, and when we are able to push it against the parietes of the urethra, we do not always penetrate into the internal opening, especially when this is narrow, and when it is situated in a point of the denuded portion of the canal, which does not answer to the direction of the fistula. The escape of a greater quantity of pus, by a slight pressure made along the canal, leaves no doubt of the existence of sinuses. As to other complications, such as callosities, caries of the bone, &c., they have their peculiar signs, which easily make them known.

It is from the knowledge of these different complications, that we derive the indications which are to be fulfilled in the treatment of these fistulæ. If they are kept up by a detachment of the scrotum, an accurate compression upon this part is sometimes sufficient to

effect the re-union. If this process does not succeed, we may facilitate the re-union by an incision, made upon one of the sides of the scrotum and carried as far as the denudation. If sinuses exist, and if they depend upon the narrowness of the opening or upon its situation being in a place that is unfavourable to the flowing of the pus, this opening may be enlarged, by prolonging the incision even into the focus of the abscess. When we meet with callosities, that resist the most active cataplasms and dissolvents, one or more troches of minium, introduced into the fistula, produce the destruction of these callosities in a short time. If the bones are carious, and the tendons affected, we must wait for their exfoliation; and in every case vary the treatment according to the cause that keeps up the fistula.

Incomplete and internal urinary fistulæ, or otherwise blind internal fistulæ, are seldom found in the ureters and in the bladder; the quality of the cellular texture that surrounds these parts, is too favourable to urinary effusions and infiltrations, to limit to a simple internal fistula, the disorder which would arise from the perforation of these canals; but these fistulæ are often found in the urethra. The opening of an abscess in the interior of this canal, the cracking of the same canal in consequence of a retention of urine, a false route, the external cicatrization of the wound resulting from the operation for the stone, without its parts uniting internally, are so many causes of this disease.

The diagnosis of these fistulæ may be derived from the historical signs, added to the discharge of the pus through the penis, before and sometimes after the evacuation of the urine; from the presence of a tumour along the urethra,—a tumour, which increases while the patient is making water, then disappears upon pressure, and whose disappearance procures through the penis, a

new discharge of urine mingled with pus. This is the only characteristic sign; for an old gonorrhœa, complicated with callosities, may also keep up the suppuration of the canal. The pain, when it exists, is no positive indication, and we cannot acquire any certain knowledge by the introduction of the catheter. The beak of this instrument, it is true, may be engaged and stopped in the fistula; but a great number of obstacles of different natures may equally oppose its entrance into the bladder.

We cannot cure these internal urinary fistulæ, but by preventing the urine from getting into them and remaining there, which renders the use of the catheter indispensable. It is important that the catheters, which are employed, should be neither too large nor too small. When too large, they would exactly fill the canal; and neither the pus, nor the urine contained in the fistulous sinus, could be evacuated. When too small, they would allow the urine to ooze between them and the canal, and then it would be carried afresh into the fistula. These inconveniencies may be avoided by using a catheter of a moderate size. Its use should be continued, until the ulcer was entirely cleansed and cicatrized. The inutility of medicated bougies, and of other remedies, both internal and external, is too manifest, for us to stop to mention the proofs of it.

Of all the urinary fistulæ there are none more frequent than complete fistulæ. They originate sometimes in the ureters, sometimes in the bladder, sometimes in the urethra. Those, that originate in the ureters, sometimes open into the intestine colon, from which the urine, mixing with the fæces, escapes through the anus. But most frequently the external opening of these fistulæ is either into the lumbar regions, or into the inguinal regions. Those, which communicate with the bladder, have different vents also. When they proceed from the summit

and from the anterior part of this viscus, they commonly pierce the parietes of the abdomen, above the pubis and towards the umbilicus. They also terminate sometimes in the groins. When they originate in the posterior side of the bladder, they discharge themselves sometimes into the cavity of the abdomen, in which case they are generally mortal; sometimes into the intestines, if there should be any adhesions between them and the bladder, that are favourable to this communication. When the opening into the bladder is near the fundus of this viscus, the fistula sometimes terminates in the rectum in man, and in the vagina in woman; but most frequently it terminates in the perinæum in both sexes. As to the fistulæ which have their origin in the urethra, they commonly open outwards at the perinæum, in the scrotum, along the penis, and sometimes also in the rectum. It is not rare to see the external orifice of these fistulæ very remote from the internal, and to find it at the middle and even at the lower part of the thighs, the groins, the parietes of the abdomen, and as far as the sides of the thorax. Frequently there is but one opening into the urethra, while there are several externally, more or less distant from each other.

These fistulæ are, for the most part, the consequences of retention of urine, and arise from the same causes as the diseases of which they are the symptoms. Those which communicate with the rectum in man, sometimes depend upon a perforation of this intestine, made in the operation for the stone; and those which penetrate into the vagina, are frequently the effect of a violent contusion, made by the head of the child in a laborious parturition, or of an ulceration, occasioned by the continual pressure of a pessary, that is too large, and whose edges are cutting and full of asperities. Carcinomata of

the rectum and vagina also produce these fistulæ, by extending themselves into the bladder.

The discharge of urine through the external orifice of the fistula is an unequivocal proof of its communication with the urinary passages; but this sign is not always met with, and it frequently happens when the fistulous passage is narrow, and when there is no embarrassment in the natural canals, that the urine follows this route in preference to passing through the fistula. The kind of cord which we feel along the fistulous passage, and which is directed towards the urethra, is a very uncertain index of the communication into this canal; this symptom is common to all fistulæ that are complicated with callosities, whatever may be their nature otherwise. The fungosity in the shape of a fowl's rump, which is sometimes remarked around the external orifice, is also found in stercoraceous fistulæ. The situation of this external opening scarcely furnishes a presumption respecting the nature of the fistula, since we have seen in many cases, this opening very remote from the urinary passages. When the fistulous passage is narrow and tortuous, injections do not always penetrate into the bladder or into the urethra; they are effused or infiltrated into the cellular texture. It is often difficult, sometimes even impossible, to ascertain with a stylet the internal orifice of the fistula. When it communicates into the rectum or into the vagina, we may sometimes distinguish the orifice with the finger introduced into these canals, and frequently we may there give a naked touch to an algali introduced through the urethra. The discharge of urine through the fistula is constant, when it originates in the bladder; and it takes place only at the moment when the patient attempts to make water, if it opens into the canal of the urethra. This distinguishing sign is not constant; and we have

several times seen the urine escape through vesical fistulæ, only when the patients endeavoured to make water.

The fistulæ that originate in the kidneys or in the ureters, are entirely beyond the reach of art, unless they are kept up by the retention of the urine in the bladder, or by the presence of an extraneous body in the fistulous passage. The re-establishment of the natural course of the urine, and the extraction of an extraneous body, might in this case, contribute efficaciously to the cure. Here we have not any certain means of preventing the urine from penetrating into the fistula. It is not the same case with fistulæ of the urethra, in which, so to speak, we may make ourselves masters of this fluid. It is especially in these last diseases that catheters of gum elastic have advantages which cannot be appreciated.

When the fistulæ of the bladder or of the urethra are the consequences of a retention of urine that is produced by obstacles in the canal, these obstacles often exist also, and sometimes they have even increased after the formation of the fistula, which, in most cases, renders the introduction of the catheter extremely difficult. We will not recapitulate the manner of conducting this instrument, in order to surmount these different obstacles; having developed it sufficiently in the treatment of each in particular.

It is especially when the fistulæ open into the bladder and towards its fundus, that we must watch with the greatest care that the catheter is not closed by some extraneous body that stops the urine, or that it does not become deranged or escape out of the bladder. Perhaps, in this case, it would be better instead of closing it, to keep it constantly open, so as to prevent all accumulation of urine in the bladder, and the passage of this fluid through the fistula. But when the fistula proceeds

from the urethra, we would not derive any advantage from leaving the catheter open, and the treatment would be rendered more troublesome, and more disagreeable to the patient.

In both cases the use of the catheter must be continued, not only until the fistula is cured, but also until the obstacles that prevented the urine from flowing through the natural passages are destroyed. If besides, there exists any of the complications which we have mentioned under the article of external blind fistulæ, we should have recourse to the means indicated in that article; but most commonly the catheter is sufficient to accomplish the cure. There are, however, certain fistulæ, such as those that go from the bladder into the vagina or into the rectum, which require a particular treatment.

The vesical fistulæ opening into the vagina, and produced by laborious parturitions, are generally attended with loss of substance. The violent contusion, made by the head of the child upon the anterior side of the vagina and the fundus of the bladder, gives rise to gangrenous eschars, whose fall sometimes leaves holes large enough for the introduction of the finger into them, which makes their cure extremely difficult. In the treatment of these fistulæ there are two indications to be accomplished: 1st. To oppose the passage of the urine into the vagina. 2d. To bring together, as much as is possible, the edges of the division in order to favour their re-union.

The first of these indications demonstrates more and more the utility and even the necessity of the catheter. Its introduction is more easy in women; but it is also more difficult to fix it firmly than in men. It is, however, very essential that it should be favourably situated in the bladder, in order to give vent to the urine as soon

as it arrives in this viscus, and that it should be invariably fixed in this place. None of the means hitherto used, appear to us to fulfil this object completely. Threads tied or agglutinated to the hairs of the large labia, are very inconvenient. We cannot thus fix the catheter in an invariable manner, without the threads being stretched, and by a necessary consequence the hairs also, which must cause a kind of pain to the patient, and occasion the catheter to penetrate too far forwards into the bladder. If these bands are not stretched, the catheter may be deranged, and even escape from this viscus. We do not succeed better by attaching these threads to the under straps of a double T bandage; these being stretched or relaxed accordingly as the thighs are in a state of extension or flexion. It is nearly the same case when we fasten the cords of the catheter with sticking plaster to the upper and internal part of the thighs.

Guided by reason and experience, we have seen that we cannot avoid the inconveniencies attached to each of these methods, but by fixing the catheter to a point which will always preserve the same position, with regard to the meatus urinarius. To effect this, we made use of a machine in the form of a truss, whose circle, long enough to embrace the superior part of the pelvis, supports at its middle part an oval plate, which ought to be placed upon the pubis. In the middle of this plate is a groove, in which slides a stalk of silver bent in such a manner that one of its extremities, pierced with a hole, falls above the vulva on the level of the meatus urinarius. This stalk may be fixed upon the plate by means of a screw. After having introduced and fixed the catheter in the bladder, in such a manner that its beak and eyes are found in the lowest part of this viscus, we

must engage the end of this instrument in the hole of the stalk which is moveable in the groove, where it is then secured as was said above. By the aid of this machine the catheter is invariably fixed, without incommoding the patient even during walking.

In this disease we should use catheters whose diameter is large and their eyes well pierced, so that the urine may have more tendency to pass into them than to fall into the vagina. In the first stage of the treatment these catheters should be kept open continually.

To accomplish the second indication, and to approximate, as much as can be done, the lips of the division, which we suppose to be always with a loss of substance, we may introduce into the vagina either a plug of cloth, or a kind of glove finger furnished with lint or a piece of cork, or any other substance approaching the cylindrical form, and spread over either with gum elastic or wax. Whichever of these extraneous bodies may be preferred, it should be large enough to fill the vagina without distending it. In pushing it into this canal, we should try to approximate that edge of the fistula which is near to the neck of the bladder to the opposite edge; then the fistulous opening, instead of the round form which it had, becomes transverse; a disposition which we know to be more favourable to the re-union than any other. This extraneous body has moreover the advantage of closing the fistula in the vagina, and of preventing the urine from falling into it. By following this process, we are able to cure very ancient urinary and vaginal fistulæ, through which we could easily push the finger into the bladder. We think that we ought to observe that the treatment of these fistulæ is necessarily long, and that the cure has frequently been not perfected until the end of six months, and even one year.

When the rectum is opened in the operation for the stone, which may be known, as well by the escape of the fæces through the wound, as by the introduction of the finger into the incision or into the anus, we must not hesitate to divide the parts, that are comprised between the cut for the stone, the opening made in the rectum and the margin of the anus. It is the way to prevent the symptoms that would be occasioned by the passage of the fæces into the bladder, and of the urine into the rectum. This second operation permits these matters to flow out easily, and the cicatrix taking place from the bottom of the wound towards the external part, the patient is cured without a fistula; although this accident is almost inevitable, when this resolution is not taken at first. It is to be remarked that then the catheter is insufficient to perform the cure. This instrument is a good prevention of the urine from penetrating into the fistulæ; but it cannot oppose the entrance of the stercoral moisture, which would keep up the disease. There is here also no other resource than to cut the kind of bridge, that is comprised between the orifices, both internal and external of the fistula, and the margin of the anus, which is performed in the following way.

After having, through the penis, introduced a catheter into the bladder, a grooved sound is entered through the fistula of the perinæum; it is pushed into the hollow of the catheter; then by the aid of the finger, placed in the rectum, we are to conduct the same sound through the fistula that opens into this intestine; then, after withdrawing the catheter, which becomes useless, and substituting for the finger that is in the rectum, the gorget of wood, which is used for the incision of stercoral fistulæ, we are to engage in the gutter of this gorget the end of the sound, and by the favour of its groove we may divide, with a straight bistoury, all the parts

which are comprised between this sound and the gorget placed in the rectum. Then through the urethra we may pass a catheter of gum elastic into the bladder, where it may be fixed. We introduce into the rectum a tent of long lint, which is to be interposed between the edges of this new wound, so as to oppose their re-union, until the old fistulous passages are cleansed and cicatrized. We have several times had occasion to treat fistulæ of this kind, in which we have always followed this process, and it has never disappointed our hopes.

CASE.

Frederic Louis Omet, aged ten years, entered into the Hotel Dieu, on the third of September, 1790, to be treated for a retention of urine, and several urinary fistulæ, which he had in the abdomen.

From the earliest age, this child made water with difficulty. For a long time, a more or less marked impediment to the evacuation of the urine, had been the only inconvenience which he felt. This difficulty increased about his eighth year, and induced his parents to ask advice. After the employment of different means, the introduction of the catheter, which was very laborious, was resorted to; and the medicinal aid was confined to flaxseed tea, as a constant drink. During one year the flow of the urine was easy; but it ceased to be so, on account of a violent blow with the fist, which the child received in playing, upon the right side of the scrotum. The place that was struck, immediately became the seat of severe pain. In a little time after there was a swelling and abscess, and the urine flowed only in a small stream. Nevertheless no attempt was made with the catheter to ascertain the state of the canal; no attention was paid to any thing but the abscess, which followed the usual course, excepting that the pus always remained serous.

The opening, resulting from this abscess, was cured, and the difficulty of passing the urine remained the same.

In a little while after, there appeared in the anterior part of the left lumbar region a tumour, which, having been inflamed and opened, discharged pus, mixed sometimes with a few drops of urine, and was converted into a fistula. After a short interval, there appeared about the same place, but a little outwards, another abscess whose opening degenerated in the same way into a second fistula. At the end of a month a new collection was remarked in the same region, a little below the pubis, and after a like space of time, a fourth abscess, which approached the right lumbar region, and was distant from the crural arch only about an inch and a half. These openings not healing, the hypogastric region presented four fistulæ. At first they permitted some drops of urine to escape; in a little time they afforded more, and at length scarcely any passed through the urethra. The small quantity, that filtered through this canal, flowed only in a very fine thread and by drops, sometimes even by regorgement. The part of the scrotum, which had been the seat of the first abscess, opened again, and produced a fifth fistula.

When the child came to the Hotel Dieu, the fistulæ were extremely narrow, situated in the centre of fungous flesh and surrounded with considerable callosities. This child felt very sharp pains in the whole hypogastrium, and no longer made water through the urethra.

From the inspection of the parts we were induced to believe that the urine could not get to the parietes of the abdomen but by a crack in the body of the bladder; and this conjecture was so much the more probable, as we could not feel the cord, that is directed from the scrotum towards the canal, nor from the side of the rings into the abdomen. We could not, however, reject the

possibility of a crack in the urethra, and so much the rather as there had been a fistula in the scrotum, and in this case the urine might have made for itself different routes from the canal up to the ring on the right side, and be diffused between the parietes of the abdomen, where its stagnation had determined the abscesses which supervened there.

With the view of curing the fistulæ, by re-establishing the diameter of the urethra and the natural course of the urine, Desault attempted to introduce an algali into the bladder. This instrument was very much constricted by the canal as far as the perinæum; however, by using a slight force, it advanced a little farther, but nevertheless did not reach the bladder. The dilatation, effected by the algali, made it possible to introduce, with the assistance of an iron stylet, a small gum elastic catheter, covered with cerate, and which, by means of slight rotatory movements, at length got into the bladder, which was singularly horny. The catheter was secured as usual with cotton threads. The urine flowed through it easily; and it was remarked, that it left a purulent deposit. An emollient cataplasm was applied over the whole extent of the callosities of the abdomen, and flaxseed tea was given as a drink. The course of the urine through the catheter was established from that time, and diminished through the fistulæ. The patient was on that day more tranquil, and did not suffer from the presence of the catheter.

The next day, the pain in the hypogastric region was diminished. On the third day suppuration was already apparent in the parietes of the canal; a mixture of pus and urine passed through the fistulæ; and the callosities, that accompanied them, were already less considerable.

Between the fourth and the tenth day there was nothing remarkable, only the catheter was cleaned on the sixth

and re-introduced easily enough. The dressing and regimen remained the same. The child walked with as much ease as if he did not wear a catheter.

On the sixteenth day all the urine passed through the catheter, excepting a few drops, mingled with pus, that escaped very abundantly through the fistulous openings. A part of the callosities was destroyed, and none remained except at the circumference of the fistulæ.

On the eighteenth day, the catheter becoming loose in the canal, another larger one was introduced almost without resistance. By means of this catheter it was again ascertained that the bladder was narrow, and very sensible at its upper part. The contact of this instrument produced there a sharp pain, which spread itself particularly over the whole hypogastric region. This pain was dissipated whenever the catheter was withdrawn, and when it did not pass farther than the neck. The emollient cataplasms over the abdomen were continued.

On the twenty-first day, there were no more traces of fistula upon the right side of the scrotum. That which was in the left lumbar region, no longer suffered the urine to escape; its callosities were dissipated, and the fungous flesh which before surrounded it was withered. The other fistulæ were not so far advanced; but a very small quantity of urine passed through them, and that only when the child made violent exertions on going to stool.

The twenty-fourth day, the fistula of the scrotum was cicatrized, and no more hardness was perceived there. The urine passed equally well through the catheter.

On the thirty-fifth day, the callosities upon the whole of the right side of the hypogastrium were almost resolved; but a few remained, and even those were very superficial. The fistulæ no longer furnished urine, but

at very distant intervals. The catheter was much more loose in the canal.

On the forty-sixth day, the suppuration of the urethra was nearly dried up, and on the forty-ninth, this canal seemed to be as free as could be desired. At this period, the cure of the fistulæ was very much advanced. That of the left lumbar region, and that of the right side were entirely healed. The two other fistulæ, which occupied the interval of the former, were no longer fungous, preserved only very slight callosities, and but rarely gave vent to some drops of urine. This state remained absolutely the same until the eighty-third day. Occasionally he passed three or four drops of urine through the two fistulæ that still remained; but most frequently there was only a slight oozing of pus. The same treatment was continued. The catheter was cleansed every six days, and secured upon the prepuce, because the glans had become extremely sensible.

Several weeks elapsed without a single drop of urine passing through the two last fistulæ; and on the hundred and twenty-first day, one of these fistulæ, which was situated between the one in the neighbourhood of the pubis, and that of the right lumbar region, was perfectly cured.

The child was in good health, and the dissipation of the callosities was complete on the hundred and forty-fifth day. Three days after, the last fistulous opening was also cicatrized, and the catheter was then withdrawn. The child made water more easily than he had ever done, and in a very large stream. From that period until the hundred and ninety-ninth day, the continuance of this child in the hospital, gave an assurance that the cure was complete, and beyond the danger of any relapse.

Of Bougies.

After having successively treated of the different contractions of the urethra, and the symptoms that are the consequences of them, we have yet to speak of a method of cure, which was almost exclusively adopted by all those who devoted themselves to the treatment of these diseases. Before the discovery of elastic catheters, which is due to the sieur Bernard, we were acquainted with nothing but bougies, to destroy obstacles that were situated in the canal, and we should ourselves have employed them, if catheters had not afforded us advantages, which would be sought in vain in the former.

We may distinguish bougies into simple and compound, and arrange in the first class bougies of leaden thread, those of catgut, and the elastic bougies of Bernard. In the second class should be placed bougies that are demulcent, resolvent, suppurative, detersive, desiccative, escharotic, caustic, &c.

Bougies of lead are nothing but a larger or smaller thread of this metal, passed through the wire-drawer. The thread that is chosen for this use should be perfectly full and without flaws. If it has any defect, there would be reason to apprehend that it might break, and that one of its fragments might remain in the bladder or in the urethra. These bougies have been particularly recommended for varicous swellings of the urethra and of the prostate. It was thought that being specifically heavier than other bougies, they would exercise a stronger pressure upon the cellular texture of these parts, and procure a more speedy cure. This excess of weight might perhaps act usefully, but it is so inconsiderable with relation to the effect to be produced, that it can add nothing to the sensible effect of these bougies. Besides, the inconveniencies that are common to

them with all bougies, their introduction is often difficult, and sometimes even impossible. If the leaden thread is thin, it is too flexible; it yields to the obstacle, and folds upon itself rather than surmount it. If it is larger, it cannot enter into the contracted portion of the canal; it is besides too stiff to mould itself to the curvatures of this conduit; and if pushed with force, it may wound the parietes of the urethra, and make a false route.

The composition of the catgut bougies is sufficiently indicated by their name alone. They are made of different sizes. A conical or pyramidal form is commonly given to them, by thinning one of their extremities, the end of which is rounded, whilst a kind of head is formed at the other extremity, by presenting it to the flame of a candle. These bougies are especially employed in cases where we cannot break through the contractions of the urethra. They are introduced as far as the obstacle, and fixed in the canal. The increase of their size, from moisture, dilates not only that portion of the canal in which they are engaged, but it also extends this dilatation a little beyond, and carries it even into the contracted part of the canal, which permits a new bougie to penetrate farther. By thus advancing gradually it at length gets into the bladder. We cannot deny that here the catgut has many advantages over the other kinds of bougies, and even over elastic catheters. But we may reproach it with being too stiff during the introduction, with causing pain by its too speedy swelling, and with getting so soft as not to be able to be introduced again, when the patients have been obliged to take them out; which circumstance makes it necessary to employ a great number of these bougies. The elastic bougies of the sieur Bernard are composed of a firm tress of hair, impregnated and covered with a coat of gum elastic.

They have not any of the inconveniencies that are attached to the other kinds of bougies. They are sufficiently flexible to yield to all the curvatures of the canal, and we may besides, when they are hollow, give them all the desired curvature, by means of an iron stylet already bent. We may add that their elasticity prevents them from reduplicating in the canal of the urethra, and finally that the same bougie may answer many times.

The medicated bougies are made in two ways. The former, prescribed by most authors, consists in soaking in a plaster composition, pieces of fine and half worn cloth, of which strips eight or nine inches long, are then to be cut, and these to be more or less wide, according to the size which we wish to give to the bougies; and in order that these bougies may be smaller at one of their ends than at the other, the strips should be made narrower at one of their extremities. Two or three lines wide are sufficient for the finest bougies, and we may procure them of different graduated thicknesses, by increasing the width of the cloth by lines to that of an inch, which is sufficient for the largest bougies. These plaster tongues are dexterously rolled between the fingers, then between two pieces of marble until they shall be well united, and no more inequalities perceived.

The second way of making these bougies differs from the first in this, that, instead of strips of cloth, wicks of cotton are used, similar to those that are employed by wax chandlers. To give more strength to these wicks, we may add to them one or two flax threads, and cut off some slips at different lengths, so as to graduate them, and make the bougies finer at one end than at the other. These wicks, thus prepared, are soaked in the plaster composition; they are rolled between two pieces of marble or two planks, till well united; they are soaked

a second time, if necessary; then they are again rolled upon the marble. The extremities are cut, and they are rounded as slender as possible, by lightly rolling them between the fingers.

As to the ingredients of the plaster composition, they differ according to the indications which are proposed to be accomplished. The bougies called demulcent, are made of a mixture of wax, mutton suet and oil of sweet almonds. Plasters of night-shade, hemlock and diabotanum are employed for resolvent bougies. Wax, turpentine and oil are the base of the suppurative bougies. The extract of saturn and white ceruse are found in almost all desiccative bougies. Corrosive sublimate, red precipitate, verdigris, egyptiac ointment, added to some plaster preparations, make the bougies caustic or escharotic. We could not conclude, if we attempted to detail all the formula of bougies, that have been vaunted as specifics for diseases of the urethra. There is no author who has not his particular composition, and to which he does not attribute virtues which he refuses to every other preparation.

The rules that are to be observed in the introduction of bougies, are few and easily executed. Before performing this operation we should ecommend to the patient to make water, if he can, in order that we may judge by the size of the stream of urine, of the size the bougie should have. After soaking the bougie in oil, its small extremity is gradually pushed into the penis, which is to be supported with one hand, drawing it in a straight line, without tightening it too much. The bougie is turned lightly between the fingers, in proportion as it advances. When it has gotten below the scrotum and towards the arch of the pubis, the penis is inclined between the thighs, in order to diminish the curvature of the canal, and we then continue to push in the bougie,

without pressing it with too much force; it is also sustained in its progress by the finger introduced into the fundament. When it is stopped at the perinæum, we sometimes succeed in making it penetrate more forward, by rubbing this part externally with the finger of one hand, whilst with the other hand we push in the bougie, turning it between the fingers.

The entrance of the whole bougie into the canal is not a proof that it has overcome the obstacles. Frequently, when it is pushed in with force, it yields and bends itself in the urethra; and we can seldom introduce it into the bladder at the first trial.

When these trials are fruitless, we must fix the bougie in the canal, keeping it inserted as far as the obstacle; and we must renew these attempts several times in the day; by perseverance we commonly succeed. There are, however, numerous obstacles to baffle the bougies; such as strictures, that occupy almost the whole cavity of the canal, lymphatic tumours and other engorgements, accompanied with hardness and callosities, &c. In this case recourse has been had to caustic bougies; but to what dangers does not their use expose? When we have succeeded in introducing the first bougie into the bladder, it may be replaced by others of the same size, until these pass freely; and for them, we may gradually substitute larger ones, until the natural diameter of the canal is restored.

When we reflect upon the manner in which these bougies act, we perceive that it is only to the compression and irritation which they produce, that we must attribute their success. As compressing bodies, they dilate the urethra, express, if we may so speak, the stagnating juices in its coats, and are sometimes sufficient to dissipate their engorgement. As irritating bodies, they determine a more abundant secretion of the mucus

which is naturally filtered into the canal, and in a little while they excite there a phlogosis, which gives a puriform appearance to this secretion. The heat and vital action are increased in the parts where the engorgement resides; the dissipation and resolution of the humours, that stagnated in these parts, are favoûred by the suppuration of the canal, and by the ulcerations that are sometimes caused by the bougies. The inflammation, in extending itself into the coats of the urethra, produces the adhesion of the leaves of the cellular membrane, withered by the compression; and by this mean prevents the return of the disease, preserving to the canal the diameter that has been re-established by the bougies, whose use has been continued during the whole treatment. If we except caustic bougies, which, from their ingredients, have a determinate action, all others, even the most simple, worn for a certain time without interruption, would produce these effects, and they would always be the same; their pretended specific virtue is only imaginary. Thus, bougies that are called demulcent, are by no means suited to assuage the pains of the urethra; with respect to this conduit, they are always extraneous bodies, whose presence causes irritation, inflammation, &c. We know besides, that the same bougies are successively suppurative, detersive, and cicatrizing. It is true that bougies, formed of acrid and stimulating drugs, have a more severe and speedy action than those which are composed of milder substances; but also, besides the severe pains which acrid bougies occasion, they often excite a considerable inflammation in the canal, succeeded by abscesses along this conduit: which circumstance renders the disease more dangerous, and sometimes compels the surgeon to interrupt the treatment. These accidents are not to be dreaded, when we make use of simple bougies, whose action is more

moderate. However, whatever may be the advantages of these last, they are not near equal to those which the gum elastic catheters promise. To be convinced of this, it is sufficient to compare their different properties with each other.

The softness and flexibility of bougies not permitting them to be pushed with the necessary force, they are sometimes employed for several days, before they can overcome the slightest obstacles; and when these are more considerable, they frequently cannot accomplish it by the most multiplied attempts. When finally we suppose that we are so fortunate as to penetrate as far as the bladder, we are even then obliged to withdraw the bougie every three or four hours after its introduction, that the patient may make water, and it is not rare for the way not to be found again with a new bougie. Besides, the pain and the slavery caused by the necessity of thus renewing the bougies, the treatment becomes very expensive; for the same bougie not serving twice, we must use three or four every day; and it happens too frequently that a bougie is broken in the canal or in the bladder, or that, not having been secured outwards, it may be entirely pushed into this viscus. The pyramidal form, that is commonly given to bougies, renders them more proper for destroying contractions, situated near the neck of the bladder; for the larger extremity of the bougie is employed in dilating the entrance of the urethra, for which there is no occasion, whilst the finest extremity corresponds to the contracted portion of the canal, where the dilatation ought to be exercised.

The iron stylet, with which Bernard's catheters are furnished, by procuring to them a curvature, similar to that of the canal, facilitates their introduction greatly, and by the firmness which it gives them, enables them to surmount the resistances that baffle all bougies.

These catheters, affording a passage to the urine, may remain a long time in their place, and the canal being enlarged by their habitual presence, permits them to be renewed easily. Besides, if we fear finding some difficulty in passing the second catheter, it would be easy to obviate this inconvenience, by making use of catheters open at both ends; we should introduce the first by means of a stylet with a button, and before changing it we should furnish it with a stylet about two feet long, which should be pushed some lines into the bladder; then we should withdraw the catheter upon the stylet, which must be left in its place, and upon which we may thus conduct a new catheter without trouble and with safety. Desault once had recourse to this expedient, for a patient, who could not succeed in introducing the catheter himself, and who made false passages almost every time that he attempted it. This method succeeded so completely, that Desault proposed to have catheters constructed, with which he might often put it in practice. However obstinate the disease may be, three or four of Bernard's catheters are sufficient for its treatment. The texture of these catheters is too firm for them to be broken, and their elasticity prevents them from sinking entirely into the bladder. The cylindrical form which they preserve in their whole length, dilates the canal in all its extent. We may add that they have moreover the advantage of being usefully employed in diseases of the bladder, in which bougies are entirely useless.

This short comparison appears to us sufficient to demonstrate, in the most clear and most certain manner, that we have had strong motives for abandoning bougies in the treatment of diseases of the urinary passages, and for preferring to them the catheters of gum elastic.

Puncture of the Bladder.

In this place we consider the puncture of the bladder, only in relation to the retention of urine. For this operation we refer to the article of operation for the stone, according to the mode of Foubert, Thomas, &c. In treating of the different kinds of retention, we have already said that the puncture of the bladder offering only a palliative aid, it should not be employed until after we have tried all the means that are capable of procuring the evacuation of the urine. We must also then have some hope of soon re-establishing the course of this fluid through the urethra; for if we remained deprived of this resource, the incision of the bladder would be more proper than the puncture. But, as we have observed, there is scarcely any case in which a surgeon, practised in the use of the catheter, cannot penetrate with the algali even into the bladder; from whence it follows that it is extremely rare for the puncture of the bladder to be absolutely necessary. We might cite a great number of cases in support of this assertion. During ten years that Desault was surgeon in chief of the Hotel Dieu at Paris, where diseases of the urinary passages, and especially embarrassments of the urethra, are always very numerous, this surgeon never made the puncture of the bladder but once. This was soon after his entrance into this hospital; and he confessed that if he had then had the experience and skill in the use of the catheter which he acquired afterwards, he would perhaps have spared the patient from being subjected to this operation. However, all surgeons not being so skilful in the use of the catheter as, without exposing to very great danger of making false routes or causing other disorders, to overcome the different obstacles that may be found in the urethra; and the canal being some-

times contracted to such a degree, that neither the presence nor abode of a catheter or bougie, introduced as far as the contraction, can determine any discharge of urine, the puncture then becomes indispensable and urgent, to terminate the symptoms that depend on the retention, and to prevent the rupture of the bladder.

Authors are not agreed with regard to the spot in which the bladder should be punctured. Some recommend performing it above the pubis, others at the perinæum, and others at the rectum. A succinct statement of each of these methods will display the differences, and will be sufficient to enable us to appreciate their just value.

§ I. *Puncture above the Pubis.*

The puncture above the pubis may be made with a straight trocar; but one that is curved is preferable. The curvature of this trocar should be uniform throughout its whole length, and should form the arc of a circle about eight inches in diameter. This instrument should be more or less long, according to the corpulency of the patient. The calibre of the canula should have at least two lines diameter, in order to afford a passage to the glair and to the pus, with which the urine is often charged. The punch, fixed upon a handle of ebony or ivory, should present towards its point three faces united together by cutting angles. It should exactly fill the canula, which is thinned at the end, corresponding to the point of this punch, and soldered at the other end into a circular plate of about eight lines diameter, upon each side of which is a small ring, to which are attached the ribbands that serve to secure it. At two lines from the extremity of this canula, which must be introduced into the bladder, is made a hole, opening into the cul de sac of a gutter grooved along the punch, and intend-

ed to give vent to the urine, for the purpose of informing that the instrument has penetrated into the bladder.

The puncture above the pubis may be made when the patient is standing up, or lying upon the side of his bed. The surgeon, after being assured that the bladder projects into the hypogastric region, immediately plunges above the symphysis pubis the trocar, which he has soaked in oil or smeared with fresh butter, and whose handle he holds in the palm of his hand, taking care that the concavity of this instrument is turned towards the pubis. Instructed by the resistance, and by the escape of the urine along the gutter of the trocar, when it has entered into the bladder, he withdraws the punch, and substitutes for it a second canula of a similar length and size, but whose end, which must be naked in the bladder, is rounded and pierced upon its sides with two elliptical openings, like the common algalis. He then pushes both these canulæ even to the fundus of the bladder; then, after having evacuated the whole of the urine contained in this viscus, he closes the second canula with a small plug of white wood, and secures both by means of small ribbands and a bandage round the body. Besides, these canulæ are not to be suppressed, until we are able to insert through the urethra into the bladder a catheter sufficiently large to procure an easy vent to the urine.

In this puncture it is rare for the linea alba to be directly passed through. We generally pass upon its sides and divide the skin, the aponeurosis of the large muscles of the abdomen, the recti muscles, and sometimes one of the pyramidales, and the anterior side of the bladder.

This operation is easy. The thinness of the parts to be pierced renders its quick, and little painful. To perform it the surgeon has no need of assistance. The

patient is neither alarmed nor fatigued by the position in which he is placed for the operation. It is almost impossible to miss the bladder; or it must be horny, and reduced to the smallest size. Neither have we any more cause for apprehension of penetrating into the cavity of the abdomen. Anatomy informs, that in this place the bladder is applied immediately upon the recti muscles, and that when this viscus is distended by urine, it pushes backwards and upwards the peritonæum, under which it develops itself, and that it thus removes the point of the trocar more and more from the cavity of the abdomen. The patient, by inclining himself upon the side, or upon the abdomen, can easily give vent to all the urine that is contained in the bladder. There are not in this place either nerves or vessels, the wounding of which would be dangerous. No difficulty is experienced in fixing the canulæ, and their presence does not prevent the patient from rising or sitting, nor even from walking in his chamber. The canulæ being pushed as far as the fundus of the bladder, cannot escape from this viscus, whatever may be its contraction or its sinking. The orifice which is left by them, closes and cicatrizes sooner than if the bladder had been pierced in any other place.

§ II. *Puncture at the Perinæum.*

The puncture at the perinæum is performed with a straight trocar, seven or eight inches long, constructed otherwise in the same manner as the trocar for the hypogastric puncture. Some practitioners, however, instead of terminating the canula of the trocar by a flattened edge, have added to it a kind of gutter, twelve or fourteen lines long. It is good also to have a second canula to put into the first.

After having laid the patient upon a horizontal plane, the legs and thighs bent as in the operation for the stone, whilst an assistant compresses the hypogastric region slightly, the surgeon having one finger in the rectum, in order to keep it away from the place where the puncture is made, pushes the trocar into the middle of a line, which, going from the tuberosity of the ischium, would terminate at the raphe, two lines in front of the margin of the anus. He first pushes the instrument, according to a line that is parallel to the axis of the body; he then directs the point a little forwards. Here it is not necessary to push the canula as much forward into the bladder as when the puncture is made in the hypogastrium. The portion of this viscus that has been pierced, not changing its position with relation to the other parts of the perinæum, it is sufficient for the canula to be inserted some lines into the cavity of the bladder to prevent its escaping from it. It would even be disadvantageous for it to be pushed in more; its beak, resting against the posterior side of this sac, would make the patient suffer a pure loss. These canulæ are to be secured to the under straps of a double T bandage.

The parts divided in this puncture are the skin, much cellular membrane and fat, the elevator muscle of the anus, and the part of the fundus of the bladder which is situated upon the side of the neck of this viscus.

In this track there is no part, the piercing of which should necessarily cause accidents. A surgeon, moderately skilful in the practice of this operation, is generally certain of penetrating into the bladder. This viscus is opened in its most depending place,—in a place that always preserves its relation to the perinæum. But the position in which the patient is placed for the operation, is much more fatiguing than for the puncture above the pubis; several assistants are needed to secure him; there

must be one to compress the bladder at the hypogastric region; the vessels of the perinæum may be opened, and the nerves that accompany them be pricked; the point of the trocar, when directed outwards, may slip upon the external side of the bladder; when pushed forwards, it may pass between this viscus and the pubis; and when too much inclined inwards, it may pass through the prostate gland; carried backwards, it may wound the vasa deferentia, the rectum, the termination of the ureters, the vesiculæ seminales; and while the canula remains in its place, the patient can neither walk nor sit; he is obliged to keep his bed. Add that frequently the puncture of the perinæum is contra-indicated by tumours or other affections, which are very frequent in this place, in consequence of retentions of urine.

§ III. *Puncture through the Rectum.*

The trocar, which is used for the puncture of the bladder through the intestine rectum, is perfectly similar to that, which is employed for the hypogastric puncture.

The patient being laid crosswise upon the edge of his bed, should have the thighs and legs bent and separated from each other. The surgeon after having ascertained, with the finger introduced into the rectum and carried as high up as possible, the tumour that is formed by the distended bladder, slips the trocar, whose point is concealed in the canula, upon the anterior part of the intestine. Having reached the end of the finger, he disengages the point of the instrument, and supports it with the same finger against the middle of the anterior side of the intestine, into which he plunges it, pushing the trocar with the other hand, whilst an assistant makes a slight compression above the pubis.

Here we have to pass through only the rectum, and

that portion of the fundus of the bladder which corresponds to it. In this place these viscera are united by a very thick cellular membrane, and always preserve their respective situation to each other. We do not run any risk of wounding the vesiculæ seminales, by taking care to plunge the trocar into the middle of the anterior side of the rectum. The bladder is pierced in the triangular space above the vesiculæ seminales, which, in complete retentions of urine, is situated lower than in the natural state. The operation is safe and attended with little pain.

The canula is situated in a place, favourable to the evacuation of the urine, and its remaining in the rectum is of little inconvenience, especially when we use, as recommended by Fleurant, the author of this method, a flexible canula, which moulds itself to the different inflections of the intestine and yields to the passage of the fæces.

Some practitioners, persuaded that the presence of the canula in the rectum would be insupportable, prefer to withdraw it and to repeat the puncture, if this operation should again become necessary.

But is there no danger in thus multiplying punctures, and would it not be better to leave the canula in its place? The only inconvenience, resulting from its remaining in the rectum, is that of being a cause of slovenliness, of requiring much care when the patients go to stool, and of keeping them in bed. Besides, excepting a considerable swelling of the prostate gland, very large hemorrhoidal tumours, and carcinomata of the rectum, there are few cases in which we cannot make the puncture of the bladder through this intestine.

We have stated separately the different methods of puncturing the bladder, in order that our readers may compare, judge and decide for themselves, which is

preferable. To influence the choice, we cannot here support ourselves by authorities; each of these methods has had men of the greatest merit, for its advocates. In the Surgical Journal we find two memoirs; the one in favour of the hypogastric puncture by Noel, surgeon in chief of the Hotel Dieu at Rheims, the other by Hoin, surgeon at Dijon, a zealous defender of the puncture through the perinæum. These two surgeons, estimable from their knowledge and their love for the art which they profess, support their opinions by many cases, in which the method adopted by them has perfectly succeeded. But has not the puncture through the rectum also been successful? Dionis, Heister, Bertrand, Bell, &c. do not recommend any other process.

We may also leave to the choice of young practitioners these three different ways of puncturing the bladder. We do not find an essential fault in any of them, and we are persuaded that they must all succeed in the hands of a skilful man. However, we believe that the puncture, above the pubis, is most easily performed and least painful to the patient. Some cases inserted by Noel, in the Surgical Journal, will come in support of this assertion. We cite these cases, because Desault scarcely ever had occasion to perform this operation.

CASE I.

A man, aged sixty years, subject to a difficulty of making water for many years, and accustomed to introduce bougies himself into the urethra, could not accomplish it one day. The different attempts which he made, on the contrary, brought on a total suppression of urine. Immediately the means used in similar cases, such as bleedings, semicupium, drinks, were employed, but without success. Neither the algali of silver, nor that of gum elastic, being capable of being introduced

into the bladder, it was determined to send for me. When I arrived the lower region of the abdomen was so tense, and the pains about the kidneys so violent, that I thought it my duty, without longer delay, to have recourse to the puncture. To proceed to this I caused the patient to stand up, resting against the edge of his bed, and supported by one assistant on the right hand and another on the left; then I plunged a curved trocar, about four and an half inches long, into the bladder, immediately above the symphysis pubis. As soon as the punch was withdrawn from within the canula, the bladder, which was extremely full, emptied itself with more facility than if it had been through a sound urethra, and the patient assured me that he had felt very little pain. I closed the orifice of the canula with a small cork stopper, and kept it in place with a little band, which made a turn round the body. I covered the whole with a napkin, folded in three, passed under the kidneys and fixed upon the side by three cords. To prevent the derangement which this napkin might occasion at the stopper, and the projecting end of the canula, I surrounded them with a small collar or ring of cloth, about two inches in diameter and one inch thick. When the patient was desirous to make water, he untied the three cords of the napkin, took the stopper out of the canula, and inclining himself a little to the right or left, he discharged his urine without the least difficulty.

From the first day I remarked a tension in the perinæum. It communicated itself to the scrotum. The tumefaction became considerable, and in eight days it was terminated by a gangrenous abscess, which, as soon as I opened it, discharged almost a pint of putrid suppuration. At least half of the scrotum became gangrenous: the testicles being drawn up a little towards the rings, the rest of this sac was sufficient to cover them.

The principal symptoms were no sooner dissipated, than I attempted to introduce a small bougie of gum elastic into the urethra. Although I did not perceive a great resistance, I was not willing, however, to use too much force at first. The next day I got the bougie into the bladder and did not withdraw it, for two hours. From that time the urine began again to flow a little. During nearly a month I repeated the same manœuvre every day, taking occasionally bougies of a much larger diameter and leaving them a longer time in the urethra. When I saw the urine escape easily and in full stream, I withdrew the canula, and in two days the wound was entirely closed. I might have taken it away sooner, but as it did not at all incommode the patient, and as he could go in and out of his chamber, I thought that I ought to keep it in as long a time as was necessary to destroy all the obstacles of the canal. From that time this person had no recourse to bougies, without the use of which he had not passed a whole month, for several years.

CASE II.

On the 20th of May, 1790, I was sent for to the street Perdue, on account of M——, a manufacturer, aged sixty-seven years, attacked with retention of urine. Three days before a surgeon had introduced a silver algali and had got it into the bladder, with the greatest difficulty. As this algali, which was left in the place, incommoded the patient much, he had only withdrawn it on the morning of the day I was sent for, with the intention of substituting another of gum elastic. Before the introduction of this new catheter, he wished to be certain if the patient absolutely needed it; and in consequence, he waited until evening to see if he would not make water without this assistance. All the efforts which the patient made, and all the means that were employed

in the course of the day, having been fruitless, it was necessary to attempt the introduction of the catheter again; but at this time, in whatever manner it was attempted, it could not be got into the bladder. It was then that I was informed of it, and that I proposed the puncture as the only means of cure. The bladder was extremely tense, and the pains so sharp, that the patient, far from opposing it, begged me to do it as quick as possible. It was done immediately in the same manner, and with the same ease, as in the preceding case. There was no difference except in the treatment. Instead of leaving the silver canula during the whole disease, I drew it out at the end of twelve days, and in its place I introduced without the least difficulty, one of gum elastic, which was changed every ten or twelve days to prevent its obstruction or injury. At the same time I was employed in destroying the embarrassments of the canal. At the end of the seventh week, the urine passing tolerably well through the urethra, the canula was not introduced any more; and five days after, by means of slight and constant compression, made with a bandage round the body, its orifice was entirely closed, and the patient completely cured.

CASE III.

M. P—, a bookseller, aged sixty-six years, had passed his urine with much difficulty for more than twenty years. In 1773, for the first time it was totally suppressed; but a bleeding and some bathings caused it to re-appear. From that time its evacuation had always been very slow, and the fineness of the stream demonstrated that there was a considerable contraction in the canal. On the first of July, 1791, the urine was suppressed again. About seven o'clock in the evening M. P. sent for his surgeon, who bled him, had him put into

the bath, and advised some drinks for him. All these means having been unsuccessful, and the pains considerably increased during the night, the surgeon was recalled. At this time he attempted to introduce an algali, and as he could not get it into the bladder, I was sent for. The hypogastric region at this period was already extremely tense, and pains were felt along the course of the ureters and in the kidneys. With a very slender algali of gum elastic I made some slight attempts, but they were as fruitless as those of my colleague. We contented ourselves with directing him to drink nothing but by spoonfuls, and to take the bath again. Perceiving, if this last did not succeed, that the puncture was become indispensable, I announced it positively. The patient not refusing, and the attending surgeon agreeing with me, the hour was appointed. When we came, we found no other change than an increase of the symptoms; consequently the operation was performed immediately, in the manner described in the preceding cases. Nothing particular occurred in the course of the treatment. A canula of gum elastic, four inches and a half long, was substituted on the thirteenth day for that of silver, which had remained in the place since the operation. Every ten or twelve days it was boldly changed, after previously emptying the bladder; a thing which I had not dared to do in the first case, because I supposed that the bladder, in emptying, would abandon the internal side of the hypogastric region, in order to redescend into the pelvis; and that in consequence of this displacement, the orifice made in the bladder might no longer be found directly opposite to that of the abdomen, which would necessarily render the re-introduction of the canula almost impossible, and moreover would expose the patient to a dangerous effusion. It was the great quantity of tartar, which I found

both on the interior and exterior of the canula in the first case, when I withdrew it at the end of six weeks, that induced me in the second operation, to hazard the changing of the canula: the ease with which it was done, encouraged me, and made me conjecture that some days after the operation, the bladder contracted adhesions with the internal and inferior side of the abdomen, which placed this part out of the danger of any effusion. The embarrassments of the urethra were so well destroyed by means of bougies, that the patient actually made water almost in a full stream. To obtain a complete cure, about seven weeks were necessary, only two of which were passed in bed; during the other five, M. P. generally got up to attend to his business.

La Boutonnière.

From reading authors both ancient and modern, it is difficult to form an accurate idea of the operation of *la boutonnière*. It is performed in so many different ways, and the operative processes exhibit such contrariety, and so little resemblance, that we cannot contemplate this subject under any general point of view. The parts that are divided, differ according to the place where the operation is performed, and this place cannot be determined except by the nature, and especially by the seat of the disease. Sometimes only a single incision is made in the canal of the urethra, as in the operation for the stone by the great apparatus; sometimes the incision is prolonged as far as the neck and body of the bladder; and sometimes only the body of this viscus is attacked, as in the operation for the stone by the lateral apparatus. It is therefore only by the separate consideration of each of these methods, that we can form a clear idea of the operation of *la boutonnière*.

The same process is not always followed in performing *la boutonnière* upon the canal of the urethra. When a staff can be introduced into the bladder, we may make use of this instrument to perform the incision of the canal upon its groove, and to conduct a gorget which may serve to facilitate the introduction of the canula that is intended to remain in the bladder.

In this case the operation does not present more difficulty nor more danger, than the incision for the stone by the great apparatus; but also it does not offer any advantage in the treatment of retentions of urine; for since a staff could be introduced, it would have been equally possible to pass a catheter, which would have served for the evacuation of the urine, and by its presence would have re-established the liberty of the canal.

When we cannot succeed in introducing the staff, the operation becomes much more embarrassing. Some practitioners advise to open the urethra upon the beak of this instrument carried as far as the obstacle; then to seek through the wound, with a grooved and blunt sound, for the natural opening of the canal; to push this sound through the contraction, and then to divide the contracted portion of the urethra, in order to convey a canula into the bladder by means of this incision.

Here we have a right also to make the same objections as in the preceding case, and to say that since through the wound which has been made, we have been able with a grooved sound to surmount the obstacle of the canal, we ought in like manner, with a little patience and dexterity, to succeed in introducing an algali through the urethra; for the introduction of the one ought not to be more difficult than that of the other. We ought even to be less certain of finding again the natural passage with the grooved sound, carried into a

wound that is deep and bathed with blood, than of not losing it with an algali introduced through the urethra, sustained and incessantly brought back by the parietes of this conduit in a suitable direction. Thus, it has often happened, that even men who have enjoyed a high reputation in surgery, have commenced this operation, and have not been able to finish it.

Other practitioners, more bold, not being able to find the canal of the urethra with this grooved sound, have not been afraid to plunge according to the direction, and through the contraction of the canal, a trocar, which they have pushed even into the bladder; then by means of a groove made upon the canula of this trocar, they have divided the parts which were pierced, and have conveyed a canula through the wound into the bladder.

The slightest reflection is sufficient to make us perceive that this process presents nothing but uncertainty and dangers. It is very rare that a false route is not made with the trocar. Now, can we hope that the artificial passage which has been opened, and which we strive to keep open by the presence of a canula, will not contract itself sooner or later, and bring back the disease?

Besides, do we not run risks by making a false route, of wounding the ejaculatory canals, of opening the vesiculæ seminales, of piercing the rectum, of penetrating into the bladder, and of producing many other accidents more or less severe?

When urinary fistulæ exist in the perinæum, it is proposed to follow another process in the operation. This process consists in introducing bougies through one of the fistulæ, until we shall be able to make them penetrate into the canal, and from thence into the bladder; then to substitute for these bougies a grooved

sound, and by the aid of this sound to divide all the parts that are comprised between the fistula and the neck of the bladder.

It has also been advised to remove on both sides, the hardness and the callosities which usually accompany these kinds of fistulæ, and thus to make a wound with loss of substance.

This operative process does not appear to be very rational. The incision being made beyond the obstacle, and situated between the contraction and the bladder, by no means touches the cause of the disease; and to obtain a radical cure, we must always return to catheters introduced through the urethra, in order to destroy the obstacle which was the first cause of these fistulæ. Besides, the excision of these callosities is scarcely ever necessary; they would be dissipated and destroyed of themselves, as soon as the urine should cease to pass through the fistulæ. The excision, far from hastening the cure, often does nothing but retard it. We know from our own experience, that the disgorgement of parts is not more speedy when the callosities are cut, than when we are contented with placing a permanent catheter in the urethra. The continual presence of this instrument in the canal is more powerful and more efficacious than the most celebrated resolvents.

Finally, *la boutonnière* is sometimes performed immediately upon the body of the bladder, and without touching the canal of the urethra, as happens when the fistula that is cut, originates directly from the fundus of the bladder. But the operation performed in this place, is not more advantageous than in any other. The patient will not be cured without a new fistula, unless we can re-establish the caliber of the urethra by means of catheters, and this method alone would be sufficient, and would perform the radical cure.

The name of *la boutonnière* has also been given to the opening of abscesses situated in the perinæum, because it has sometimes happened that, through the crack of the canal, a canula has been conveyed into the bladder; but this canula is perfectly useless; being placed beyond the obstacle, it cannot be of any service to the re-establishment of the natural passage of the urine.

This short statement is sufficient to enable us to appreciate the operation at its just value. The progress of art in the treatment of the diseases of the urinary passages, has already almost banished, and will one day entirely banish, this useless operation from the practice of surgery.

ANATOMICAL OBSERVATION

Of a complete Prolapsus Uteri, with a retention of Urine in the Bladder and in both Kidneys.

IF the anatomical observation which I am going to describe, presented no more than a complete prolapsus uteri, I should have declined the task, as it would only be adding to the number of analogous facts, which have hitherto tended only to show the deplorable condition resulting from the fastidious modesty of some females, or the unskilfulness of those to whom they have been confided. But the concomitant affection of the urinary passages has induced me to add it to the memoirs forming a supplement to this work, in which there is nothing of the kind recorded.

An unusual anatomical variety will enhance the importance of the observation: there being in each side two ureters perfectly distinct and separated by a considerable space, even at their origin in the pelvis of the kidneys. In the beginning of last Thermidor, I observed this extraordinary conformation in one of the bodies brought to the Anatomical Theatre. I have obtained no information of the symptoms the woman laboured under who was the subject of this observation. The inspection of the body presented the following appearances.

Exterior to the vulva there was an oblong tumour formed by the vagina being inverted, terminating in a transverse opening, the orifice of the uterus.

A considerable ulceration, probably occasioned by the trickling of the urine on the surface of the tumour, led to the opinion that the patient had been afflicted with the disease for some time; nevertheless, the mucous membrane of the vagina still preserved nearly its natural aspect, though in similar cases, by exposure to the air, it looses its natural velvet and resembles the common integuments.*

* I take this opportunity to record an important fact in the history of mucous membranes. About a year ago, I saw a woman who had a complete prolapsus uteri The membrane of the vagina differed but little from the skin: it was remarkable that whenever the woman sweated, an abundant exhalation was distilled from the surface of the tumour. She could not inform me whether this phenomenon occurred in the beginning of the complaint; which would have been a pretty conclusive fact, as regards the exhalation from mucous membranes. It is well known that physiologists are not agreed respecting this exhalation, some believing that what is called the pulmonary exhalation is no more than the mucous fluids, the lining of the bronchia dissolved in air; since the existence of the gastric fluid, as poured into the stomach by a particular order of vessels, is far from being demonstrated; and since the intestinal fluid admitted by Haller, and which he supposed likewise formed by exhalation, is in the opinion of very accurate physiologists, only the mucus of the intestines. Moreover they do not consider it so abundant as Haller imagined.

I do not know that it necessarily follows that in the woman, who is the subject of this note, the exhalation occurred from the time the tumour first appeared; it is sufficient that it took place at the period when I made the observation. The mucous membranes might perhaps not be capable of presenting this phenomenon, till they had acquired a greater resemblance in character to the skin.

It ought to be kept in view that this conversion of the mucous membranes is only apparent, for in their most natural state, their structure has great analogy with that of the skin; while if the exhalation be considered as a new phenomenon, the development of vessels fitted for its production must be admitted. It appears to me more correct to suppose that the exhalation constantly occurs from the mucous membranes, and that it does not appear as on the

The upper part of the tumour was separated from the labia pudendi, by a cul de sac or shallow furrow. In front the clitoris and meatus urinæ were seen, and perfectly natural. Through the parietes of the vagina the uterus was felt, of its usual size and perfectly sound.

The state of the urinary passages was as follows. The bladder was greatly distended, projecting above the pubes, and filling almost the whole pelvis, but not otherwise altered in structure. The ureters, two on each side, as already related, were distended to the size of the little finger, and passed separately into the bladder. The pelvis was so enlarged as to resemble cysts connected with the corresponding kidneys, the latter presenting no traces of disorganization.

On sounding the urethra I was confirmed in the opinion I had formed. Its direction was evidently changed, being vertical to the posterior portion of the symphysis pubis. Hence it is easy to conceive how the retention of urine was brought on, which was no doubt gradually formed, and at last occasioned the death of the person: it is very probable that by the introduction of the catheter, which the woman must have refused, death would have been prevented.

skin, because it is mixed with the mucus which lubricates the surface of these membranes; whence it will be easily understood why in proportion as they assume the character of the skin, the secretion of mucus is diminished, and the exhalation becomes more sensible.

MEMOIR

ON THE

Organization of Uterine Polypus, and the application of this knowledge to practical Surgery.

ON a superficial view of the history of medicine and of surgery, we are struck with the irresistible impulse which directs men of talents alternately to each of these sciences; and that the most commonly from the unforeseen appearance of those characters, whom nature has created as guides to the mass of mankind. But it would be an error to imagine that, while one is the favourite object of attention, the other must decline: these two sciences are too intimately connected not to exert a reciprocal influence, and mutually to impress strong marks of their progress. Of late years, advancing by rapid strides towards perfecfection, surgery seems to have checked the extravagancies to which medicine was blindly conducted by the spirit of system and hypotheses. At present the latter, in its rapid progress, permits surgery to collect from an abundant harvest, and to stamp a value on its own particular productions.

I. *Preliminary Reflections.*

Hitherto practitioners have confounded, under a common denomination, many affections essentially distinct.*

* In surgery, as in medicine, the names of many diseases might be advantageously reformed. This reform, seemingly confined to

Without adverting to the absurdity and incorrectness of its etymology, the term polypus has been applied to various excrescences from the pituitary membrane, and to tumours with a narrow base growing from the inner surface of the uterus or vagina; again, have they not distinguished among the latter the true polypus from the fungous growths, from the mucous membranes. The latter, to which Levret, and after him Herbiniaux, have given the name of *vivaces*, are certainly more analogous to the polypus of the nasal fossæ, since they affect the same system* with the uterine polypus. From observations which

the nomenclature, is nevertheless indispensably connected with what is unquestionably more important, the classification of these diseases. Among many others I shall select aneurism. Do not the ideas lately acquired warrant some changes in the distribution and designation of this disease? The following I have adopted in my course of operations. I form a particular order of reflections on the suspension of hemorrhagies, and here are naturally classed those of the great blood-vessels (primitive false aneurism). I next treat of the other diseases classed among aneurism, and designate them in the following manner. 1st. Arterial tumour from dilatation (true aneurism). 2d. Encysted arterial tumour (consecutive false aneurism). Venous dilatation from communication with the artery (varicose aneurism). I leave to the decision of others whether this change corresponds with the generally acknowledged condition, and whether it is not preferable to those proposed by Messrs. Deschamps and Briot.

* The advantage of considering in medicine local diseases, according to the system they affect, is now generally admitted. On the one hand we see inflammation a common disease of all our organs, evidently differing in each, and consequently presenting a variety of modifications of importance to be ascertained, and which are directly opposed to the generally received hypotheses. On the other hand, we observe each system susceptible of diseases peculiar to itself. I am aware that, more steady in its progress, and less uncertain in its conclusions, surgery does not so imperiously require the same rigorous plan of study; nevertheless, at the present period it will not be improper to subject it to the same general laws, and to

I shall soon explain, I restrict the latter denomination to that species of organic affection of the uterus, which is the subject of this memoir.

If Levret has justly acquired great reputation by advancing first in a path hitherto unknown, (I mean in passing the ligature round the polypi in the internal surface of the uterus,) he has given us no anatomical details, such as might have been acquired by examining the bodies of women who have died of this disease. Those who have followed have been charged with the same indifference; or more probably, for want of favourable opportunities, their writings present the same void.

To this want of exact acquaintance with the nature of this disease, we must attribute Levret's attempts to exclude all distinction between them and moles; though the latter, as is well known, are the effects of false conception. It is from the same want of precision, that authors and practitioners, have admitted as uterine polypi only those which appear on the internal surface of the uterus or of the vagina. I shall, however, shortly show that tumours perfectly similar may appear on the external surface

the same general principles, founded on the improvements in anatomy. Thus, to speak only of the mucous system, for which I take the liberty of making this digression, is it not obvious that fungous tumours constitute a disease to which it is alone subject? And are we not led to refer it to the same order, in whatever organ they may be seated, whether the nasal fossæ, larynx (Desault), the meatus auditorius, the bladder, the cavity of the uterus, &c. These tumours belong exclusively to the mucous membrane, and have been denominated in some places polypi, in others fungi. If the first appellation be restricted to the disease which is the subject of the present memoir, and the second be applied to the excrescences of the mucous membranes, still it would be necessary not to confound them with other tumours termed fungus, but having no affinity to those I have mentioned of this class, are those which appear in the substance of the dura mater.

of the uterus, or even in the very substance, without being marked, it is true, by any specific character, and without affording any other indication of their existence, than the infinitely varied phenomena and symptoms which accompany the other organical affections of the uterus, such as a dull fixed pain in the hypogastric region, extending down the thighs; irregular menstruation; sometimes its suspension; more frequently, and especially about the change, excessive and repeated discharges, soon followed by marasmus, œdema of the lower extremities, ascites, &c.

For the illustration of this subject, every thing may be expected from the astonishing progress made in morbid anatomy, a career no sooner opened than explored by the spirit of observation, and which, pursued with zeal latterly in the Charité and the Hotel Dieu of Paris, by men whose fame is proclaimed by greater eloquence than mine, promises, amidst the great advantages obtained by medicine, the happiest application to surgery.

The interesting course delivered by Bichat, has furnished me with the principal materials for this memoir. I have disposed of them in the order that follows, adding some particular remarks.

II. *General appearance and structure of Polypi of the Uterus.*

Whatever may be the appearance of the tumours in question, which I shall examine in the following article, they all possess similar organization. We cannot positively assert, that in the substance of the uterus, there may not be formed tumours or diseased productions other than those I shall here describe. Perhaps, indeed, future observation may afford this information. To the present time, at least, the great number of specimens presented by the inspection of the dead body, authorizes us to ascribe a perfect identity of structure to all the polypi of the

uterus; at the same time, it permits us to class along with them other tumours, sometimes projecting from the external surface of this organ, sometimes formed in its substance, of which polypi, strictly so called, appear to be rather rare modifications. I shall here explain this structure, designedly omitting the peculiarities of each species.

All these tumours are extremely firm, resistant, infinitely variable in volume, from the size of a hazel nut to that of two fists. In the greater number, we observe on the exterior surface slightly elevated tubercles, a fallacious indication of their division into lobes. In fact, on the inner surface, no trace of such partition can be observed, their texture being perfectly even. On cutting them, they yield with difficulty to the instrument, are of yellowish colour, appear fibrous, the texture very dense, and the fibres interwoven in all directions, forming a kind of spongy body, in the cells of which is contained a soft substance, its nature unknown, but which, without diminishing the resistance of the texture, appears to render it more pliable.

The light reddish tint would indicate the existence of blood-vessels, supposed to be necessary for the development of the tumour, though not demonstrated by dissection, and which are consequently very minute and delicate. Levret, however, states, that he saw an artery of pretty considerable diameter in the center of a large polypus extirpated by the ligature.

It will be readily conceived, that the extreme minuteness of the nerves of the uterus will prevent their being traced into these tumours, even on the supposition of their being continued. I say on the supposition, for it is well known, that the vessels extend their ramifications into the middle of the new organized substances, which may be formed in our organs, though the nerves have never been detected.

Levret, whom I have just quoted, has compared with tolerable correctness, the substance of uterine polypi, which he had examined after extirpation, to that of a boiled cow's udder. If we compare it to any known organ in the human economy, there is none in which the resemblance is more striking than in the intervertebral substance, especially of old people. There is, in fact, the same degree of resistance, pretty uniformly the same colour. Polypi have sometimes, from age, a tendency to become cartilaginous, another feature which strengthens the supposition of their fibrous nature. In other respects, I am not disposed to admit a perfect similarity between them and the substance with which I have compared them. In the intervertebral substances, the fibrous laminæ are regularly concentric; but in the polypi, on the contrary, the minute fibres are so interwoven, that their course cannot be detected. The texture of the latter is the same throughout. The intervertebral substances insensibly lose the fibrous appearance in proportion as we advance towards the centre. Moreover, the action of chemical re-agents on these substances dissipates the idea of similitude which had been formed on a superficial examination; for when plunged in the concentrated nitric and sulphuric acid, the intervertebral cartilages coagulate and become more dense. The substance of the polypi is completely and more rapidly dissolved than we should at first suppose.

The marks of organization in the uterine polypi which I have just described, are never wanting in any of these tumours. They have been confirmed by eight or ten specimens, collected by Bichat at the Hotel Dieu, some of which I had engraved agreeably to his views, to give an idea of their various modification, in respect to external form. Four shown to me by M. Mysten, one of the assistant anatomists in the medical school, presented the

same characters. The only specimen contained in the museum belonging to this institution, and which M. Thyllaie very politely permitted me to inspect, in no respect differs from the foregoing.

III. *Different forms and appearances of Uterine Polypi.*

From the preceding details, it will be perceived, that I make an essential distinction between the fungous tumour of the inner surface of the uterus, which are the mere excrescences from its mucous membrane, and polypi, or to speak more correctly, the tumours which I have expressly designated by the term; and which are truly the result of new substance formed in some part of the texture of the uterus, to which they adhere, and of which they constitute a particular disease. It will likewise be observed, that I have not restricted the appellation of polypus, to those tumours which project from the cavity of the uterus, connected to its surface by a larger or smaller pedicle; but that I have extended it to all others, wherever situated, provided they present the characters of organization described above.

In consequence of this extension, I have ranged polypous tumours* of the uterus in three principal classes, according to their respective situations.

1. Some proceed entirely from the cavity of the uterus or the vagina: these are polypi, strictly so called. Most commonly pear-shaped, they are fixed to the spot whence they arise, by a pedicle generally proportioned to their size, though the contrary is sometimes observed. These tumours, smooth and polished on the outside, are covered

* To prevent mistake, the term polypous tumours might indicate the disease in general, restricting that of polypus to the tumours projecting in the uterus. I shall give an example in the course of this memoir.

by the mucous membrane, which is unaltered, and under which they have been formed undoubtedly in the cellular texture between this membrane and the fleshy substance of the uterus, or perhaps even on the internal surface of this latter substance. These are the only polypous tumours hitherto known; they have been viewed and described in all their relations with tolerable precision, by authors, so that they need not engage our attention. I shall only mention as one of their essential characteristics, the tendency they have by the increase of their bulk, to pass into the vagina, and even to project through the vulva from whatever point in the cavity of the uterus or of the neck of this organ to which they may be attached.*

Among the specimens which I have noticed above, there were three of this first kind of uterine polypi. One presented the following peculiarities: the tumour of a great size, instead of descending into the vagina, had ruptured the upper and posterior part of this canal, and was embedded between it and the rectum. In all instances, the fleshy texture of the uterus remains unaltered.

* On this subject there is nothing satisfactory. Levret has stated, that hemorrhage as a symptom of uterine polypi never occurs in those fixed at the cervix uteri. He adds, that when it accompanies the polypi of the cavity of this organ, it occurs only after they project through the orifice, and that then it is owing to the compression of the vessels of the pedicle leading to a rupture of the capillaries. Daily observation invalidates the two first propositions, and the third, it is obvious that a mechanical condition in a phenomenon observable in other cases, when such an explanation is evidently inadmissible, must fall. Besides, it is too directly in opposition to the known laws of our economy, and the phenomena of diseases, to require a refutation. I shall only remark, that Levret is inconsistent, since in another place he states, that the ligature applied to the pedicle of some polypi has stopped the hemorrhage instantly, and as it were by enchantment.

2. Other polypous tumours appear on the external surface of the uterus, projecting into the abdomen: they differ from the preceding by the following characters: 1st. They are for the most part numerous, and then each is of no great size. In one of the four specimens which I might cite, as having this general disposition, th little tumours are ten or twelve in number. Nevertheless, there are instances where a single one of considerable size has occupied this position. Bichat, before he was connected with the Hotel Dieu, had observed a case of this kind in one of the wards of this hospital: the woman had died of extensive ascites.* 2d. In all these instances the tumours have no well defined pedicle; their base is always more or less extended, doubtless because passing upwards into the abdomen, they do not drag the part to which they are fixed, as happens in the first species in which the pedicle appears purely accessary. 3d Lastly, the peritoneum under which they are found, covers them but im-

* Here it is seen, as in many analogous instances, that the contiguity of diseased parts, or mere vicinity, greatly affects the production of dropsies in organic diseases: it would be difficult to prove that this continuity was not the sole cause. I observe, in fact, that, in uterine polypi, ascites rarely accompanies those of the second class. It is very unusual to observe it in those of the third: in the first it is never an attendant symptom. Viewing the other principal organic disease, I observe that the aneurism of the heart are most commonly followed by hydrops pericardii, seldom by hydro thorax: that the latter is more peculiar to chronic diseases of the lungs. It may be asserted, that in diseases of the organs, 1st. The cellular texture is always affected sympathetically, and that of all the symptoms in which a manifest exhalation and absorption exist, it is the most readily affected by chronic diseases. 2d. With respect to secondary dropsies of the serous membranes, those which occur in membranes distant from the part affected, are evidently sympathetic. The others seem to be occasioned by the contiguity or vicinity of the injured organs, without our knowing the mode in which this influence is exerted.

perfectly: it appears to be merely raised by them, but without being closely united, as the mucous membrane on the contrary is to those of the first class.

In other respects, not the slightest difference interiorly; on the contrary, every thing indicates the most complete resemblance to the other polypous tumours.

3. Another disposition, more frequent than those I have mentioned, is, that these tumours are observed to be seated in the very substance of the uterus. In these cases they pretty generally acquire a large size, without manifestly affecting the organization of the texture, in the midst of which they are formed. They appear as it were encysted, and externally have tubercles, the more striking as they are not invested with a particular covering such as the preceding tumours receive from the mucous membrane, or the peritoneum. Lastly, they may, according to their size, form a greater or less elevation of the external or internal surface of the uterus. But this elevation, which occurs through part of the parietes of this organ, is never so circumscribed, nor so well defined as to resemble the polypi, or the tumours which naturally project into the abdomen.

IV. *Application of the preceding opinions to the practice of Surgery.*

Since the observations recorded by Levret, and others, of the successful application of the ligature for the radical cure of the polypus of the uterus, it has been indiscriminately advised to employ it in all those observed in the uterus or in the vagina, after having protruded through the cervix uteri, or what is more rare, beyond the vulva.

This precept ought undoubtedly to be adopted, if these polypi existed always alone; I mean if with them other polypous tumours were never found, which, inde-

pendent of the impossibility of ascertaining them, are beyond the reach of art, and consequently incurable. But this independent existence of the polypi, strictly so called, is very rare; more commonly, on the contrary, other polypous tumours co-exist, whose presence is an evident obstacle to the success of any operations which might be attempted on the polypi.

In the four specimens which I have noticed when describing the character of the polypous tumours of the first kind, there is but one in which the polypus exists uncombined, and consequently might be tied with advantage. In the others it is connected with tumours of one or other of the two last kinds. I shall relate the history of one of the women in whom these specimens were discovered; being complete, it is the more interesting, and may give an idea of the progress of the disease, and of the circumstances influencing its formation, at the same time that it will present a case in which all curative efforts were ineffectual.

Mary Besier, a native of Paris, aged forty-six years, on her entering the Hotel Dieu last Pluviose, had the menstrual discharge when eleven years of age. From that period she had enjoyed good health, and was of a strong constitution. Impelled by an extraordinary propensity, she gave a loose to the passion of lust. In the year 8, catamenia more abundant than usual, and preceded by some alarming symptoms, followed by greater irritability, and a slight degree of melancholy. In the month of Nivose, in the year 10, she had a profuse discharge, accompanied by darting pains in the groin, pains in the loins and violent colics. After a few days the menses stopped, and soon returned; the latter circumstance seems to have been occasioned by the frequency of coition. Notwithstanding the deplorable condition of this unfortunate woman, rest, and a strict attention to her diet, which

she enjoyed in the Hotel Dieu, repaired her condition. She soon went out, though not restored to health; and being, besides, subject to a mucous discharge from the genital organs. A fresh discharge of the catamenia obliged her to return about the end of Germinal. From that time, the appearance of a variety of alarming symptoms, the consequence of the disorder in the functions, indicated the near approach of death: she expired on the 27th of Floreal, terribly convulsed, a few days after the existence of polypus in the vagina had been ascertained by the touch. The examination of the body confirmed the presence of this polypus, which adhered to the os tincæ; but besides this, a tumour of the same kind was discovered in the substance of the body of the uterus in the anterior parietes.*

What benefit could have been obtained by the ligature in this instance? Certainly none; for if it had succeeded in removing the tumour which projected into the vagina, the other, which was only ascertained on the inspection of the dead body, and supposing its existence ascertained during the life of the person, was beyond the reach of art; this other tumour, I state, must have destroyed the patient. This reasoning, founded on positive facts, will apply to all cases of a similar nature, the number of which is unfortunately much greater than of the cases favourable to the success of the operation. Nor ought we to be guided in our hopes from the ligature merely by the greater or less facility with which it may be performed, but rather by the projecting tumour being single, or in combination with others whose situation renders them inaccessible. In fact, we cannot really conceive it possible to cure only the polypi, strictly so

* This short account is extracted from a very detailed observation communicated to me by Bichat.

called, when they are alone; for by the ligature the disease may be completely removed, and the woman even at rather an advanced age, rendered capable of procreation, as Levret has recorded some cases. But how shall we determine by the symptoms, whether the polypus is single, or whether, on the contrary, one or more polypous tumours exist at the same time. Experience has not yet taught us this, yet I think we shall probably obtain this information. I am inclined to believe that ascites, considered as the consequence of the present organic affection, never accompanies the polypi strictly so called, when they are single; hence in my opinion this dropsy in a woman known to be affected with polypus, would afford a presumption sufficiently strong, that other polypous tumours existed to divert us from the operation. But this opinion requires to be confirmed by observation. I only offer it as a first sketch in a work necessary to complete the history of a disease which engages my attention in a surgical point of view.

If I have only made mention of the complication of polypi strictly so called, with other polypous tumours, it is not that the latter may not exist uncombined. In fact two specimens have each presented a groupe of those of the second class, and at the same time an analogous mass in the very substance of the uterus, without any signs of the true polypus on the inner surface of this organ.

V. *Remarks.*

In the preceding articles I have endeavoured to remove the uncertainty and doubt in regard to the term polypi, as applied to certain organic affections of the uterus. I have restricted it to one, which appearing under a variety of forms, hitherto misunderstood, nevertheless requires in all cases an analogous denomination indicative of a nature identically the same. Constrained by the limits

necessarily prescribed to this memoir, I have only given a hasty sketch of the internal structure of these new productions, and of the external appearance which they present to the eye of the observer. I have likewise been only able to give an imperfect view of the useful application to surgery which this knowledge is susceptible of. Other facts will probably afford an opportunity of adding to the reflections I have just offered, at the same time that they may resolve the following queries, which appear connected with the subject of the memoir.

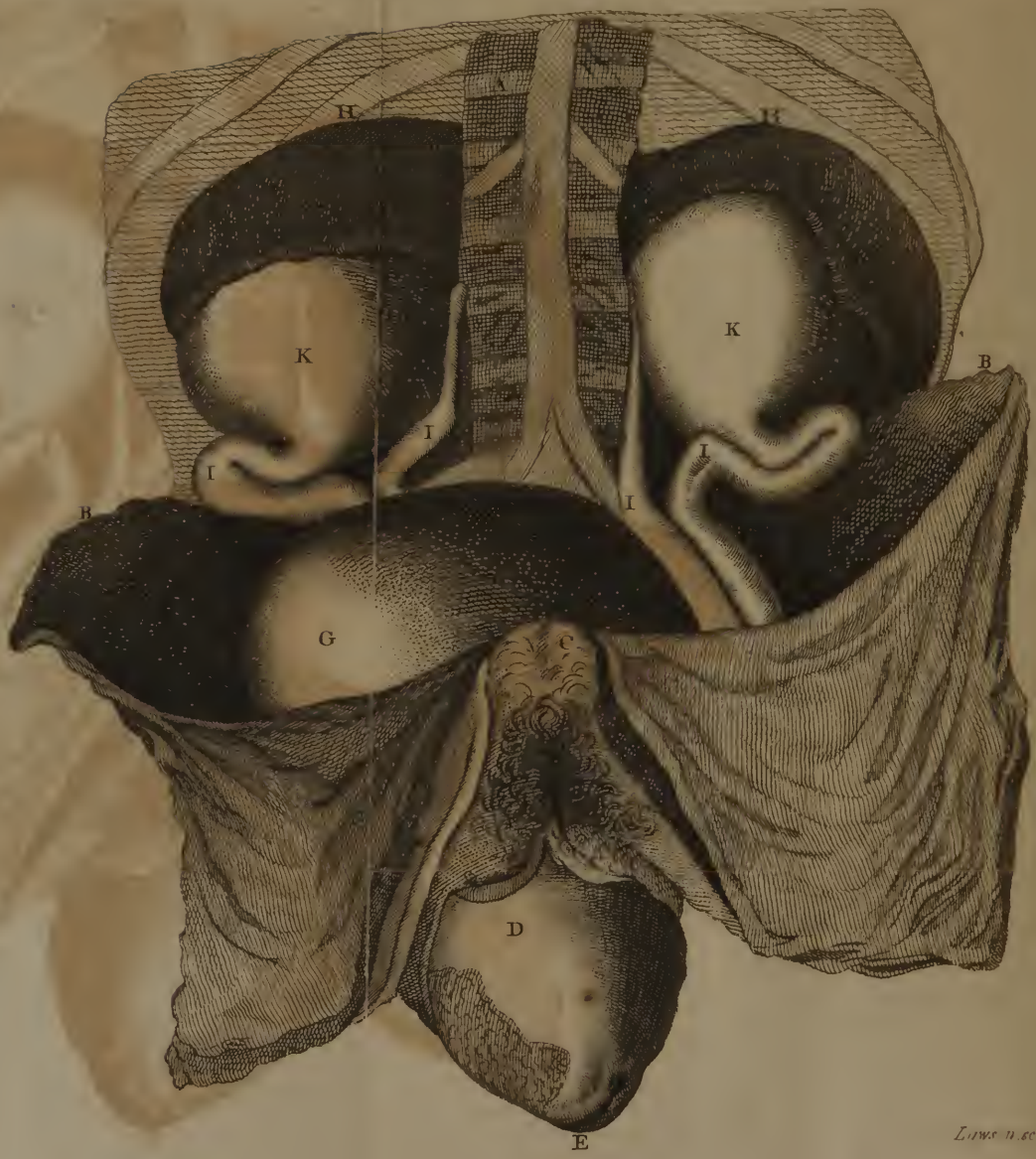
Notwithstanding the difference which certainly exists between the uterine polypi and the greater number of the polypi of the nasal fossæ, can there be any analogy between those of the latter termed sarcomatous, and the former, which were likewise for a time designated by the same name to distinguish them from *vivaces* or fungous growths of the mucous membrane of the uterus?

2. Or rather, on the contrary, are not all the polypi of the nasal fossæ hitherto admitted, but different degrees of the same original alteration of the mucous membrane.

3. What advantage could be derived in the treatment of *vivaces*, when better known, from the success attendant on the operations for the polypi of the nasal fossæ; among which, by the bye, I give an almost decided preference to extraction.

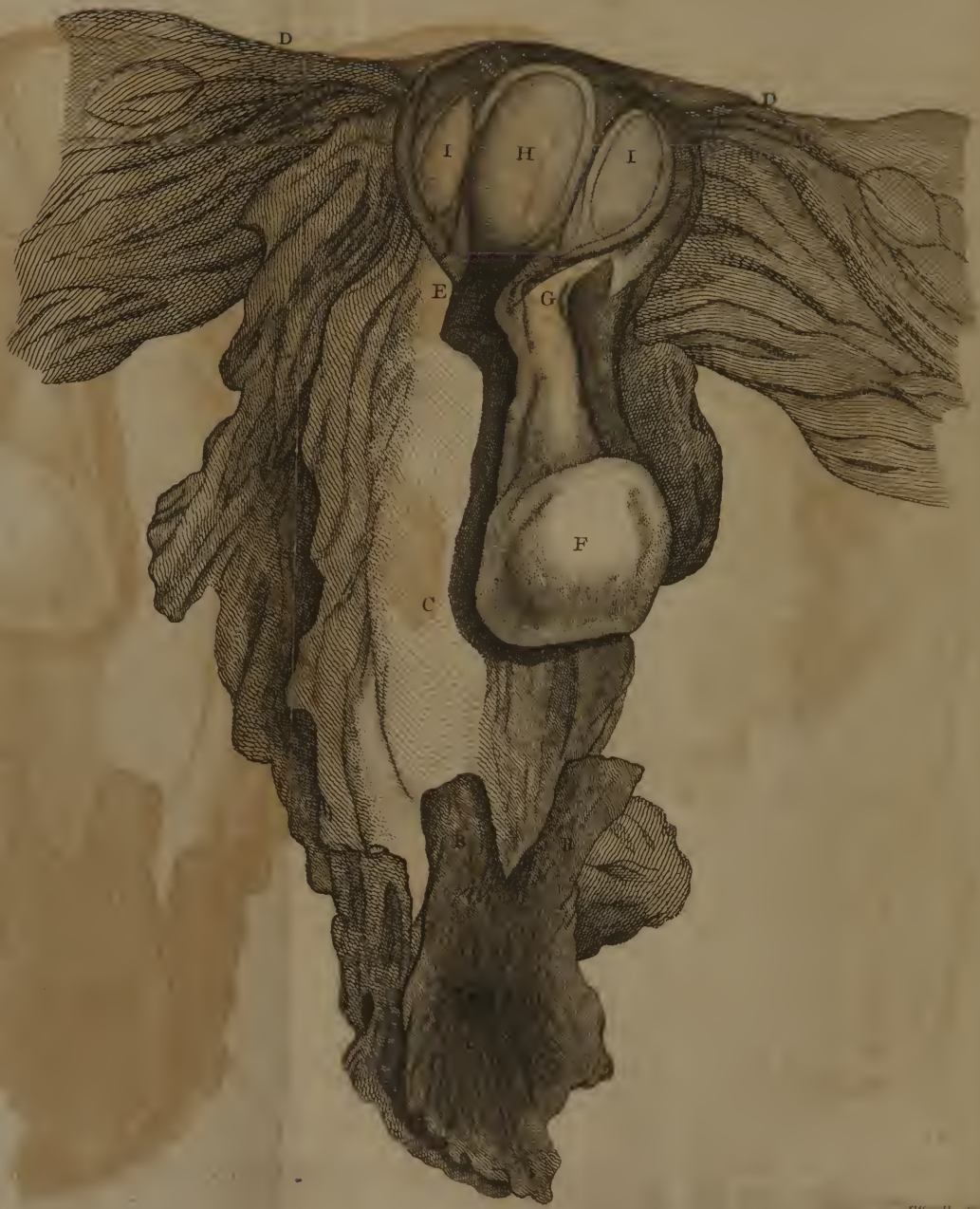
4. Lastly, what is the nature of the polypi, though uncommon, seated in the parietes of the vagina? Are they analogous to those of the uterus; or rather what is the difference, if any exists.

Pl. 9.



Lawson sc

Pl. 10.



Explanation of the Figures.

PLATE IX.

Figure, representing the anatomical part under consideration.

A. The Spine.
BB. The Iliac Cavities.
C. The Mons Veneris.
D. The Tumour going much beyond the level of the external part of the Womb.
E. The orifice of the Uterus.
F. Part of the Mucous Membrane of the Vagina in a state of Ulceration.
G. The Bladder very much distended, above the Pubis.
HH. The Kidneys.
II. The four Ureters.
KK. The Pelves of the Kidneys.

PLATE X.

Figure, representing the part procured from the body of the woman whose case has been mentioned. It gives a good idea of Polypi of the first and third kind.

A. The Anus.
BB. The posterior part of the Labia.
C. The interior of the Vagina laid open in front.
DD. The broad Ligaments.
E. The interior of the cavity of the neck of the Uterus.
F. The body of the Polypus rising in the Vagina.
G. Its root attached to the orifice of the Uterus.
H. The interior of the Uterus. This organ is divided vertically in its anterior coat.
II. Two divided portions of the Polypous Tumour enveloped in the folds of this coat.

PLATE XI.

Figure, representing the part already mentioned, when treating of Polypi of the first species, whereon was to be seen, a considerable tumour, which, having burst above and behind the vagina, settled between it and the rectum.

A. The posterior part of the Uterus.
BB. The broad Ligament.
C. The posterior part of the Vagina.
DD. The two *halves* of the Tumour.
E. Its root.

PLATE XII.

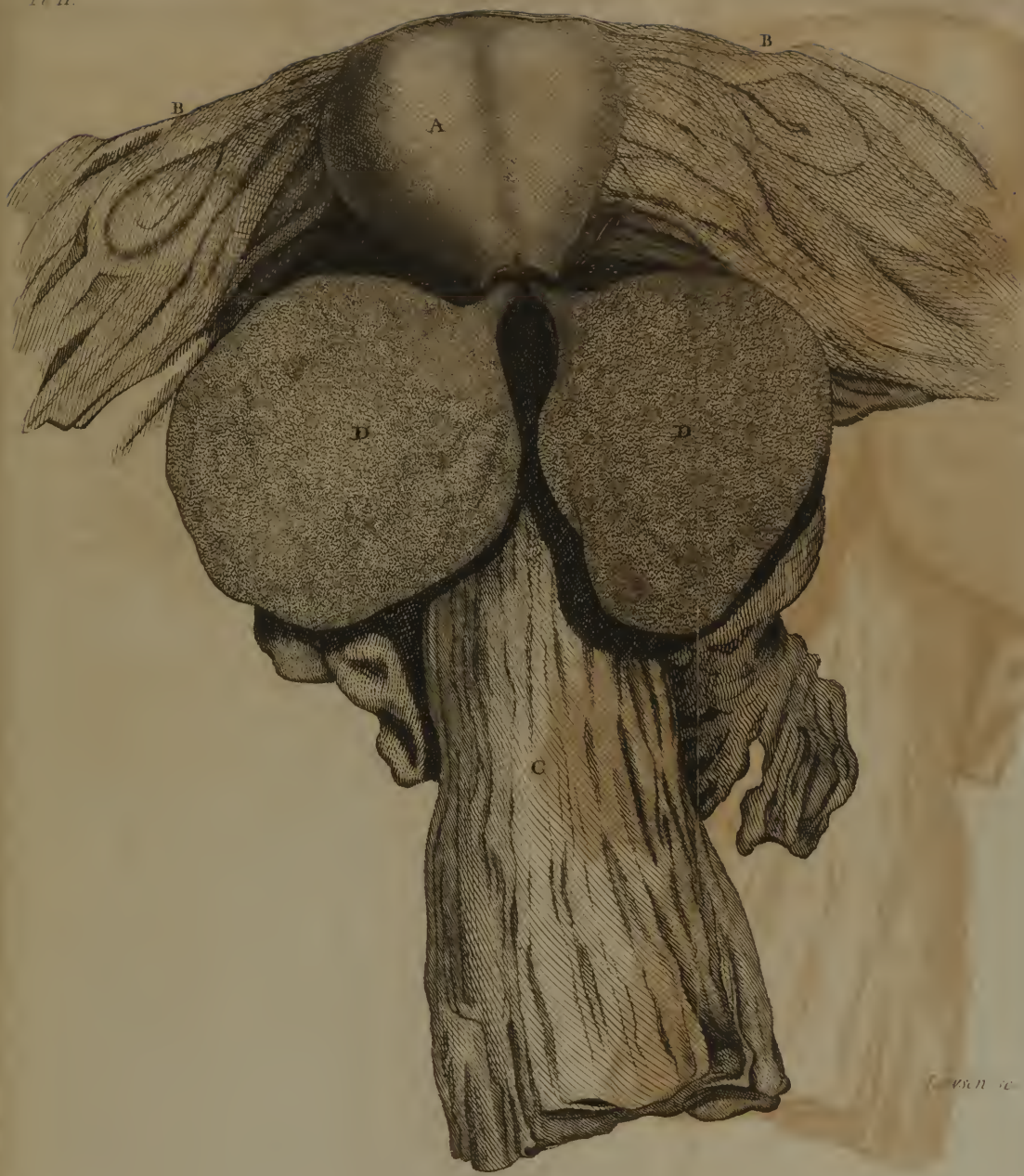
Figure, shewing the situation of the Polypous Tumours of the second species.

A. The Uterus.
BB. The broad Ligaments.
C. The Vagina.
DDDD. Several Tumours, varying in their size and situation; all of which, however, being contiguous to the peritoneum, raise it up, and are covered by it.

NOTE.

Whilst giving this explanation of the figures, I find, in one of the bodies in my dissecting-room, a polypus similar to these as to situation, but of the size of the two fists. It weighs from two to three pounds, and is completely bony; around it are to be seen three other smaller tumours, which still preserve their fleshy appearance. The uterus, in other respects, is in its natural state.

Pl. II.



Pl. 12.