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ANNEX I
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No. 59984



OF THE
MEDICAL AND PROPHYLACTIC TREATMENT
OF
STONE AND GRAVEL.

WITH A MEMOIR ON THE
CALCULI OF CYSTINE.

BY

Jean

✓
CIVIALE, M. D.

TRANSLATED FROM THE FRENCH BY

HENRY H. SMITH, M. D., OF PHILADELPHIA.

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PHILADELPHIA :

PUBLISHED BY A. WALDIE, 46 CARPENTER STREET.

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HENRY H. SMITH, M.D., OF PHILADELPHIA

PUBLISHED BY A. WALLACE 46 CARLETON STREET

1841

TO
J. RANDOLPH, M. D.

Lecturer on Surgery, one of the Surgeons of the Pennsylvania Hospital, one of the Consulting Surgeons to the Philadelphia Dispensary, Member of the Philadelphia College of Physicians, &c. &c.

Dear Sir,

Knowing the strong interest you have long taken in every subject connected with lithotripsy, and your high opinion of M. Civiale, I take the liberty of offering you this translation of his work on the Medical Treatment of Stone and Gravel, as a small tribute of my high respect for your character, and as an acknowledgment of the pleasure that I have derived from witnessing your operations on lithotripsy.

In undertaking this work, I have been mainly actuated by a desire to increase its circulation, and to place in the hands of our practitioners a systematic treatise on a subject which must so frequently be brought to their notice. With this view, I have endeavoured to give strictly the sense of the author, and the following pages are a transcript of his work, with the exception of the fourth part, which, as it related to matters of local interest, (as reports on the waters of Vichy, &c.) I thought would hardly repay the trouble of perusal by the American reader. How far I have succeeded, I of course cannot judge. Aware as you are of the difficulties always to be experienced in an attempt to transfer the ideas of an author into a tongue different from that in which he wrote, I hope you will ascribe its faults to other causes than a want of attention, and give it the sanction of one who has done so much to render lithotripsy favourably known in this country.

With sentiments of high respect and esteem,

I remain sincerely yours,

HENRY H. SMITH.

No. 280 Chestnut street, Philadelphia.

PREFACE.

I think that I have nearly exhausted, in the Treatise on Calculi, and in my preceding works, all that it was important to say on the diseases vulgarly called *stone* and *gravel*, when considered under the different relations of their causes, formation, developement, effects that they produce by reacting on the animal economy, and the manner in which they ought to be treated surgically, at least in the greater number of cases. These points were the most important, and those which it was right to study first. But there is another of them, not less interesting, which I have hardly glanced at, and which will form the subject of the present publication; I refer to the medical treatment which ought to be employed, sometimes exclusively, sometimes conjointly with the resources of surgery, the success of which it assures whilst it facilitates its application.

The remarks that I have to offer are essentially practical. Their object is,

1st. To make known the resources of medicine when the calculary disease is yet under the form of gravel, or when it is not sufficiently developed to require the intervention of surgery.

2d. To point out the conduct to be observed when the stone, from its situation or volume, is inaccessible to surgical means.

3d. To enumerate the means that ought to be employed after the performance of the operation, in order to prevent a return of the disease, and overcome the tendency of the patient to a return of the stone.

4th, lastly. To examine into the value of certain chemical and pharmaceutical means to which are ascribed the power of solving or disaggregating the stone, and that of some mineral waters to which the attention of the public has been called, from their being presented as possessed of the same power.

The different questions connected with calculary diseases have been treated of chiefly in a scientific point of view in my treatise on this disease. There, indeed, the subject was the reunion of the principal avowed facts in our possession, and the re-arranging and placing in apposition the often contradictory opinions which arise when we examine only a few of them. Here, I shall not pursue the same course; for as, in the subject that I propose to review, the practical results are the most essential, so I shall only aid myself with the combinations of theory as far as it may be useful to introduce them, in order to explain certain peculiarities which it would perhaps be difficult to understand if we only reproduced the views which prevailed at the observation and directed it.

Neither shall I have much space to give to the researches of erudition; old works have been decided upon, and it would be tiresome to submit them to a new discussion. In regard to the investigations undertaken by some of the modern authors, I feel an embarrassment of which the reader ought to judge. The greater portion of them seem to me to have been only attempted for their private interest. The mask of science has been borrowed only in order to serve as a bait to public credulity; truth is what they have least thought of, and they have especially endeavoured to reproduce those theories which seemed the most likely to insure the vogue of this or that remedy that they have ordered to be sold or sold themselves, a sort of medical charlatanism, so much the more dangerous as it affects to call art to its aid, but with the sole view of affording greater facilities to its agent; I shall here offer a single example of it. Every one knows of the waters of Vichy, which possess in certain cases of gravel a utility that our fathers knew how to appreciate, and that more than one ancient writer has celebrated, but which within a few years have become a true subject of speculation; every day the officious press holds them forth as equal to the white mustard seed, purgative tonics, purifying syrups, and other wonders of this kind, and in order to give more weight to its statements, attaches to them the testimony of honourable men. There is yet more; each year sees the publication of a pamphlet only intended to extol their inestimable virtues, and to attribute to them effects which they do not possess; the author takes great pains to give a scientific colouring to his periodical epistles, so that it becomes impossible to those not familiar with the subject to see that the facts on which he supports himself are incomplete, and in reality prove nothing. By this able combination, each new publi-

cation corroborates the preceding ones, and if science gains nothing, all at least is not lost. This manœuvre resembles much that of the charlatan, who, in order to escape the law in regard to secret remedies, printed a pamphlet, known only to those to whom he sent it, and which in the advertisements in the papers indicated the "treatment after the formula that he had published."

Some persons have reproached me with having too severely treated the efforts tending to give credit to the action of alkaline substances against the stone. But was not the value of these pretended lithontriptics long since decided on? The debates of the day are only a pale reflection of those which it formerly excited, and we now know no more in regard to them than was known formerly, without even excepting their power of alkalisng the urine, which was known to the great Hoffman, although he made no noise about it. But where is the remedy, truly proved by experience, which has fallen into a neglect comparable to that which covered the alkaline lithontriptics when it was seen fit to exhume them? Besides, it would suffice, in order to clear me from all reproaches, to represent the unhappy patients, abused for a long time by fallacious hopes, and thus conducted to that frightful state where all the resources of art become inapplicable, where the practitioner is as it were condemned to view with folded arms the anguish in which they draw out their last moments. Such is the result of the pretended curative means, the marvels of which they do not cease to proclaim, and which have no other real effect than to lead the patients with stone to a desperate situation. If the honourable confere to whom I reply had seen, as I have, a certain number of these scenes of grief, instead of tolerating, or even justifying, the means which lead to it, he would not have been able to find expressions sufficiently strong to condemn the manœuvres which place the lives of so many men in danger. We must without doubt encourage all that can extend the domain of art, and I think I have never had to justify myself from seeking to restrict its limits; but it is a strange self-deception to consider as an advancement that which makes us retrograde towards methods, the value of which experience has long since decided on in a way that is as marked as it is solemn.

We have lately been much occupied with gravel, but it is unfortunately too true that the greater part of the researches of our cotemporaries have been made after systematic ideas previously arranged, and have led to false conclusions. Indeed, they have almost always considered the formation of pebbles as dependent on

the laws of chemical affinity, and have confined themselves to seeking the means to combat the action of this affinity; then, when they have supposed the concretions to be formed, all their efforts have only tended to procure the escape or destruction of them by chemical means, without regarding either the organic modifications which created them, or the sad influence which they themselves gradually produce on the whole economy from their presence alone. As they have generally taken for the disease that which is only its product, that is to say, an effect, a result of one or more morbid states, they have been drawn into numerous arbitrary interpretations, taken either from the physical characters and chemical composition of the pebbles passed, or from the connection of accidental peculiarities, which they have afterwards attached with more or less art to this morbid phenomenon. Hence it is not surprising that the greater part of the theories presented should be false, since they err in the commencement, and the circumstances noted in the first line have little or no influence. We cannot too often repeat, that the greatest evil which can arise to a science, is to be delivered to the speculations of theory; for, by systematising a small number of badly made observations, it becomes the more difficult to avoid errors, as they almost always are drawn on from the commencement by preconceived ideas.

The chemical theory of the calculary disease cannot, moreover, be applied, except at the moment when the urine has been brought to the conditions likely to determine the formation of gravel in consequence of disease. But what has prepared these conditions? What causes a predominance in one case of uric acid or urate of ammonia, in another cystine, in this one oxalates of lime, in that phosphates? These are the questions to be solved, if we would wish to remove the medical treatment of stone from the sad empiricism which governs it at present. I have attempted this solution, and if I have not found out the whole truth, I can at least flatter myself with having met with a part, for the manner in which I explain the formation of urinary concretions in the two great classes that I have been led to admit among those with stone, furnishes the elements of curative means, the happy effects of which long experience has enabled me to prove sufficiently for me to believe it right to recommend them highly to my confreres and to patients.

One of the partisans of the doctrine which wishes to reduce the whole history of calculi to the phenomena of chemical affinity, affirms that if he had the stone, he would prefer to continue for a long time a treatment by the mineral waters to submitting to an

operation. This assertion, not to speak harshly, is to a certain point formed for the mouth of an apothecary, whom a natural fondness ought to draw towards the remedies that he is accustomed to handle; many patients with stone have thus acted formerly, and none have found themselves the better for it. On the other side, Camerarius, D'Alembert, Buffon, and Barthez, without allowing themselves to take up such delusions, prefer a long and painful state of suffering to the adventurous chances of lithotomy. Would these great men do the same thing at the present day. We doubt it, especially since we have seen so many physicians with stone resorting to the benefits of lithotripsy, to which one of its ancient enemies has recently added the most distinguished homage, by the preference that he hastened to give it when it was an affair of his own person. Be this as it may, so long as it shall not be demonstrated as clearly as daylight that such and such remedies have the infallible property of dissolving such and such calculi in the living body, patients will enjoy their repose and their life in flattering themselves with hopes that they will never realise. For stone is eminently distinguished in this, that time plays the principal part, since a disease which at first was one of the slightest accidents that could attack the urinary organs, is transformed by it into one positively fatal, that each day diminishes the chances of the success of any operation, and in which a moment at last comes when it ceases to be possible to attempt any one.

Facts are daily multiplied to render the happy influence exercised by lithotripsy on all that relates to the diseases of the urinary apparatus in general, and to calculi in particular, beyond a doubt. For example, up to the present time we were but little occupied with the measures likely to facilitate the escape of pebbles by the urethra; the results, therefore, to which we came left much to be desired. Since the application of lithotripsy, the facility with which the fragments of calculi are expelled, the volume of many of them to which the urethra has given passage without effort and with little suffering, and often even without pain, show the possibility of obtaining the spontaneous expulsion of pebbles coming from the kidneys, which, by remaining in the bladder, would become the nucleus of stone. Why, indeed, do not patients pass naturally by the urethra pebbles as voluminous as the fragments daily seen to escape with such facility after the application of the new method, when the same forces are in action and they act on the same organs? The identity of these different points is evident to all. What, then, can be the difference in the results? It is this. The effects of the

preparatory treatment of lithotripsy is to modify and diminish the sensibility of the urethra, and the manœuvres of the operation tend to increase the contractility of the bladder. It is to the union of these two circumstances that the escape by the urethra of fragments of calculi of astonishing dimensions is owing. It was, then, very natural that we should be led to prepare in the same manner the passages which ought to give exit to the pebbles which have come from the kidneys, and whose presence in the bladder is often revealed by the most serious symptoms. This induction has been formed into a precept, and the result has been as happy as possible. The new method, therefore, would not only have the effect of removing patients from the operation of lithotomy, but would also lead them to the most rational treatment to favour the expulsion of the pebbles, and protect them from stone, strictly speaking.

ON THE
MEDICAL AND PROPHYLACTIC TREATMENT
OF
STONE AND GRAVEL.

PART FIRST.
GENERAL REMARKS ON GRAVEL.

CHAPTER I.

Of the Form, Colour, and Mode of Formation of Gravel.

The meaning which ought to be attached to the words *Sand*, *Gravel*, *Pebbles* (graviers), and *Calculi*, has not as yet been decided with sufficient accuracy, and it is from our not having well understood the true signification of these terms that grave errors have been introduced into practice. Thus, for example, in calling the pebbles passed by patients when under a certain treatment, *calculi* or *stones*, we have been induced to believe that true stones had been acted on and expelled by means of these remedies. A large number of the pretended lithontriptics owe the importance which has been attached to them and the reputation that they have enjoyed only to this false interpretation, so that instead of *calculi* having been expelled, it has been only simple *pebbles* (graviers), analogous to those passed by patients under different circumstances, and even when not submitted to the action of solvents or other like means.

1st. *Sand* is understood to be a powdery deposit which takes sometimes the form of a very fine powder, or sometimes, and more frequently, of grains, caused by the agglomeration of little crystals, which are easily distinguished with the lens, or that are sometimes perceptible to the naked eye. This deposit is most frequently of a

bright red colour, though in certain cases it resembles that of brick dust, or is gray, ash-coloured, black, or dusky.

2d. We apply the name of *gravel* more particularly to little granular bodies, of the size of a pin's head, or even much smaller, which are found united together at the bottom of the vessel in which the urine is passed and cooled. These grains vary much in colour, density, and form. Their colour is generally reddish, but they rarely show the bright red of sand. In these the colour tends to a russet brown, and it is to be remarked, that in proportion as they increase in size so the colour fades. Gravel may also be white, gray, ashy, yellow, black, &c.

3d. The term *pebble-stones* (*gravieres*), is confined to little concretions which have acquired a greater developement in the urinary apparatus, but whose volume does not as yet exceed the limits of the diameter and dilatibility of the excretory duct, so that they can still escape by the urethra. Gravel and pebbles are often confounded in practice.

4th. Lastly, these same concretions are called *calculi* when they have attained such a size that they cannot pass through the urethra, at least in its normal state. This term is applied indiscriminately to all urinary concretions whose volume exceeds the diameter of the excretory duct, although the largest are sometimes designated by the term *stones*.

To these concise indications I here confine myself, referring to the second and third chapters of my Treatise on Calculi for an explanation of the different forms that may be assumed by stones; forms the more important to be recollected, from their connection with the indications of a special medical treatment, and also from the fact that grave mistakes have been made by those who have not taken sufficient account of them.

The same thing is true of the mode of developement taken by urinary concretions, in order to pass from the form of sand to that of gravel, pebbles, and calculi, as well also as of the physical character and chemical composition of these different bodies. Important modifications in the plan of treatment are closely connected with each of the numerous peculiarities shown under these different points. I believe it therefore useful to call attention as briefly as possible to the most important of them.

SECT. I.—*Manner of Developement of Urinary Concretions.*

Whatever be the nature of the concretions formed in the urine, their production and developement is effected in two principal ways. In the one (which was formerly regarded as the most common, though in reality rare), the solidifiable matter is deposited in laminæ. In the other, which is applicable to the majority of cases, this matter becomes concrete in isolated grains, the junction of which forms masses of a greater or lesser volume. These two modes exist separately, but may be combined. I have in my col-

lection many specimens of gravel which prove their coexistence in the same individual. We can readily distinguish the one from the other. In the first, the pebble is smooth, rounded, generally hard, and very regular; in the second, on the contrary, the foreign body is unequal, knotty, rough, and easily divisible. The grains which have lately adhered to the nucleus present peculiarities worthy of remark. Sometimes they are placed by the side of each other in a nearly regular manner, so that the pebble or calculus, although granulated, is regularly rounded; this disposition is preserved even in the largest stones, but it is chiefly seen in the calculi of uric acid and oxalate of lime. Sometimes the grains are deposited without any apparent order, and often on the most prominent points of the nucleus, whence we have those pebbles and branching calculi, unequal and of a bizarre shape, which defies explanation, though often met with even in the same gravel.

SECT. II.—*Colour of pebbles (graviers.)*

Distinctions altogether arbitrary have been established, as much in regard to the colour as to the other physical characters of gravel, upon which, however, are based the indications of the various plans of treatment recommended against this affection. It is only necessary to cast our eyes upon a collection of pebbles in order to see how inexact have been the assertions of writers relative to the colour of each kind of gravel. Indeed the red, yellow, gray, white, and black differ essentially, and almost always in the idea which these colours offer to the mind, when they are considered in a purely abstract manner, and their shades are in reality infinite. Scarcely can we recognise a perfect identity between two specimens of the same gravel, and besides, there is no well marked limit between the different kinds of colour, so that the same gravel will be red to one person, deep yellow or brownish to another, and black to many, or white to this one, and gray or ashy to that. All, then, is arbitrary on this point. But when we had attributed to characters which were variable, and consequently without value, a certainty which they wanted, means were found to draw from them false practical results; for the colour is by no means able to enlighten us, as has been pretended, on the nature or chemical composition of pebbles. Having examined this important question very much at length in the *Treatise on Calculi*, it will suffice at present to offer a short summary. The most remarkable point in regard to the pebbles of uric acid is, that they are colourless at the moment of their appearance. They show themselves then under the form of little white and transparent crystals, which can be readily seen with the lens, and which are sometimes perceivable by the eye alone. When they become larger, and above all, when they are united in mass, the first tint that they have is a more or less striking red, sometimes tending a little to a yellow. In this case they take the form

of powder or very small grains, sometimes of a bright red colour mingled with shining points, and at others of a russet red.

When the grains have acquired a greater size, we rarely find the clear red colour of the fine sand. The shade becomes duller, and we should say that the pebbles had been soiled. The russet colour with numerous tints is that which is most commonly offered by the larger pebbles, a large number of which seem to be covered with a very thin grayish layer, allowing us, however, to see the primitive colour beneath, for it is the mixture of red, of a dirty yellow, of gray, or of ash colour, which forms the tint of the greater portion of the pebbles of uric acid and of urate of ammonia. Let us add, that the same shade does not exist upon the whole surface of the pebble, which may be whiter or grayer on one side, and redder upon the other, tending sometimes to a brown. In this respect innumerable differences exist, according to the kind of gravel that we may take up; the colour, therefore, should not in any case be considered more than an approximative means of diagnosis.

We may go still farther: the shade varies in the same individual according as the pebble is lamellated, with a smooth surface, firm and polished, or is granulated and roughened, with little inequalities at its periphery, a distinction very easily made, especially when we examine a concretion smooth on one side and granulated on the other. As a general rule, the larger the pebbles of uric acid and urate of ammonia, the paler will be their surface, as I have just stated, and often, then, this colour of the external parts differs strongly from that of the centre of the concretion, which, in order to be well seen, should be broken and not sawed, as is generally done. I possess many large pebbles which have the same tint outwardly that they have within, although they are composed entirely of uric acid or urate of ammonia. There are some of them that might be taken at first sight for phosphatic agglomerations, and indeed the phosphates often enter in certain proportions into the composition of the superficial layers.

When there has been friction between two pebbles, there results almost always facets, or diamond-shaped portions, in regard to which the colour varies in a marked manner. This difference is always more apparent than real, and depends for the most part on the polish acquired by the surface rubbed. It is this which we see when examining the pebbles which have remained in the ureter or in the urethra; and this character is often sufficient to enable us to distinguish those which come from the bladder. There is yet another peculiarity which we observe in certain urethral pebbles; it is a shining aspect, which gives them the appearance of being varnished. I have had many opportunities of observing this peculiarity, which is common to them and to many prostatic calculi.

What I have just said relative to the colouration of pebbles of the commonest kind, applies equally to the rarer ones, only here the differences are less marked, because we can not unite so large

a number of specimens. I shall resume these different points when treating of each kind of gravel.

SECT. III.—*Of the shape of pebbles (graviers.)*

Nothing is more variable than the shape of these little masses as passed by the patient or found in the body. Sometimes they are round, and surprisingly regular. Many of the patients that I have seen since 1824 have passed boxes full of grains uniformly rounded; very numerous, but only differing in their volume, or sometimes in the colour, which varied from red to an ashy gray. The largest were like peas, but the smallest were distinguished only by the aid of a lens. Such were the cases of MM. Lehoux, Coiseau, Barbot-Duplessis, and others, who passed pebbles of a certain size, regularly ovoid or spherical in their shape. It is necessary to observe this disposition, particularly when the pebbles are large, as it proves their development takes place slowly in the bladder, without their being troubled by the contraction of this viscus, or by friction against others. It shows, also, that when the pebble is at the same time lamellated, hard and smooth on its surface, that the solidifiable matter is in small quantity in the urine, and that the vicious secretion in the kidney is but slightly developed, although constantly existing, without derangement or important modifications, so that we must pursue a treatment not very active, but which shall be long continued.

When, however, the deposition in the urine is abundant and rapid, the grains unite in an irregular manner; the pebble is not hard, but takes an irregular shape. There is in this same irregularity some peculiarities to which the practitioner ought to pay attention, because they will explain to him phenomena which otherwise he would be unable to account for, and also furnish him precious indications in the treatment. For example, it is a common thing to see pebbles elongated to such an extent as to be four, five, or six times greater than their breadth and thickness. I have seen many cases of this, one of which, a patient in the environs of Dreux, M. Guillaume, passed spontaneously granular pebbles of uric acid seven lines long by two in diameter. I have mentioned also in another work the case of M. Daudet, of Nismes, who passed a pebble thirteen lines long and only three and a half in diameter. I have also at present a patient in Paris, M. Band, an old gentleman who has long had gravel, and has passed great quantities of pebbles, among which many of an elongated shape, slightly flattened, are from nine to eleven lines long by two and a quarter or a half in diameter. From all appearances the development of these long pebbles takes place in an organ which acts as a mould, and especially in the ureter. They might also be produced in the urethra, but the urethral pebbles have rarely this elongated form; in general, in the urethra the new grains which come to be added to the foreign body already existing, instead of being attached behind

it, so as to form one oblong mass, remain detached, and develop themselves in an isolated manner, one side being in contact with the parietes of the canal, the other with the primitive pebble, against which it rests itself, so that it remains flattened. It is from this cause that we have the smooth and polished surfaces which are seen on them from time to time. I have already given a long explanation of these peculiarities of urethral calculi in my Treatise on Calculi, and I shall hereafter speak of the pebbles found after death in the ureters, which support the conjecture previously given, of the oblong form presented in those which the patients themselves have passed with their urine.

The elongated pebbles expelled by patients, or found in their ureters after death, explain the deep-seated, obstinate pains, more or less acute, which we observe either in the direction of the ureters, or in the sacro-lumbar region; for here, as in the neck of the bladder, the pain is not always referred to the seat of the evil, and it is not rare that the sojourn of pebbles in one or the other of the ureters, instead of determining local, produce only vague, pains towards the loins or sacrum. This is a peculiarity seen every day, but which nevertheless becomes a source of error to many afflicted with the gravel.

We can understand, also, on the other side, how the pebbles thus elongated can acquire the dimensions that they present only by the successive additions of a great number of little pebbles which have escaped from the kidney. Consequently they must have rested a long time in the ureter, where they have produced the long train of morbid phenomena met with in those suffering from gravel, and against which all our curative means possess so little efficacy. The urine escapes sometimes between them and the parietes of the tube, and produces on their surface those gutters or furrows which tend to support the illusions of the partisans of dissolution of the stone.

It is not easy to conceive of the spontaneous expulsion of large elongated pebbles by a canal so narrow as the ureter; it however takes place daily, and practice constantly offers us remarkable examples; and, without going far, I could add many cases to those that I have just cited. But the question here is less a contested truth than a peculiarity that each one may verify for himself, so that new proofs will be superabundant. But do not let us forget that these expulsions are in many cases the result of the efforts of nature, that they take place in persons who undergo no special treatment, and that when they occur during the use of remedies reputed to be solvents of stone, an inexperienced man might be led to attribute them to the sole influence of these means.

Elongated pebbles, and closely resembling those which come from the ureters, may be formed in the bladder; but, generally speaking, those which we meet with in this viscus, or which come from it, are of an ovoidal shape and enlarged in the middle. This oblong and ovoidal shape of pebbles which have been formed in the bladder has no appreciable cause.

We are ignorant why it is that the new grains are added to the most eccentric portion of the nucleus, but the fact is well established, and occurs so frequently, as often among gravel as among the calculi, strictly speaking, that we might believe that there exists there a law of affinity which we have hitherto been unable to explain.

The other peculiarities of shape presented by pebbles have been caused in the bladder or urethra; for reason refuses to believe that those among these bodies which have a configuration more or less bizarre can be formed in the kidney, as it is impossible that they could then pass the ureter. I do not, therefore, think it rational to regard the renal organ as the seat of their development, and have nothing to add to what I have said in another place in treating of the calculi found in this organ after death. As to the bladder, it is sufficiently common for the pebbles to acquire singular forms, which closely resemble those of the vesical calculi that I have described, and for which I refer to my treatise on this subject. These singular shapes are produced entirely by the increase of the stone from the addition of new grains; for the lamellated pebbles, formed by the adherence of layers in a semi-liquid state, have generally the ovoid or spherical shape and the smooth surface which distinguishes them. I have not had occasion to remark that the passage through the urethra of rough, knotted, granulated pebbles, or those with odd shapes, was much more painful than that of the ovoidal, smooth and compact ones. All that we can say on this point is, that if there is a difference in this respect, it is much less than the appearance of the two would lead us to believe.

The peculiarities which have just been described as to the form of pebbles, applies to all kinds, but especially to those of uric acid, urate of ammonia, and oxalate of lime, and are less marked in the other kinds of gravel. I have seen a white pebble with a very clear yellow tint, composed of phosphato-ammoniaco-magnesiata, whose shape was elongated, being six lines long by three in diameter. This pebble, slightly pyriform in its shape, was passed by M. Choquet, whose case I have before reported.

In a large number of cases the white, gray, and ashy pebbles, with a variety of shades, are passed under the shape of grains more or less rounded, spongy, generally light and easily broken. Some of them are flattened, as in the case of Madame Theille, which I shall refer to hereafter, who passed them in this form, one being eight lines long, five broad, and three thick, the other seven and a half in length, five in breadth, and two in thickness. Sometimes they are powdery and shapeless deposits, or in plaques or laminae of different sizes and consistence; such was the case in a printer whom I attended, who passed with his urine a large quantity of plaques of a yellowish gray, composed of phosphate of lime; such also was the case with M. Saloman, whose case I have reported. Cases of this kind seem to me to be closely connected with those in which the patients pass a chalky kind of urine, or with

those in which earthy depositions are found adherent to the sides of the vessel, or to the linen, and of which I have given some singular examples in my treatise.

Among the white and gray pebbles are sometimes seen those whose surface is, if we may so express it, pearly. These are round or ovoidal, and flattened, but their surface is always compact, whilst that of the others is rough and covered with points. I have never seen singular forms among the pebbles of oxalate of lime or of cystine.

The pebbles which escape spontaneously from the urethra, or which are extracted by a surgical operation, after having remained there some time, or been developed there, never take a determinate shape.

I have removed two from the fossa navicularis, which were oblong and slightly flattened. One, which came from a small child, presented a tubercle on one side and a furrow on the other; this pebble, which was of a brown colour, was four lines and a half long by three broad and two thick. I removed it with facility by means of a little hook, after having opened the meatus urinarius.

Among the pebbles that I have met with towards the spongy portion of the urethra, two were very large, one ovoidal, the other spherical. The first was taken from the urethra of M. Desportes, whose case has been reported. It had remained for a long time in the canal behind a stricture, and its surface was bristling with points, and of so firm a texture, that when it was sawed through in its length, it received a remarkable polish from the action of the instrument.

In the membranous portion the shape of these bodies is extremely variable, above all, when the canal contains several which are glued one upon another. Then we find them flattened on one side and knotted on the other, triangular, oblong, pointed, &c. I have cited several cases in my third letter, as well as in my Treatise on Strictures of the Urethra and Calculi. It is chiefly to this last work that I here refer, for in every case it was more an affair of calculi, properly speaking, than of pebbles.

SECT. IV.—*Results of the preceding reflections.*

I shall here point out (somewhat in anticipation) certain considerations which ought to be connected with these different peculiarities, relative to the developement and mode of formation, as well as to the colour and configuration, of these urinary concretions.

So long as the solidifiable matter in the urine is precipitated under the form of sand, the patient is as far removed as possible from an attack of the stone. It is not that there is a deficiency of petrifiable matter in the urine, for some pass enormous quantities of this deposit, but only because the elements necessary to produce an agglomeration of these substances into one body do not exist, consequently they remain in a state of powder or sand. In that which is

ordinarily termed lamellated gravel, a grain is first formed, around which the solidifiable matter, though yet in a fluid state, is deposited. This formation takes place slowly, and the body is very often expelled before it has acquired sufficient dimensions to constitute it a stone. The lamellated stones are, I repeat, less common than is generally believed, but they are the hardest of all; the layers being deposited in a fluid state, the union is more intimate and the consistence more uniform. In those cases, on the contrary, where the grains are formed at the moment of their application to the nucleus, there remains intervals between them which are sometimes filled by the fluid matter, but which sometimes also remain empty and form cavities. I have cited many examples of these hollow calculi. Whatever be the mode in which gravel is formed, it is certain that if its development takes place slowly, the foreign body can be expelled before it has acquired much volume, and that then, also, we need have little fear of stone, provided the patient is submitted to a proper treatment.

But there are some cases where things go on differently. Here the laws of attraction exercise a more marked control, either from the grains forming separately and then uniting together by means of a matter still fluid which acts as cement, a disposition which we see in the pebbles of cystine, and in the greater part of those of the oxalate of lime, triple phosphates, and uric acid: or from the depositions being made by layers in a fluid state, yet having some consistence, and hardening with great rapidity. Observation shows us often cases of this kind, as often among pebbles as among calculi. The history of both teaches us that the precipitation of the solidifiable matter in the urine takes place with great promptness, and indeed we frequently see urinary concretions acquire a great size in the space of a few months. It is above all in these instances that the patients ought to fear the stone.

It is important to recognise these peculiarities, in order to direct the medical treatment in certain cases, where it ought to be feeble, mild, and continued for a long period, without regard to the means employed, whilst in others it should be active, prompt, and energetic. It is difficult to explain how such essential peculiarities have escaped the notice of the various authors on gravel. The conduct of the practitioner must therefore vary according to the case.

In those of the first series he has only to combat the predominance of one of the principles in the urine; but this predominance causes neither pain nor disorder, nor yet a well-grounded fear of stone, properly speaking. It is only an affair of a temporary derangement of the renal secretion, which may exist, and which often does exist, without any lesions of the kidney, but which does not exclude other forms of calculary affections, since we find powdery depositions both in cases of gravel and in those of calculi.

In cases of the second series, when the deposit is expelled under the form of gravel, the union of a greater number of circumstances

is requisite, in order that the depositing matter should unite itself into a mass capable of becoming so large that it cannot traverse the urethra, and thus becomes a calculus. This rule in a great number of stones appears to be that which governs their increase of volume. Notwithstanding its slowness, the attention of the practitioner ought to be as much given to this as to the preceding one. Beside the predominance of solidifiable matter, there then exists in the urine the means of fixing these substances, means which seem to be wanting in cases of sand, strictly speaking. The treatment ought therefore to be more active, as much from the fact of the formation and increase of the foreign bodies bringing on disturbance, as from there being greater reason to fear the production of a stone.

The third degree is the most serious. The separate agglomerations which constitute sand or gravel, can be produced with great promptitude and in considerable quantities, and as the grains which are formed afterwards adhere to each other, the sand or gravel resulting from them may in a short space of time give rise to a true calculary disease. Here truly are found united in the highest degree both an abundance of solidifiable matter, the attractive force which determines the agglomeration of the grains of sand, and the cementing substance under whose influence the primitive grains are formed, so that immediately after the production of the latter, they are united and harden. Thus when a patient passes frequently pebbles formed by the agglomeration or solidification of grains of sand, the calculary diathesis is strongly marked in him, and he unites all the conditions most favourable to the formation of a stone. It is in this instance, above all, that we ought to hasten to direct the resources of our art against this diathesis, and administer our remedies with energy.

CHAPTER II.

Of the Expulsion of Pebbles of Different Natures successively.

The new observations which daily practice enable us to collect, tend more and more to the overthrow of the theory which some have sought to establish relative to the formation of gravel. In the special treatise in which I have given the analysis of the observations in regard to the calculi of cystine, I have shown that this substance often alternates with some other of the constant or accidental principles of the urine, and that it does not, as has been thought, form an exclusive diathesis. The different natures of the various layers which constitute the greater number of calculi, serves to heighten an important circumstance which alone would have sufficed, if some attention had been paid to it, to cause us to

guard against the fabricants of theories and the propagators of the idea of solvents of stone. I refer to the successive and very variable predominance of the materials in the urine, likely to form concretions. But it is not only in the stones already formed and developed that we see this alternation; we see it also in those afflicted with gravel who pass successively pebbles varying in nature and composition.

In many cases the uric acid and oxalate of lime alternate. I have seen several examples of it, among others the case of M. de Montbasin, in 1838, is remarkable. This patient was formerly a soldier, had a fine complexion, and enjoyed otherwise sufficiently good health, but passed habitually the urate of ammonia in powder with his urine, especially when he took violent exercise, rode in a carriage, or drank less than usual, either at his meals or in the intervals between them. The formation and expulsion of this deposit was unaccompanied by any appreciable derangement, but at different periods he suffered from pains in the region of the kidneys and in the course of the ureters, after which symptoms they found pebbles of the black oxalate of lime granulated and hard. I was consulted on account of one of these pebbles, the patient feeling no inquietude in regard to the powdery russet-coloured deposit, of which he could relieve himself at pleasure, either by drinking freely or by taking some slightly alkaline substances or the waters of Vichy. I wish to insist here on the security that he displayed in regard to the reddish gravel, for it is an observation that can be repeated every day. Patients become familiar in an astonishing manner with their diseases, if ancient, no matter how serious they may otherwise be, and those afflicted with gravel have in this respect a sort of privilege; the first emissions of sand alarm them, but it ends generally in their regarding it as a perfectly natural occurrence, and this security is often injurious to many of them.

At this moment, whilst writing, I have my eye on a case in which the gravel of uric acid alternates with a stone of the oxalate of lime. M. Mangot, of Amiens, aged thirty-six years, has suffered since his infancy from the symptoms of gravel and of stone successively. He came to consult me for this last affection in 1838. His stone, though of long standing, was neither very large nor very hard. It was easily destroyed by the proceedings of lithotripsy. During the treatment, M. Mangot had some symptoms of nephritic colic, though not very seriously. A few simple remedies relieved him of these, and they ended on the spontaneous expulsion of a yellow pebble, smooth and polished. This pebble of uric acid was of a spheroidal shape, and of the size of a pea. The alternation of uric acid with the oxalate of lime and vice versa, is the most frequent. I have never been able to attach any special circumstance to this fact, though I have observed it a great number of times. Sometimes the succession is rapid, and lasts but a short time, as happened with M. Montbasin. In other cases, on the contrary, the change from one substance to the other is less sudden, but when once the predomi-

nance of one of these principles is established, it lasts for a longer or shorter period. This same fact is seen in some cases of stone, and forms in the vesical calculi thick layers of different natures.

M. Bourgeois, of Petersburg, where he was a confectioner, suffered for some time from a considerable derangement of the functions of his bladder, against which they had tried various kinds of treatment, but without success. The symptoms, instead of diminishing, increased, a vesical catarrh supervened, and he commenced to pass gray gravel with his urine, but without having a true nephritic colic. Believing that he had a stone in the bladder, he came to Paris to consult me. I satisfied myself at first that the bladder contained no stone, and that the accidents resulted from the catarrh of the bladder and the irritability of the urethra, and prescribed for these morbid states the mode of treatment that I have recommended in my practical treatise on the diseases of the genito urinary apparatus. The amelioration was more prompt than is generally seen, but some few days after the cessation of the affections of the urethra and bladder, the patient perceived that his urine contained a large quantity of red sand. There is, however, nothing in this case which need astonish us. I have shown in another place that the predominance in the urine of phosphates of lime and ammoniaco magnesiates was essentially connected with an advanced inflammation of the urinary apparatus. This inflammation having just ceased, it was natural that the secretion from the kidney should take its primitive characters, and that there should be at intervals a superabundance of the constituent principles of red gravel. This was the case with M. Bourgeois, and it is what I have also seen in many other cases.

M. de Cayron, residing in the environs of Caen, aged seventy-one years, and of a robust constitution, though weakened by pain, was troubled during ten years with the gravel, against which he had tried every kind of treatment. Nevertheless his nephritic colics continued, at first at long, and then at shorter intervals. They ended sometimes by the expulsion of sand and pebbles of uric acid, and sometimes by the discharge of foreign bodies. At last the gravel appeared to change its nature. Instead of being red or tawny, the pebbles had a gray tint, and their escape became more and more painful and difficult. Many of those which he passed towards the last were as large as cherry stones, but sieve like, spongy, light, and much roughened. At this period the urine was catarrhal, and his health much broken. For two years previously, when he came to Paris in September, 1829, the emission of the pebbles had diminished considerably, and on this account his condition at first sight seemed to be improved, but the functions of the bladder became more and more painful, which was attributed to a vesical catarrh and an engorgement of the prostate. However, his pains terminated by taking a character which left no doubt of the presence of a foreign body in the urinary pouch. It was easy for me to acquire by catheterism the certainty that this reservoir

contained numerous calculi, which were destroyed by means of lithotripsy. The centre of these calculi was composed of uric acid, as had been the case with the pebbles that had been first passed, whilst the cortical portion was formed of phosphate of lime, as also had been the pebbles last discharged. Under the influence of the operation and the consequent medical treatment, the catarrh of the bladder disappeared, the nephritic colics ceased, and he had no further trouble with gravel.

These facts, to which I could add many others, since practice offers numbers of them, establish two propositions which it is important to settle, in order to overthrow some grave errors.

1st. The different diatheses, or the predominance of one of the constituent principles of the urine, are neither so constant nor so exclusive as has been pretended.

2d. The effects, attributable to certain medicines, having for their object the destruction of these diatheses, are not as conclusive as has been supposed, for these diatheses are modified and even entirely changed by causes which escape our knowledge, and the changes that they undergo can take place even when the patient has not been submitted to any treatment.

These remarks are especially applicable to the gravels of uric acid, urate of ammonia, cystine and oxalate of lime, which succeed each other at the moment when we least expect them. The succession is less sudden in the gray gravel, for this latter is owing to particular causes at present well understood. We can readily understand the importance which arises from this in practice, either from our wishing to form a just appreciation of the remedies that such a one has tried to give credit to, but which are far from having the power that has been attributed to them, or from its bearing on the treatment tending to correct the vicious secretions in the kidney, which all things being otherwise equal is as much more difficult to destroy, as it dates from a period more or less remote, and offers less intermission.

CHAPTER III.

Of Gravel in those who have Stone in the Bladder.

It is very generally believed that the presence of a stone in the bladder excludes the appearance of gravel. This opinion rests on the fact of nephritic colics ceasing immediately after the formation of a stone in the urinary pouch, and that in similar cases it is rare to see pebbles passed with the urine. Nevertheless this opinion is a false one, and has been too injurious to a large number of patients to permit me to neglect to call attention to this important question.

It is true that well marked nephritic colics, such as are met with in a large number of those afflicted exclusively with gravel, are not seen in those who suffer from stone, but it is also asserted that in a large number of cases, gravel itself is not accompanied with nephritic colic; besides, in those suffering from stone, the accidents and pains have only assumed a different form. The pains are wandering and disseminated throughout the renal, lumbar, sacral and pubic regions; they are dull, deep seated, and irregular, but obstinate and fatiguing. Neither does the passage of the pebbles offer that periodical character which is seen in well marked cases of gravel, but it takes place, if we may so speak, continuously; only instead of pebbles, it is more commonly a fine sand, or powdery crystalline deposit, which is precipitated at the bottom of the vessel, and which is easily seen by carefully decanting the urine. This deposit almost always consists of uric acid or urate of ammonia: sometimes it is very abundant, and continues during whole years without our being able to discover any cause in the patient likely to produce such a superabundance of matter capable of being precipitated or crystallised in the urine. I have seen great numbers of cases of this kind, and have thought that the quantity of the deposit increased when the irritation at the neck of the bladder and the peculiar pains of stone supervened. This peculiarity tends also to support a fact that other observations had established, to wit, that all irritation of the neck of the bladder, whatever be its nature, influences the renal secretion in such a way as often to increase the proportion of the principles incapable of remaining in solution. But it still remains to determine why this excess of uric acid, of urate of ammonia, of oxalate of lime, or of cystine, sometimes is applied in a soft state upon the vesical stone, so as to increase it by means of a new layer, which hardens by time, and sometimes is collected in grains or isolated crystals of more or less fineness. Nor are we better acquainted with the reason why, in this last case, the grains are sometimes adherent to the calculus already formed, and sometimes remain isolated in the bladder, or are carried off by the urine. We have not as yet been able to seize on the true cause of these different peculiarities. Let us therefore confine ourselves to the important fact, that stone and gravel can coexist in the same subject, a fact which, from all the evidence, proves a most serious disorder in the functions of the kidneys. It is chiefly in these cases that we see the persistence of gravel after the extraction of the stone from the bladder by a surgical operation, and the reproduction of the same kind of calculus after the lapse of a certain period, sometimes very short.

The coexistence of gravel and stone in the same person has caused grave errors in the diagnosis. It is also not less injurious in regard to the therapeutical treatment, for very often even in patients who submit to it, we see the most wisely combined and methodically directed medical treatment producing no effect, or at least producing it so incompletely, as to be satisfactory neither to the practitioner nor to the patient. In general these cases are not sufficiently studied;

we do not seek with sufficient care and perseverance the cause of the obstinate derangement in the functions of the kidney, and as this cause is frequently owing to the presence of a calculus, the first thing to be done is to explore the bladder; we too often then acquire the proof that the gravel is only an increase of the disease. We here perceive all the importance of similar facts in the appreciation of the means which it is pretended cure the gravel by regimen or alkaline waters, and they furnish a new proof of the empiricism which directs these pretended curative modes of treatment, in which all that is most essential is neglected, as the proofs of the true enemy to be attacked, and the distinction of the different cases, each of which demands a peculiar treatment.

It has happened to me more than once to be called to see a patient who thought himself attacked with gravel, and who wished to know why the medical treatment, upon which he had calculated for relief from his disease had not produced any result, although he had submitted to it with exemplary resignation. These patients were often not a little surprised to learn that they had stone instead of gravel, and a stone also so large that lithotripsy could not be applied to it. Among the victims of this mistake I will mention the case of Doctor Guerbois. The consequences, however, are not always as serious as in our unhappy colleague; many of the patients so situated have been able to claim the assistance of our profession in time, and I have cured many by means of lithotripsy or lithotomy. I will add the following facts to the details which I have already given in my other publications.

In August, 1838, a butcher, aged fifty years, presented himself in my wards, who had suffered for eight years from pain in the region of the kidneys, and passed pebbles of uric acid, which were granulated, of an irregular form, and for the most part bristling with rough points. Four months previous to his entering the hospital he had passed two of these pebbles of an elongated shape, and the size of a large bean, the one being seven and the other six lines long by three and a half in diameter. After the escape of these large bodies the pains continued, and catheterism proved that the bladder contained a large stone of uric acid, which I destroyed by means of lithotripsy.

At the commencement of the year 1839, the same wards presented me with a new case, in which the bladder of an old man, aged eighty years, contained ninety-nine pebbles, independently of four calculi, of a moderate size. The latter were of a lamellated structure, and had existed for a long time; the pebbles had been formed subsequently, and were about the size of peas. He had also an engorgement of the prostate, which had opposed the expulsion of the gravel. Thus we found united, the spasmodic contraction of the neck of the bladder determined by the presence of stones, the deviation of the urethra from the prostatic engorgement, and that atony of the parietes of the bladder, which is not rare at eighty-three years. But the great number of pebbles show how abundant was the

solidifiable matter in the urine, without taking into consideration that which was adherent to the four calculi. Besides, the pebbles must have remained sometime in the bladder, for they as well as the calculi were covered with a gray layer.

The 22d of May, 1839, a patient with stone who was in the wards of the Necker Hospital, passed without any symptoms of nephritic colic, a spherical, granulated pebble of the size of a pea, and of an ashy yellow colour. This patient, whose bladder contains a stone of the middle size, as near as can be judged from simply sounding him, passes every two or three days clots of blood with his urine. He is also feeble, has continual fever, loss of appetite, discoloration of the skin, and change of features, in a word is in an unfavourable condition. The very great disproportion existing between the natural effects of stone and the general symptoms made me fear a deeply seated lesion of the kidneys. Had he not had stone, the pebble which had been passed would have offered nothing remarkable. I can only add this fact to those which have preceded to prove completely the error of those authors who deny the coexistence of stone and gravel, and who think that the first is a proof of the non-existence of a calculus. In reality these cases are exceptions, but they are exceptions that occur so frequently that the practitioner ought constantly to remember them.

The superabundance of the solidifiable principles of the urine persists sometimes a long time after the patients have been cured of the stone. I have cited many examples of this in my treatise on calculi. I however add one here.

M. Benezet, of Corbeil, a septuagenarian, of strong constitution and good health, passed with his urine a considerable quantity of fine sand, of a red colour and bright appearance. During some years he thought little of this deposit, and took no precautions against it, and continued to lead a sedentary and very sober life. Towards the end of the year 1836 he began to find a difficulty in passing his water, and wandering pains about the pubis, in the perineum, and above all at the sacrum. These symptoms were attributed to sand, which he continued to pass very abundantly. A few baths, mucilaginous drinks and enemata gave him relief. The symptoms, however, reappeared, were treated in a like manner with like success, and continued to appear during many months. He at last came to consult me: I suspected the existence of small vesical calculi, which were proved to be there, and were destroyed by lithotripsy. M. Benezet continued however to pass sand of the same kind, and in as great quantities as before. The bicarbonates of the alkalies, the waters of Vichy and Contrexeville, quantities of drinks, vegetable diet, and all the means likely or reputed to diminish the uric acid in the urine, produced no change. In exploring the bladder, and in the destruction of the stone, I had satisfied myself that the prostate gland was much enlarged, and that the neck of the bladder was constantly over excited, and produced the frequent necessity of urinating with a difficulty and even

pain in satisfying it. I have already shown that these two peculiarities are the manifest source of the predominance of uric acid in the urine, although the cause of its being so is inexplicable.

When we find the circumstances which I have just examined united together, a coincidence of stone and gravel, abundant expulsion of the latter, either before or after the operation, irritation of the neck of the bladder, tumefaction of the prostate and atony of the bladder, we ought to fear a return of the stone even after we have cured the catarrhal affection of the urinary passages. In this case it may happen that the sand and calculi of the second and third formation will not differ from those which existed at first. Among the cases of this that I have seen I will cite that of M. Cailletet, who was operated on in 1829 and 1833, and who had a third attack in 1838, his bladder contained only the small calculi, which would perhaps have been expelled by another patient, but their passage was prevented in him by the inertia of the bladder and the engorgement of the prostate. During the space of ten years this patient had had stone three times, independently of the lithic deposits which the urine constantly brought away, under the form of sand or very small pebbles. Nevertheless he had undergone all the prescribed treatments, and had employed the mineral waters, which are the most celebrated for the relief of gravel. This shows that all these means may fail when the neck of the bladder is in a morbid state; the success of the treatment of gravel is then subordinate to the treatment directed against the organic lesion.

CHAPTER IV.

Of Prostatic Pebbles (*graviers*.)

We must not confound the cases of which I shall hereafter speak, and where the pebbles, strictly speaking, remain in the urethra, when conjoined with stricture or without it, with those of prostatic calculi. These latter have proper physical characters, and others which are dependent on their composition. They also produce equally different effects, being more obscure. The disorders in the passing of the urine have also peculiar characters, if the presence of prostatic pebbles is not complicated with other morbid states which modify them. We do not see in these cases either nephritic colic, with or without the emission of pebbles, or that series of grave and alarming symptoms which are often presented by the cases whose history we have just examined. The symptoms generally are confined to dull, wandering, deep-seated pains, without marked characters, with a desire to urinate and difficulty in satisfying it. Sometimes there is even no marked symptom, and it is only by

fortuitous circumstances that we discover the presence of a stone at the urethral surface of the prostate; for the pebbles which are placed in the thickness of the gland, or in its passages, are almost always unknown during life except in a small number of cases, which I shall refer to when treating of the diseases of the prostate. The exploring of the urethra by means of a sound, with soft bougies, or with a three bladed pair of forceps, will generally enable us to discover these prostatic pebbles, from their being prominent in that portion of the canal which is embraced in the gland. I have given some examples of this in my third letter on lithotripsy, in the parallel and in the treatise on calculi, so that I think I may here confine myself to the relation of a fact to which is attached some remarkable circumstances.

Two years since the Count de W—— came to consult me about a calculous affection which he thought he was labouring under. In going to London, he had consulted the first English surgeons, who all proved a diseased state of the prostate, and ascribed a great portion of the symptoms to albumen in his urine; this was also the opinion of a distinguished Swedish practitioner who accompanied the patient. I satisfied myself that the bladder contained no stone; but when the sound reached the neck of the bladder, where there was a variation in the canal upwardly, produced by the intumescence of the prostate, I felt a sensation of rubbing or grating which could only be caused by the passage of the instrument over, or its meeting with some inorganic body in traversing the neck of the bladder. The knowledge that I had of the special impressions left upon soft bougies by urethral calculi, and those of the neck of the bladder, induced me to try one, which I took and forced into the bladder. In withdrawing it with great care, after having allowed it to rest there three minutes, I found upon its internal face, and at the spot corresponding to and behind the internal orifice of the urethra, at the superior face of the body of the prostate, a perpendicular impression, very clear, and ending abruptly, except on the side of the end of the bougie, where a long furrow was seen in the wax. This impression, which I obtained on all the large soft bougies successively introduced, cause me to regard it as a calculus formed in the prostate, and sending a prolongation into the neck of the bladder; it was this elongation that scratched the wax when the bougies passed above it. But the important fact of the size, thickness, and disposition of the embedded calculus remained to be learnt. The examination by the anus could furnish no idea, nor did that by the bladder offer more. I was therefore prevented from detaching the stone or destroying the prominent portion. This last result might have been obtained, as has been proved by two cases of encysted vesical calculi which projected into the bladder, and in which I destroyed the prolongation. But in this case it was a question of time; the patient could remain in Paris only a certain number of days, and in these attempts we knew nothing positively as to the duration of the treatment or the seriousness of the

attendant circumstances. I abstained, therefore, from attempting any thing, or even from making the examinations, which would have enabled me to determine definitely the nature of the disease. The patient believed that he might be able to return to Paris, and I promised him that if necessary I would go to Stockholm to operate on him, but some months after his return to that town he was attacked with an accidental disease, which caused his death.

I have spoken of the sensation of grating or rubbing, which could only result from the meeting of two hard bodies, for I am well aware of the analogy existing between it and the rubbing of the sound against the indurations of the prostate or even against the fleshy columns of the bladder. This last sensation, which has been the source of grave mistakes, as I have elsewhere said, I think I can clearly distinguish from that which existed in the patient just spoken of, and that it is also seen in many cases of gravel or of very small pebbles; but it requires a tact which we can neither communicate to others nor yet define in an exact way, and that long habit in exploring the bladder can alone enable us to acquire in cases which have so close a connection to each other in regard to the sensations felt by the hand of the operator. M. de W—— is not the only patient in whom the large soft bougies have enabled me to understand the grating sensation produced by the passage of the sound over prostatic pebbles. In another who suffered from calculi of this nature in the sides of the urethra, I have also obtained small impressions, but more shallow and less clean, owing, without doubt, to the calculi being less voluminous, or that they made less of a projection.

Every time that we have been enabled to prove the presence of prostatic calculi, either as free or only salient in that portion of the urethra which is embraced by the gland, we have little reason to count on their spontaneous expulsion, especially if at the same time there are obstacles existing in the urethra, for then we might hope that after the destruction of the stricture the foreign body would be forced out. Nevertheless I have only seen two or three cases of this kind, and yet I ought to observe that I have mistaken the ordinary pebbles which had remained a long time behind a stricture, or which had even been expelled without there existing any contraction for prostatic pebbles, as experience has proven that these bodies can remain a long time either in the middle of the prostatic or in the membranous portions of the urethra, and we do not know the cause which has prevented their being expelled with the urine. Whatever it may be, it is rare that prostatic pebbles escape of themselves. When they are loose upon the sides of the verumontanum, where I have often found them in the dead subject, it is easy to extract them by the means which I have shown in my third letter, or in the comparison of the different methods of treating stone, and the success is so much the more certain, as in the generality of cases these pebbles exist without a serious disease of the prostate gland; for it is remarkable, that in the formation and

sojourn of these bodies in the urethra, they are only retained by a sort of stringy mucous, in small quantities. I have seen them in the subject, collected together on the sides of the caput galiginis, easily displaced by the finger, and yet having from all appearances remained there some time, as they grow slowly, and many had attained considerable size. In patients, and especially in M. M. Janisch and Arthur, whose cases I have reported, the pebbles occupied the same place, were extracted with the greatest facility, and without being followed by any serious symptoms; the patients had also suffered from them for a long time, and yet the jet of urine could not bring them away.

On the other hand, the formation of these pebbles does not always produce disease of the prostate, or even its tumefaction or induration, but accompanies an alteration yet unknown, of the fluid secreted by this gland.

When these prostatic pebbles are imbedded in the tissue of the organ, or lodged either in the cells or in the orifices of the excretory ducts, the difficulties may be great, or even insurmountable, and the practitioner finds himself reduced to the prescription of emollient drinks and of anodynes, whose effects will be very restricted. Nevertheless it is better to confine ourselves to the employment of these simple means, which can be varied at pleasure, than to expose the life of the patient to hazardous attempts, the more so as we often see the symptoms due to this cause remaining stationary, or ceasing after a longer or shorter period.

CHAPTER V.

Of the progress and symptoms of Gravel.

The developement of gravel presents almost as many variations as there are patients attacked. But we find some cases in which its different phases follow a perfectly regular order. Such is the following, taken from among many that I have seen.

M. de Tascher, a septuagenarian, had had gravel for some time, when he came to consult me for a stone in the bladder. At first, and during many years, he had passed a great quantity of very fine red sand, but as it produced no suffering, he regarded it as a normal and unimportant affection, and thought little about it. Some time after he suffered at different periods from nephritic colic, which ended in the expulsion of larger grains of sand, the passage of which caused so little pain that he did not think of resorting to a special treatment, but continued to take diuretic drinks, to use barley water, and to live according to his usual habits, without troubling himself with his gravel. Finally he ceased to pass pebbles, and

thought himself cured ; but some months afterwards he perceived a series of disorders in the bladder, which induced him to think he had stone. Nevertheless, as his symptoms related as much or even more to a vesical catarrh than a stone, attention was only given to the former, and it was not until all means had been tried that M. Tascher determined to examine seriously into the cause of his sufferings. It was, however, too late ; the bladder contained a large calculus, was the seat of an intense inflammation, his health was ruined, and his constitution worn out. No operation offered sufficient chances of success to induce us to hope for the cure of the disease, and in fact he sank under it soon after.

But this regularity in the development of the disease is far from being constant. In a great number of cases the gravel appears, continues a certain time, then ceases, and is reproduced without any appreciable cause to explain it.

Sometimes there are many regular and periodical attacks of nephritic colic, which are unexpectedly followed by an interval of months or of years. In certain cases the disease never reappears, even when it has not been combated by any treatment. We can readily understand that the coincidence of these intervals with the employment of any therapeutic agent would give credit to this means, although the fact was foreign to the result with which we had been astonished. Such cases are often seen. The wise and prudent practitioner ought, before giving his confidence to the numerous remedies vaunted for the treatment of gravel, to see that the same effect can be obtained in similar cases. But none of these boasted remedies have sustained this too much neglected proof of their therapeutical effects.

As in the cases of stone, so also do those with gravel, suffer little, or even too little, at the commencement of the disease, and this circumstance is very often fatal to them. Others, on the contrary, whose bladders contain only a small number of large pebbles or little calculi, have even formidable symptoms. The smallest pains produced by these foreign bodies at the neck of the bladder rebound upon the functions of the economy in a way that we cannot explain. I have seen some cases in which there was only gravel or a small calculus, and in which the patients have died before we could decide on an operation to relieve them. Such was the case with one of the directors of the school at Toulouse, who died a short time after being sounded by one of my fellow practitioners ; all that was tried in order to throw light on the symptoms proved useless. I have cited in my fifth letter the case of M. Rollet, in whom this disposition was so strongly developed, that I had great trouble to cure him by lithotripsy. M. Bousquet, of Bordeaux, was in the same state, suffering from slight pains, but which reacted strongly on his general health, although the bladder contained but one small calculus. In his case also the application of lithotripsy was more painful than it is in the generality of like cases, and required great precautions. I have also seen a patient whose bladder contained

large pebbles, which other subjects would have passed readily, or that it would have been very easy to have broken or extracted by lithotripsy, yet when he got up, and the pebbles came to be applied upon the internal orifice of the urethra, suffer from the most severe symptoms; the simple introduction of a sound produced a derangement of his system, the effects of which lasted fifteen days. I at last operated on him with success by means of the precautions that I have elsewhere spoken of.

But it is not only at the neck of the bladder that we see this peculiarity. There are other points of the urinary apparatus which cause like sympathetic affections. In all these cases we are unable to understand the connection existing between the disease and the effects produced, for we can hardly believe that a very fine sand, a simple dust drawn off by the urine, can cause the violent and continued fevers, the troubles of digestion, the exaltation of the nervous system, and the decay, &c. that we see in some patients. Experience, however, proves it to be so; indeed in the majority of the cases it is sufficient to cause a cessation of the derangement in the functions of the kidneys, and to procure the expulsion of the foreign body, in order to establish the equilibrium in all the other organs. I have seen remarkable instances of this; among others that of M. Chomette, a sexagenarian, of strong constitution and considerable emboupoint, who passed from time to time some small pebbles, which caused him pain; besides this, he had a difficulty in urinating, frequent, though slight hematuria, fever, loss of appetite and of sleep, derangement of all his functions, progressive weakness, and alteration of features; the heart also was attacked with an aneurism, which gave a little uncertainty to the diagnosis. The examination of the bladder having proved to me that this viscus contained no foreign body, I confined myself to the use of the ordinary treatment: all the symptoms became less marked, and disappeared after the patient ceased to pass the pebbles.

The symptoms have been so serious in some of those afflicted with gravel as to induce me to think there might have existed anteriorly to the gravel, a lesion of the spermatic ducts, or of the prostate, even without any considerable swelling. In some cases the genital power had been weakened, if not destroyed, for a considerable time, although the patients were yet young, and the removal of the pebbles has been sufficient to enable me to stop the gravelly affection and re-establish the reproductive powers.

I have only four cases in which this peculiarity was well marked, and we ought perhaps to await new facts.

The neck of the bladder appears to be the point of departure of the principal disorders seen in these cases, which though exceptions still merit our attention. It is especially by the application of lithotripsy that we have been enabled to appreciate the importance of the phenomena which characterise them, and it is to the employment of this new method that we owe not only the new resources that our art resorts to at the present day, but still the

knowledge of the precautions which we ought to take. To the facts which I have already published I add the following.

M. Lebeau, aged twenty-two years, living at Toulon, has had a difficulty in urinating for some time, and a burning pain at the neck of the bladder. Certain symptoms seem to indicate nephritic pains, and the action of a pebble on the neck of the bladder; but the patient dreads the sound, and, notwithstanding our reasoning, returned home without having allowed an examination. However he was obliged to stop at Dijon, and return to Paris, as he was very much fatigued by the journey. I then assured myself that he had a pebble engaged in the neck of the bladder, pushed it back into the bladder, seized, broke and extracted it by means of lithotripsy, but he had considerable irritation of the neck of the bladder for some time afterwards. In this respect the case of M. Lebeau resembles many others that I have cited, but it is less marked than that of Dandet, which has been published with details.

Among the cases in which we see serious disorders of the neck of the bladder produced by the presence of a pebble, I recall that of a soldier that I treated in 1833 in the hospital. This man had had a pebble in the bladder only a few months. Nevertheless there was excessive irritability of the neck, and a state of anxiety resulting from it, which, without doubt, had tended to derange his general health, so that any one would have said that he had suffered from it for some years. I found the pebble engaged in the neck of the bladder, from whence it had been several times displaced. I pushed it back into this viscus and immediately broke it. The patient suffered but little, though it required some time for him to be re-established entirely, and during many days he had an involuntary evacuation of his urine, which I attributed to the stone having rested at the neck of the bladder, and to the disorders which it had there caused. If we had been forced to await the spontaneous expulsion of this foreign body, all the means likely to have produced a contraction of the bladder would have been useless; and even had we succeeded in exciting them the pains would have been excruciating, so that his health must have suffered considerably, as was shown by what actually occurred.

The question now presents itself as to the period at which a patient ought to be considered as being really attacked with gravel. M. Magendie thinks that when a person passes gravel only once or twice a year, he is not to be considered as having gravel, and he only admits this where the expulsion of pebbles takes place once or twice a month. Such a distinction is certainly singular. In common parlance a person is said to have gravel when his urine brings away one of the kind of concretions whose principal forms I have heretofore indicated. But the question ought not to be regarded in so restricted a light. Indeed all those having gravel even to a great extent do not pass pebbles, neither can we consider all whose urine contains powdery or crystalline depositions as truly having gravel; for there are many whose urine forms true concretions on cooling, who

yet are in excellent health. These persons do not suffer from any other inconvenience, and have never had either stone or gravel, although their servants have been occupied each morning during a number of years in detaching from the sides of the vessel those deposits of uric acid or urate of ammonia which are found strongly adherent to them.

On the other hand I have cited a certain number of facts which prove that the first pebbles are often stopped in the kidneys, ureters, bladder, or even the urethra, without the patients having passed true concretions or any powdery deposit in their urine, and yet they are truly attacked with gravel: these cases are much more frequent than is generally supposed. We ought then to recollect, that the calculary affections almost always begin by gravel, and that many who have stone have never passed pebbles. But a rigorous diagnosis is difficult to establish on this point, as I have shown in my treatise on calculi, where I have made known the serious errors daily committed. In restricting the question to gravel, the difficulties are even greater, for we have rarely occasion to resort to the only method of determining it, local examinations—even in cases where they are admissible. Almost always we are obliged to trust to the sensations of the patient, and daily experience demonstrates that too often they lead us into errors. We ought then to divide the sensations of those having gravel into two grand classes. 1st, Those in whom the formation, displacement, and developement of pebbles is accompanied with the general disorders known by the term nephritic colics. 2d, Those in whom these colics do not exist, at least in a clearly marked manner, so that they do not discover the disease till the pebbles are discharged with the urine, or from the symptoms that these pebbles cause by remaining in the urinary passages, and there becoming the nucleus of stone. The history of the first is the better known; the accidents to which they are subject having forced themselves upon the observation of every one in a special manner, it is therefore useless to add any thing to what I have already said in my treatise. But this is not true of the diseases of the second class, for they have been barely looked at even in special works on this subject. The causes of the gravel in these circumstances, the signs which enable us to recognise it, and the means of treatment, are points which assuredly deserve a strict examination, the more so as the number of these insidious cases is considerable.

Indeed these cases may become a source of embarrassment to the practitioner. On the one hand there is a long list of symptoms, as I have said, attached to gravel, which are said to be present in nearly all cases, whereas, at the bedside we can scarcely meet with one, or if any do exist, they are so modified, that it is with much trouble that we recognise them. On the other hand the symptoms which have been presented as being peculiar to gravel, belong often more directly to many other morbid states, so that even the experienced practitioner has much difficulty in insuring his conscience against an error on which the life of the patient often depends. In

repeating here under the form of a resumé, the accounts which tend to give precision to the therapeutical indications, and which I have elsewhere given in detail, I fear that I shall only weaken their importance, and shall therefore content myself with some special observations which I have lately been enabled to collect.

The first relates to a case which presented itself in the Necker Hospital at the beginning of this year, and consisted in disorders produced by a pebble, which was arrested at the superior portion of the left ureter, the existence of which had not even been suspected during life, and in another vesical pebble for which the patient had come to seek our aid. This patient had been operated on by lithotripsy, and it was only within a few months that he commenced again to suffer, although not with the same kind of pain which he had previously had. He also had paralysis of his bladder, and was obliged to have his urine drawn off by the catheter. Notwithstanding this resource, which he used each time that he had occasion to urinate, he perceived his strength failing, his functions going on worse and worse: he became exceedingly depressed, and entered the hospital the 8th of December, 1838. I found him so feeble and so sensitive that I did not think it right to sound him, besides he had no immediately pressing symptoms, since the stone, which was believed to have been reproduced within a little more than a month, did not cause any very acute pain. After resting some days, I introduced a sound into the bladder, and found the urethra very much contracted spasmodically from within two inches of the meatus urinarius to near its membranous portion. In this contraction of the urethral parietes I could discover nothing which seemed owing to an organic change, but only an accidental and temporary state of hardness, which it is not rare to find in certain cases of stone and other disease of the urinary passages in subjects possessed of great irritability. The introduction of some bougies increasing in size, from No. 9 to No. 11, was sufficient to overcome the spasms, and injections gave the urine a better character; but this state did not last long; mucus appeared again in the liquid, and for many days the aspect of it was decidedly puriform. Then it was that the idea struck me of trying reagents on the urine, which I found decidedly alkaline. However the mucosity was not dissolved when agitated in the urine, and I did not think that it was mixed with pus. Dr. Gutterbock then proposed to me an experiment which was very simple, and which I cannot too highly recommend, in order to recognise the presence of pus, which is especially useful in some of the diseases of the urinary and respiratory organs. It consists in exposing a small quantity of these productions to the action of a candle or lamp: if they are composed of pus they will burn with a very distinct flame, which does not hold good in regard to simple mucosity. But there are some precautions to be taken in order that this experiment should succeed; we use an iron, or what is better, a platina wire, which is curved at the extremity, and which ought to be exposed to the flame, so as to represent a figure

of 8. This arrangement is necessary, in order that a larger quantity of the matter may be suspended over the flame. As the mucosities always contain a little water, which prevents the combustion, we must move it over the flame in order to dry them before they burn. I now return to the urine of my patient. A few days afterwards it became clear and nearly natural in this respect; nevertheless it continued to be alkaline, whence I inferred that there was a deep seated lesion of the kidneys or ureters, although the patient suffered no pain in the corresponding regions, and had nothing otherwise to make us suspect it. Besides, his weakness progressed, he lost his appetite and sleep more and more until his death, which occurred the first of January, 1839. On examining the body no remarkable alteration was found in the right kidney, except that the infundibula and pelvis were a little larger than usual, and contained a few grains of an ashy gray sand: the substance of the kidney was somewhat softened and a little higher coloured than natural; the ureter of this side presented nothing special. The left kidney was double the ordinary size, and had formed adhesions to the spleen, pancreas, epiploon and adjacent tissues, and these adhesions had an almost cartilaginous hardness. We also discovered numerous collections of pus in the body of this gland, which was softened and converted into a kind of putrid state; the infundibula and pelvis were largely dilated. At the superior orifice of the ureter a large pebble was found, which obstructed it, so that it could not be withdrawn without dividing the parietes of the canal. This pebble was thirteen lines long by four in diameter, oblong and slightly curved. Immediately beneath it the ureter was contracted by a kind of bridle, of a hard and resisting tissue; lower down than this bridle, and even to its insertion into the bladder, the canal was of the size of the small intestine. The bladder offered nothing remarkable, its walls were slightly hypertrophied, and there were two little cells in the bas fond; the mucous membrane, although of a slight brownish tint, showed no signs of great inflammation; it contained a spheroidal pebble, a little elongated and flattened, of the same nature as that in the ureter, and offering, like it, a regular crystallisation. This was an agglomeration of dull white crystals, adherent to the mass by their base, and having a little point free at the other extremity. This pebble was six lines and a half long, and five thick.

The source of all these lesions being the pebble which was engaged in the superior orifice of the urethra, the lesion of the kidney had been the first effect, and the other organs had been involved consecutively. But there had been no developement of symptoms to lead us to think of the existence of a foreign body. We shall see from other cases that a like cause has been suspected without our being able to render any assistance to the patient.

The effect that the presence of these pebbles in the kidneys and ureters produces on the testicles is generally known, but we have not sufficiently observed those which they produce on the urethra. I have seen a large number of patients with gravel, especially at the

crisis, who have had the urethra so irritable, and suffered from it so much, as hardly to believe that the canal was not the true seat of their disease. In certain cases of renal or urethral gravel, without any symptoms likely to show it, the urethra offers this exaltation of sensibility. Indeed this is not exclusively the effect of the presence of a pebble, but may be observed as a consequence of all profound organic lesions of the urinary apparatus. We ought, however, to note it, not only as likely to enlighten the diagnosis, but yet, and above all, because the knowledge of it is useful in regard to the therapeutical means, as I shall have occasion to show. Practical facts show that many pebbles are retained in the bladder, where they become stones, only because we have not thought to overcome this morbid irritability of the urethra.

As to the mode of expulsion of pebbles, there is nothing certain. Ordinarily each nephritic colic is followed by the discharge of one or more of these bodies, but in many patients they are not expelled till some days after. This also is accompanied with very variable symptoms. In many cases where no colic has existed, pebbles are driven out by the urine at the moment when they are the least expected. Sometimes the patients are hardly sensible of their passage, and are only informed of it by the noise which they hear at the bottom of the vessel. Sometimes, on the contrary, they suffer more when the pebbles traverse the urethra than when they pass through the ureter, an observation made some time back, and which may be seen in the works of Gooch. In some rare cases a very large number of pebbles are expelled at the same time. I cite the two following facts as illustrations. On the 30th of January, 1839, a patient entered my calculous wards who had suffered from gravel for a long time without having nephritic colics, for the wandering, irregular, deep-seated pains of the loins, sacrum and pubis to which many patients are subject, cannot be so termed. This patient passed sixty pebbles in a single day, the greater part of which were as large as a pea. The preceding expulsions had been much less copious, often indeed only one or two escaped in an irregular way, and he had never submitted to regular treatment, but had employed some simple means, which terminated in his having stone. His bladder appeared to contain many calculi, and he had at the same time a vesical catarrh far advanced. As his general health had suffered considerably, we could not attempt the destruction of the stones in the bladder till after a long treatment.

The 20th of May, 1839, I was consulted by M. Brid, the keeper of an hotel, a man of good constitution, who had had a difficulty in urinating for some years, though not sufficient to overcome his repugnance to submit to treatment. From time to time he passed a fine sand, without its causing any serious symptoms. These things went on to the end of the year 1838. He then had a retention of urine, which lasted during several hours, at the end of which he passed by great exertions a large quantity of sand and urine. New accidents soon supervened: one day he tried to urinate at

seven o'clock in the morning, but could not; from that moment till three in the afternoon, it was only by incredible efforts that he succeeded in passing a few drops of burning water. Baths—long continued, diluent drinks, and emollient applications had been tried without success, when I was called to see him. A bougie of No. 2 had great difficulty in opening the exterior orifice, met with a second obstacle, two inches from the meatus urinarius, and was stopped above the pubic arch. Its introduction gave me the sensation of a little jerking movement, which made me think that it moved upon grains, which rolled between it and the parietes of the urethra. I at last forced it into the bladder, but in withdrawing it felt the same sensation, and many of the grains remained buried in the wax. The jet of urine which followed the bougie brought away so large a number of them that the bottom of the vase was covered; I counted more than two hundred without having taken more than half the mass. A sudden relief followed this double emission of sand and urine, and then it was only necessary to dilate the strictures by the employment of soft graduated bougies. The cure went on regularly and rapidly.

The expulsion of numerous pebbles takes place generally only among those of uric acid, especially when they are small. Those of other kinds generally escape singly, but to this there are some exceptions. I have seen pebbles of phosphate of lime expelled in great numbers, and if we may so speak, *coup sur coup*, as was the case in Madame Theille, whose case will be given hereafter.

In certain patients, the nephritic colics are regular and periodical, whether they are followed or not by the expulsion of pebbles. In 1832, I saw a patient who was attacked with them every month, and each time with very grave nervous symptoms; I prescribed for him a treatment, of which I have not heard the result.

CHAPTER VI.

Of the Necessity of frequently sounding the Bladder in cases of Gravel.

If we recapitulate the different series of cases which may be presented, and of which I have as yet only mentioned a small number, the others remaining to be examined as occasion may offer, we shall readily understand the necessity of carefully exploring the bladders of those having gravel, above all when there is any reason to suspect one or the other of the circumstances upon which I shall hereafter insist, and which render the spontaneous expulsion of pebbles difficult or impossible. Every enlightened practitioner will moreover admit, that there is no other means of assuring ourselves that all the foreign bodies have been expelled, since their presence

in the bladder may excite no morbid phenomena, nor give rise to any accidents which seem to have connection with the calculary affection. But how ought we to proceed in these examinations in order to render them as profitable as they are capable of becoming?

I have elsewhere made known the different ways in which we explore the bladder, not only in order to ascertain if there exists a foreign body, and what are its characters, but also in order to determine the different pathological states, of which this viscus may be the seat, and the influence even that these states themselves may exercise on our researches. When it is for gravel, these vesical examinations demand much more care and attention, because they have for their object the discovery of a smaller object, which escapes, as it were, before the instrument. Thus on the one hand the observer scarcely meets with the symptoms proper to guide him, and often even will not discover any; on the other, the difficulties of the operation increase by reason of the smallness of the pebble. As to the general means used in like cases, I cannot too often repeat that they are insufficient, and that the nullity and inaccuracy of the facts that they furnish lead the practitioner into the most fatal errors. As this is a matter of the safety of the patient, it is difficult to explain the indifference with which this subject has been treated in the greater number of works.

Indeed, if the pebble is too large to traverse the urethra, all medical treatment tending to prevent gravel or to favour its expulsion, will have not only the inconvenience of submitting the patient during entire months to a fatiguing treatment, but still will become dangerous, because it will afford time to the pebble to increase and to form a true stone. It is owing to the examination of the bladder having been neglected, or badly made, that so many of those with gravel have had stone. Nevertheless such is the power of routine, that the author of a work on stone and gravel, recently published, says that he has often recognised the presence of a pebble in the bladder by means of a stylet, or even of a sound in gum-elastic. This is one of those delusions into which those who have not a collection of practical facts easily fall, and we shall see that M. Segalas has often been deceived in this manner.

What are we to think after this of the marked assertions of some of the partisans on the dissolution of calculi, and especially of the author of the panegyric on the waters of Vichy, who boldly rejects the exploring of the bladder, even by the ordinary methods, as useless precautions, and who pretends that the sensations of the patient are sufficient to decide whether or not there is a calculus in it. M. Petit assigns as a reason, that the sound even in the ablest hands has not furnished the proofs which had been expected from it, whence he concludes that we ought to pass it by, and submit the patient without opposition to the treatment by the waters of Vichy. It is true, his opinions are not entirely settled on this point, for he sometimes speaks of the necessity of sounding the bladder, and even sends his patients a long distance in order that they may be sounded

by able hands; lastly, we shall see that after declaring for a number of years that the examination of the bladder was a superfluous digression, he asks for it data that we cannot grant.

When we may wish to prove the presence of a pebble in the bladder, which is too large to pass the urethra, or to recognise the morbid states which render its expulsion impossible, we ought to lay aside the usual means and insufficient proceedings of ordinary practice, and have recourse to one of the following.

1st. We can succeed sometimes by means of a metallic sound of a small curve, after having caused the bladder to contract itself upon the instrument by using cold and frequently repeated injections. In this case the bladder is reduced to an exceedingly small cavity, in fact, a mere nothing, and the pebble placed in contact with the sound, gives to the hand holding it, and which moves it backwards and forwards, inclining it in every direction, a kind of grating or rubbing, which results from the collision of two hard bodies. This sensation is more marked, if the pebble, instead of corresponding to the sides of the instrument, is placed behind it, so that the extremity of the sound presses on and strikes it when pushed into the bladder. This method has often been successful with me, especially when there was no tumefaction of the prostate, or a diseased state of the parietes of the bladder. In the opposite circumstances, and every time that we cannot procure a contraction of this viscus, we must have recourse to other methods.

2d. The curved instrument, improperly called *percuteur*, and to which I think it better to apply the term *lithoclaste*, can be very serviceable in these examinations. However, it requires some modifications, without which it is little better than the ordinary sound, as has been shown in a case of Doctor Pohl, of Moscow, who, after having carefully explored the bladder of Dr. Bigel by means of this instrument, without finding any foreign body, concluded that he had passed all the fragments of stone at Carlsbad. We shall hereafter see how much he was mistaken. I have given to this instrument some modifications, the utility of which have been confirmed by a long experience, either in searching for gravel, or for fragments after the operation of lithotripsy. These changes, and their bearings on practice, I have shown elsewhere. Here I shall confine myself to the modified *lithoclaste*, as employed in examinations. The straight portion of this instrument is nine inches long by two to two and a half lines in diameter. The curved part is nine lines long by five or seven broad. The two blades are very flat, apply themselves one to the other, so as to be nearly enclosed within each other, except a very small thin edge of the female blade, which consequently is a little larger than the male. The latter, therefore, does not exactly fill the kind of gutter made for its reception. The two blades, by reason of their want of thickness, are not large, and the urethra yields sufficiently to their introduction. When carried into the bladder, they offer many advantages for the search. In other respects the instrument does not differ from that which I have

represented in my parallel, and has been very useful to me in a large number of cases, care being always taken to make the examination when the bladder is nearly emptied. The proceeding is the same when we seek the fragments broken by lithotripsy. We first inject one or more syringes of cold water; when the liquid of the last of them has escaped, then inject about a tablespoonful, withdraw the catheter, and introduce the instrument; open it only five or eight lines, and move it successively over all the points of the bladder, opening and shutting it from time to time, to be sure that the pebble is not included in the little gutter. We examine particularly the *bas fond* of the bladder, especially when there exists an engorgement of the prostate, for it is generally behind the tumefaction of the prostate that pebbles are met with, and we can easily seize them by directing the curve of the instrument towards the lowest part. More than once I have succeeded by this method in discovering foreign bodies, which had not been recognised by the common sound. It sometimes, however, becomes necessary to repeat the examinations, in the execution of which great care and attention is requisite, for fear of fatiguing the bladder.

The instrument of M. Jacobson, which has been so highly spoken of, does not offer the same resources as that of which I have just spoken; its mechanism fully explains this, and it would be useless to refer to it further.

There are still some cases in which the means that I have just referred to do not give an absolute certainty in practice, especially such as that of inertia of the bladder. The three bladed (trilabe) one is calculated to fill this gap; it is employed in the same manner and with the same precautions as when it is used to test the cure after the application of lithotripsy. As I have already shown all that relates to the manœuvre in the parallel, I merely refer to it here, remarking that the examinations by this method are neither more difficult nor painful than the others, and that the assertions which have been made on this point are based either on suppositions or mal-applications.

It seems to me useless to cite facts in support of this doctrine, for it is only the corollary of the numerous cases of which this and numerous other of my works include the details. All is here confined to the description of the method.

The necessity of repeating the examination of the bladder is a much less serious inconvenience than has been thought. These examinations, of which so many patients are afraid, or rather which they have been made to fear, cause very slight pain, and such as is easily borne; when they have once determined to undergo them, they make no difficulty as to their being repeated a second or even third time if necessary.

CHAPTER VII.

Of the Influence of Fear and Officious Advice upon the Fate of those having Gravel.

When we may have directed a medical treatment against gravel, or when the patient has been left to himself, a period arrives in which the symptoms generally cease. Sometimes, then, the secretion of the kidney returns to its normal state, and pebbles are no longer formed; sometimes, on the contrary, and it is the more common, the pebbles, instead of being expelled with the urine, collect themselves together in some point or other of the urinary apparatus, and constitute true calculi. If nephritic colics have existed previous to the expulsion of the pebble, they cease, or at least the pains and symptoms change their character to such a degree, that it sometimes becomes difficult to recognise them, the patient believes himself cured, and many physicians partake of his opinion; they renounce all treatment, and although the patient experiences some constraint, uncomfortable feelings and restlessness, they suppose that time will remove these remnants of disease. If perchance the pains reappear with some violence, if the necessity of urinating becomes more frequent, if walking and exercise are painful, if they bring a return of the sufferings, if they produce derangements in the functions of the bladder and changes in the characters of the urine, it is charged to fatigue, inattention to diet, &c.; they are kept at rest, take baths, enemata and emollient drinks; the symptoms cease, and this relief, which is nearly constant, reassures the patient and those who surround him, the more so, as this calm lasts sometimes whole weeks, and even months. The symptoms reappear, the same causes are reaccused; they employ the same treatment and obtain the same result, and this state of things is prolonged for a longer time. It is only when the symptoms are reproduced a great number of times, and have increased in intensity, that the patients begin to be uneasy and decide on seeking the true cause. But during this time the stones increase, and cause the immense train of organic alterations which I have described in my treatise. Indeed every day shows us the unhappy patients, who believe that they have only the gravel, and who come to seek our aid because the treatment that they have employed has not completed the cure; the greater part labour under the deep conviction that it is only the gravel, repel all ideas of stone, and show their surprise when we propose to them an examination of the bladder. Some even refuse to submit to it, and allow their disease to take a development which becomes fatal. I have before said that these cases present a terrible collection for lithotripsy, to which the repeated solicitations of patients and of those who surround them force us too often to have recourse, at a period when, if we may so speak, there is no longer time, because the disorders are so serious that the extraction of the stone is not sufficient to arrest their

course. Moreover, in calculating the propriety of lithotripsy and lithotomy upon constitutions which have been weakened and broken, the surgeon deems it his duty to try the new in preference to the old method, because there is less to fear from its consequences. It is this which has given to the operation of the crushing of the stone, a mortality which the opponents of this happy innovation have presented as inherent to the method itself, whilst it depends altogether on circumstances foreign to the operation, in respect to which I have sufficiently explained myself in the parallel.

The symptoms of gravel are sometimes but little developed in some patients, and to them this circumstance may become fatal. It is because they suffer little, do not have serious symptoms, have no retention of urine, feel no pain in the kidneys, and no nephritic colics, properly speaking, that they are soothed by the sad delusion, and hope that the small quantity of pebbles which they pass is a trifling thing. I have been consulted by many of these patients, who believed, as they said, that they had a slight gravel, and in whom I have found such large stones that it was impossible to break them by lithotripsy. I will cite among others the case of M. Bardonnnet, from the environs of Chalons, aged thirty-six years, and who had suffered for some years a marked derangement in his urinary functions. When he came to Paris, he thought he had only a very small pebble, of which he wished me to relieve him by lithotripsy; he was not a little surprised to learn that his bladder was entirely filled by a voluminous calculus that it was impossible to break; the only resource consisted here in the operation of lithotomy, to which he would not listen, and at the end of a few months he died from the disorders that this enormous mass had produced. How many unfortunate patients do we daily see, who, like M. Bardonnnet, suffer only slight pain, and do not take the trouble to be enlightened in regard to their true situation, confining themselves to the use of tranquillising medicines, and seizing with avidity every thing that can heighten their delusion.

If the slight pains and badly defined sensations which sometimes accompany the gravel can lead patients into errors in regard to the nature and progress of the disease, this error is the more to be feared when there exists no proper indication to lead us to suspect the formation of pebbles. It is indeed common to see those with stone who have never had nephritic colic; who have never passed either sand or pebbles; who have never had the least pain in the kidneys, nor experienced any disorder in the functions of the urinary apparatus, and in whom the first signs of a diseased state are caused by the presence of a foreign body. It may even happen, if the bladder is but slightly irritable, if the patient makes no violent exertion, and if he is not very attentive to recollect his sensations, that the calculus may have already acquired a certain volume when the first pains of stone show themselves.

These cases are the most insidious that can present themselves, for the most careful attention on the part of both practitioner and

patient is not sufficient to discover the disease at its commencement, and even when known, medical means avail but little; it is from surgery that we must seek our aid. Indeed these circumstances are not the most unfavourable of all, since the organic lesions have generally made little progress, and the operations almost always succeed. It is not the same thing when the patients have injured themselves in order to escape the pains of stone. But if we see those with stone in whom the idea alone of a surgical operation causes so much fear, that they obstinately refuse all examinations likely to enlighten their situation, others go so far as to exhaust themselves by their efforts to conceal the torments that they endure, and eagerly seize the change in the opinions of those around them, especially of the physicians whose condescension they too often abuse. How great is their despair on learning that they truly have stone. Their anxiety is still increased on finding that this stone is so large, and that it has produced such changes in the bladder, that lithotripsy has become very difficult, even impossible, and that their sole hope of safety rests on the operation of lithotomy. It is necessary to see, as I have too often seen, and yet see every day, the deep consternation of the patients and of their families when we reveal to them the true state of things, always employing the usual precautions. It is obligatory on the surgeon to tell the patient that he has had the stone too long, that the organs are attacked, that the destruction of the calculus will be long and difficult, even if the volume, hardness, and number of the foreign bodies does not render it absolutely impracticable, and he ought to add that his general health has already suffered much, and that consequently it will be more painful than it ordinarily is. I say that this is an imperious duty, because the patient ought to know his position, the ignorance of which has been the cause of his being in such an unfavourable condition. It is also more to the interest of the profession, which will be compromised if by a false reserve we disguise the circumstances which render the application uncertain.

When once the attention is fixed on the nature of the disease, and we interrogate the patients or the persons around them as to the different phenomena which have been presented, we quickly discover in their answers the true characters of the disease, such as I have shown them when treating of the diagnosis of it. Its march, progress, and the disorders that it has excited being well established, the next important point is to attack it. If lithotripsy is still possible, the patients submit easily, but when it is necessary to have recourse to lithotomy, their regrets are bitter, and their fright increases. I have seen at least two hundred cases of this kind, in which the desolation of the patients and their families has been shown in every possible light, and in many I have been obliged to undertake the defence of the physicians, whom they accused of having been traitors to their duty in concealing the truth. The most remarkable fact is, that patients who have shown the greatest repugnance to the means of examination capable of throwing

light on the true cause of their sufferings, are precisely those who afterwards show the greatest disposition to throw all the blame on the physician to whom they had entrusted the care of their health, and because he did not force them to be sounded, accuse him of carelessness or even ignorance.

The surgeon ought carefully to avoid furnishing any pretext to these recriminations, which are almost always misplaced, since the fault is in the patient himself, and has arisen from his pusillanimity and exaggerated fears at the sight of the sound. Long experience has confirmed me in this, so that in most cases I have been sufficiently happy to prevent a rupture between men, made to esteem each other, and who would have regretted the destruction of their relations, which were already of long standing. Besides the evil being done, we must endeavour to repair it; but as the resources of our art are often insufficient, as besides informing the patient of his condition is more easily done than curing him, it will not perhaps be useless to offer some remarks upon the circumstances which most contribute to the keeping of the patient and his physician in a false security. They are of three kinds.

1st. The vagueness, irregularity, and uncertainty of the symptoms of the disease, to which generally too much importance is attached.

2d. The officious advice, that those attacked with gravel receive from their relatives, friends, or others having gravel, who all think that their cases are alike, and who support themselves on a few scattered examples, in order to cause the adoption of a vicious treatment, I might add the advice given by certain physicians with a want of thought and carelessness truly culpable.

3d. The fears which are excited in those with gravel by all examinations of the bladder, and of all that bears the name of the operation.

Of the circumstances of the first kind, I have nothing to add to what I have just said, and to what I have given in my treatise on calculi in the chapter on diagnosis. But I ought to speak more at length of the influence of vicious counsels and fear upon the fate of those having gravel.

We find some patients who have had gravel during a long period of time, and who have scarcely suffered from it; only from time to time they passed a few pebbles, almost without perceiving them. These terminate in having stone at the moment when they least expect it. Such was the case of M. Delacroix, mayor of Valences, aged forty-six years, and upon whom I operated by means of lithotripsy in 1832. During fifteen months, this patient had passed no sand, and it was only after a ride in a carriage that the sudden appearance of blood in his urine made him fear the presence of a stone. His bladder was examined by a surgeon of Lyons, but without his being satisfied, and the consequences having rapidly increased, he came to Paris, where I assured myself that the bladder contained a large stone, of the same nature as the pebbles previously passed, and

of which the patient thought so little; so much does habit familiarise a man with the affections even that he fears the most. The gravel being only the first degree of stone, ought to have placed him on his guard, yet most of those who have passed pebbles for a long time end in regarding this evacuation as an almost natural phenomenon.

There is no influence more injurious to those suffering from gravel, than that of fear. Ordinarily they draw for themselves such frightful pictures of sounding, and of all other means of exploring the bladder, that they prefer rather to endure their acute and obstinate sufferings than to submit to these simple operations. Their fears are so marked in certain cases, that they seek to deceive themselves as to the character of their sufferings, and will not listen to the true causes which produce them. I have cited in my treatise on calculi and elsewhere many observations which prove this. Their repugnance is sometimes carried so far as to cause them to shun the society of those whose conversation turns on stone, or on the operations applicable to it. This singularity is seen chiefly among the most enlightened classes of society, in men gifted with an excellent judgment in regard to all other subjects than that under which they suffer. Here is another example, which I have before my eyes at this moment when I write.

M. Guignet, sexagenarian, suffered for a long time from gravel, which he passed, however, only in small quantities. He employed successively antiphlogistics, diuretics, and lithontriptics in all doses and under all forms. The symptoms were lessened, then returned at the end of a certain time; again disappeared to return with an always increasing violence. The patient at last passed some pebbles; the pains varied in their character, and changed their seat from time to time. To all but himself these differences were not such as to remove the idea of stone; but he would not listen to this suggestion, and payed no attention to the advice of a physician, Dr. Gaide, who advised his being sounded, alledging that the surgeons of Switzerland and the French provinces, in which he alternately dwelt, were not familiar with the use of the sound, and might wound him. He therefore continued to live in this state of uncertainty a prey to excessive pain, which his fears of being sounded made him bear with great resignation. It was only when his sufferings became intolerable and continuous that he determined to visit Paris. His bladder contained many calculi, and the organic alterations were so advanced that I hesitated a long time what to do. At last I had the good fortune to save my patient by lithotripsy, but the treatment was long and painful, whilst at the commencement the operation would have been easy and the cure prompt.

M. Dareste, of Paris, nearly seventy years of age, of a light complexion and lymphatic temperament, led a quiet and regular life; was very moderate in his habit, especially in eating and drinking. He had observed a little red sand in his urine for some time, but this deposit was neither constant nor copious; otherwise he suffered

from no serious symptoms, except that from time to time he perceived some vague pains in the lumbar region, but did not think much about them, and hardly spoke of them to his physician. For some time also the emission of his urine, though causing no true pain, yet was accompanied with a kind of constraint or uneasiness, the liquid ran slowly and in a dribble, and in order to emit the first jet he was obliged to make some exertion, wait some moments, and then force it. Some time later, Dr. Broussaud, his medical attendant, in connecting this functional derangement with the lumbar pains, was led to think that the bladder might contain a foreign body; but his patient, who neglected the symptoms in the kidneys, refused the examination of the bladder, of which he had great fears, and these fears made him bear with patience the functional derangements to which he was a victim, and try to conceal them from his family. At a later period, a catarrh of the bladder supervened, against which they were forced to use tranquillising remedies without being able to arrive at the cause of it. At a more advanced period, slight hematuria came on after exercise, the patient was alarmed and consented to the introduction of a sound; but the prostate was large, and we could not recognise the stone. A second and third examination was made without our meeting the foreign body, and this was to have been expected, because, independently of the obstacles offered by the enlargement of the prostate, the pains did not allow of a prolongation of the examination as much as was requisite. One thing which still contributed to alarm the patient, was that each introduction of the sound was followed by an emission of blood, and a general derangement of health, with fever. During more than a year M. Daresté remained in this state of hesitation, which gave time for a considerable increase in the stone; his health felt it and his sleep was troubled; his digestion imperfect and painful, and a rapid emaciation followed, which alarmed his family very much. It was only at this time that he determined to submit to treatment, and consented to a full examination of his bladder, but it was too late, I recognised a stone of great size, a prostate much enlarged and purulent urine. These circumstances, joined to the destruction of his health, did not allow us to doubt as to a long and painful treatment by means of lithotripsy being supported, still less was it allowable to think of lithotomy. The patient, thus condemned to live with his enemy, strove for a long time to keep up his delusion; but the contest was not of long duration, and a few months after he sank in a state of complete exhaustion. I would like to give the reader an idea of the painful sensations that I had in witnessing the despair of the numerous family of M. Daresté, and the repeated applications of his children to me to try some means to save a father who was the object of their profound veneration. This was one of those cases to which I shall hereafter refer, in which every operation was prevented by the destruction of the constitution, although the local suffering was not sufficiently acute either to account for the exhaustion, or authorise us to think

that the progress of the symptoms could be arrested by the removal of the stone; the operation would only then have tended to shorten a life that might sometimes be still longer preserved by means of the precautions which I will speak of hereafter. In the two cases that I have just cited, the symptoms have been different. In M. Guignet there were nephritic colics, expulsion of pebbles, cessation of gravel, constancy and increase in the pains peculiar to stone, and the well marked characters of the disease, without an alteration in the general health. In M. Dareste, on the contrary, the local symptoms were vague, badly marked, and very irregular; the principal disorders were in the general health, which rapidly wasted away, and was not in proportion with that which might have been caused by the local symptoms. In a number of other cases of the same nature, the violence of the pains rendered it a duty to undertake the operation of lithotomy, although the consequences of this operation may generally be fatal; but there are cases when we are constrained by necessity to put an end to the always increasing sufferings; and although the chances of success may be few, yet we ought to attempt the operation as the last resort. In M. Dareste, and in all the patients offering the same conditions, the shock of the operation could not have been supported, and it would only have tended to shorten their lives.

The greater portion of those who suffer from gravel are perhaps more than any other class of patients, under the influence of the advice offered by those around them. The existence of a case of gravel or calculus in a family, or among a certain set, calls their attention to it; they speak of and are constantly occupied with it; conversations and confidences make known analogous facts, which they compare and unite, and often perceive analogies between them where none exist, and draw out plans of treatment, based upon a series of suppositions, which lead the unhappy patients into winding ways, and most frequently they do not claim the assistance of the physician until they have exhausted the remedies of the gossips around. Under the influence of these means, or rather by the lapse of time alone, the characters of the disease are modified; the patient then forms his opinion, comments on and arranges, after his fashion, the opinions and prescriptions of the physician, and if the latter has not a firm conviction of the cure he yields, and allows that to be done which he believes he cannot prevent. Thus every thing combines to keep the patient in the false path that he has taken. I have seen a large number of cases of gravel which had been thus led to such a degree of weakness, change and disorder of the system, that all the resources of our art were powerless.

The conduct of the practitioner in like cases ought to be firm, and it is an imperious duty for him to proceed with full and entire confidence in the cause; and on this depends the safety of his patient. I have often been consulted by patients who wished to impose on me the erroneous opinions that they themselves had formed of their state, and in order to satisfy them I have been obliged to prescribe a

treatment based upon gratuitous suppositions; but I have seen too much of the sad consequences of such condescension to allow a like thought ever again to render me culpable, or to stop on the views that they wish to offer. One among others of these patients came to me from South America, expressly, as he said, to consult me, but he had predetermined that I should not sound him. Upon my positive refusal to prescribe any treatment for him before that I had acquired a perfect knowledge of the cause of his symptoms, he said to me, with some temper, that he would not have come so far had he thought to find in me a surgeon who was so little complaisant, and went off badly satisfied. Some days after he returned with more reasonable intentions; the idea of the sound did not alarm him so much. On examining his bladder, I found neither stone nor pebbles, but that he had a neuralgia of the neck. I attributed the formation of the sand that he passed from time to time to the influence of this state, prescribed the treatment which I usually employ in like cases, and a few days afterwards he left me, much more content than at his first visit; he was cured.

But it is not only the advice of friends, and the gratuitous counsel of medical acquaintances, that those with gravel have to fear. There are others even yet more dangerous, and which ought to awaken the solicitude of the practitioner, for we are too often taught to appreciate their sad effects.

The daily papers constantly make known some new combinations, tending to relieve the sufferings of those having gravel. Newspapers, advertisements, handbills, &c. all are eagerly seized upon by this class of patients, who blindly give themselves up to sharpers, and are never wearied in submitting even to most singular remedies. I have seen many who have thus been led to irremediable ruin, either from a total destruction of their health, or from the calculus having attained its greatest degree of developement. I shall only cite a single case.

M. Destaing, a septuagenarian, suffered for a long time from the gravel, which he passed at different intervals in considerable quantities, and which was accompanied and preceded by the most acute pain. He was an old officer, and supported the sufferings which he had with the greatest courage, but was alarmed at the idea of a sound. He had therefore, before having his bladder examined, submitted to a great number of remedies. Well instructed, and having no constant occupation, he was the mark for all that the quacks daily produced and extolled. Consequently the waters and lozenges of Vichy, and all the solvents of stone and gravel whose numerous virtues are posted on each corner, had been employed in considerable quantities during many years. Nevertheless no marked change was produced in the state of the patient, who continued to pass pebbles: the pains seemed sometimes to change their character, though they did not diminish, but on the contrary, became more painful, and almost constant, and his health became worse and worse. It was only at this moment that he consented to be sounded.

I found his bladder full of little calculi, his urine catarrhal, his prostate engorged, and his urethra very irritable, with fever, loss of appetite, and sleep; we were forced to renounce all treatment, and his death followed in a few weeks, accompanied with the most excessive suffering.

This patient was one of the numerous victims who are each day made by the pretended curers who are hatched in all large cities, and whose perfidious practice is increased by the uselessness of the means that they sell, too happy if their pretended remedies do not attack the constitution. I shall again refer to this subject in speaking of the dissolution of the stone.

We may join other circumstances, which have a more limited field of action, and only exercise a certain influence, to those which I have just related, and which are also injurious to those having gravel. We could sometimes believe that the gravel is connected with evil desires, or to excesses, which those who allow them do not wish to make known. There are also individual peculiarities, the effects of mutilation, that they endeavour to conceal. Modesty also is so marked in females, as to cause them to repel every kind of investigation. From these different motives, many persons afflicted with gravel allow their disease to take a development that often becomes very serious, if not incurable. It is the duty of the surgeon to remove all these sources of error.

CHAPTER VIII.

Of the simultaneous existence of Gravel and Gout.

Much has been said of the relations existing between gouty affections and those of gravel. Having nothing to add to what I have said in my treatise, as to the causes, I shall confine myself here to some purely practical remarks.

The analogous depositions made by one and the other of these affections, an analogy by which they have pretended to explain the admitted connection between them, is not so constant as has been pretended. It is not, for example, rare to see a person with gout pass pebbles of uric acid, or of a different kind; nevertheless I will show, that the first of these pebbles is chiefly seen when the disease of the joints is but little advanced, and particularly in the acute stage, when it takes the form of rheumatism, whilst in persons who have had gout for a long time, and who are already worn out by their sufferings, the gravel which comes on, or which has continued, is especially phosphatic. This remark has much importance in directing the treatment. I will refer to the following facts. M. Plan de Sieys, a septuagenarian, of robust constitution, was

often attacked with gout, rheumatism, and gravel, and was otherwise very irritable: the urethra especially possessed such sensibility, that the simple passage of a bougie was sufficient to determine serious symptoms. The bladder contained many very hard calculi, formed by pebbles, which he had not been able to expel, doubtless from this irritability of the urethra, and perhaps, also, from a paralysis, with which he seemed to have been affected since he came to Paris to be operated on. Unfortunately, the combination of these circumstances rendered the employment of lithotripsy very difficult, and he could not support the length of the treatment. The destruction of his general health progressed, and death took place before the extraction of all the calculi was accomplished.

In this, as in many other cases, the gouty affection was well advanced. The smaller articulations, and above all, those of the feet and hands, were attacked; the fingers and toes being deformed. Nevertheless the pebbles and calculi contained in the bladder were of uric acid, and consequently contradict the facts that have been advanced in this respect.

The coexistence of gout or rheumatism, and of the gravel or a calculus, is a sometimes serious complication, which renders the treatment longer and more difficult. The acute phlegmasia of the articulations can also react on the renal secretions, and favour the formation of a deposit in the urine.

When gravel is developed in a patient already worn out by the gout, or whose sensibility is only exasperated, the symptoms of gravel, or even of stone, are often masked to such a degree, that we can hardly recognise the disease. A great number of these cases have been frequently met with, and my only difficulty is in the choice of an example.

M. Girauld de Cise, aged forty-nine years, very subject to articular rheumatism, experienced a series of vague symptoms, which alarmed him exceedingly, as he feared the stone above every thing, and which were suddenly developed in his urinary apparatus. Some time afterwards he passed numerous pebbles, which were preceded by nephritic colics. The rational signs, however, were not sufficient to fix our opinion; even an examination of the bladder left some doubt in regard to the existence of a stone, but it showed that the urethra was exceedingly irritable, and the prostate tumefied. After overcoming these diseased states, I found that the bladder contained many calculi, which were destroyed by lithotripsy; all the symptoms ceased, and an appropriate medical treatment prevented the return of the gravel. The vagueness and uncertainty of the symptoms have almost always been the cause of gravel not being treated sufficiently early, and of the patients having afterwards had stone. The last patient thus affected that I have seen was a physician, and, although he observed his case closely, he was deceived.

Dr. Richard de Courbert, aged about fifty years, and of a fine constitution, suffered from many attacks of gout, in the articulations of his hands and feet, but without any concretions in them; he had

also had rheumatism several times, and at the same period attacks of gravel, but without nephritic colics. The formation and emission of sand and little pebbles was only accompanied by wandering pains in the regions of the kidney, sacrum and pubis. These emissions of gravel came on suddenly, without other causes than long walks, and the fatigue resulting from the practice of medicine in a small provincial town. The attacks of gravel and gout came on sometimes together, and sometimes successively. Sometimes they appeared without any appreciable cause, for one of the most violent was whilst he was passing a winter very quietly in Paris, without being exposed to the inclemency of the season. This state of things lasted eight years. Towards the end, M. Richard suffered from the symptoms of stone, for which he sought my aid, having continually passed pebbles. I found the prostate slightly tumefied, and slight paralysis of the bladder, which contained a large number of very hard little calculi of uric acid, which were destroyed by lithotripsy. The different treatment which he had undergone had produced no sensible influence upon the progress of either of these affections.

This case is remarkable under several points of view, from the coincidence of gout and rheumatism, from the appearance of gravel after long rides on horseback, from the spontaneous development of symptoms without any appreciable cause, and from the continual passing of pebbles, although many calculi were in the bladder, and lastly, that which is always seen, from the continuance of powdery or crystalline deposits in the urine after the treatment for stone. Two reasons induce me to make this assertion; first, the already ancient defect in the secretion of the kidney, which could not instantly cease, no matter what treatment the patient might be submitted to; second, the existence of great sensibility at the neck of the bladder, with tumefaction of the prostate, and paralysis of the bladder, circumstances which necessarily rendered the expulsion of urine difficult and incomplete, thus contributing to keep up the abnormal state of the functions of the kidneys. From this we may see the necessity of insisting on a medical treatment, and, above all, of watching over the discharge of the urine. It is in like cases, that we ought to have recourse to the different treatments indicated, and to the use of cold injections into the bladder, a course that is modified according to the dispositions of the patients.

There is yet a remark to be made in regard to the preceding case. The neck of M. Richard's bladder was exceedingly irritable, and not only were the effects of the calculi or of the passage of the sound or lithoclaste considerable, but they also caused a great trouble in the general economy, which prolonged the duration of the treatment by lithotripsy. It is necessary to be very circumspect in the use of the sound in such cases, if the parts do not return to their natural state after the removal of the calculi. Should the gravel, therefore, be reproduced in M. Richard, we would be deprived of one of the most precious of our resources, the injections into the bladder.

On the whole, we must not only take an account of the reciprocal influence that these two diseases exercise on one another, in cases of this kind, but also in all other complications of gravel, and so combine the treatment, that they may be attacked simultaneously if practicable, or at least, that one of them may not be increased by the means taken to allay the other.

The simultaneous occurrence of gout and stone deserves then to fix seriously the attention of practitioners, as much on account of the diagnosis as of the treatment. We shall have a new proof of this in the two cases that I am about to relate.

M. Anselin, of Honnecourt, near Saint-Quentin, aged seventy years, had formerly had a good constitution, but at present it was worn out by attacks of gout, which had terminated in the addition of the pains of gravel and stone. His constant state of suffering had not allowed him to appreciate the first attacks of gravel, the more so, from the symptoms being light, and his having only a slight powdery deposit in his urine. The first symptoms, therefore, passed almost without being perceived, and it was only after many successive reappearances of them that they attracted the attention of the physician and of the patient, who were both satisfied with a simple treatment, subordinate to that of the gout, which was the most ancient and most developed. They, therefore, neglected the gravel too much, so that at a later period they had to combat stone instead of gravel, and that under the most unfavourable circumstances. The proper surgical treatment was a serious affair, and it was only after great trouble, that they succeeded in the employment of the means of lithotripsy. After the cure of the stone in the bladder, I strongly insisted on the use of measures likely to prevent a return of the gravel. Notwithstanding a catarrh of the bladder; notwithstanding an engorgement of the prostate, which constrained the expulsion of the urine, and the prolonged confinement of the patient to his bed from gout, the gravel did not return. I saw M. Anselin four years afterwards, and his health in this respect had not been disturbed.

M. Daymare, an adult, of sufficiently good constitution, though much exhausted by the pains of gout and stone, came to Paris in July, 1833. The symptoms of gout were so marked in this patient, that when I saw him for the first time, I was far from suspecting a calculary disease. The effects of the two diseases were so reciprocal, that no consequences could be drawn from the symptoms related by the patient, and it was only after a very attentive examination, and collecting minutely the sensations that he described, that I was enabled to distinguish the symptoms of stone, and to approximate the period when it had commenced to form, which had been two years previous. M. Daymare had several times passed gray pebbles, and after the formation of the stone, he, from time to time, passed a powdery deposit of the same nature, which, mixing with the mucosities in his urine, formed a paste, which became hard on drying.

The examination of his bladder showed that it contained a large soft stone; the urethra and bladder were exceedingly irritable—his health disordered, appetite feeble, and sleep troubled. I attributed a part of these disorders to a journey of some hundred leagues that he had just performed; nevertheless, rest and an appropriate medical treatment produced but a slight amelioration. It was, therefore, necessary to decide what should be done as to the stone; the patient claimed the operation of lithotripsy, and it was certainly the method which seemed most likely to be serviceable to him, for it was feared that he could not support the shock of the operation of lithotomy. I proceeded, therefore, to the preparatory treatment, and the operation was commenced with much more success than could have been anticipated in a like case. A second attempt, a few days afterwards, succeeded quite as well, but was followed by an attack of gout; this invaded the different articulations successively, and passed from an acute to the chronic state. At the end of five months he returned home, thinking that he could not recover his health at Paris, and the spring following he at last recovered the use of his limbs. His general health, which had suffered from this long attack, was re-established during the spring and early part of summer, and he suffered little from the stone, but his pains returned in July. Fearing the fatigue of a second trip to Paris, he called a surgeon of Bordeaux to visit him, who practised the operation of lithotomy, and he died a short time after the operation.

I have never seen any one who suffered from gout and stone in a higher degree than this patient. The symptoms of the former lost none of their intensity by the development of the latter; the greater number of the smaller articulations were attacked, and concretions formed in many of them. Although the patient observed a strict regimen, yet the stone was rapidly developed.

In the great majority of cases, this coincidence brings no marked modification in the curative means of gravel; but it offers an affection of greater obstinacy above all when we have the gray gravel, as it shows a deeper seated lesion, and a more advanced state of disease.

When even this lesion is situated in the bladder, and we have succeeded in destroying it, we have yet to fear the reactions which a new attack of gout almost always causes, and a succession of bad symptoms are shown to the practitioner in the treatment of gravel when the gout becomes incurable. When, on the contrary, the gravel is composed of uric acid, or oxalate of lime, the gout is much more free in its effects, and it often happens that the two diseases follow a distinct course, at least in appearance. This was the case in the last of the patients whom I treated by lithotripsy, and in whom there appeared to be no connection between an attack of gout and the formation of gravel. In these cases the gravel is to be treated as if the gout did not exist.

SECOND PART.

OF THE

PROPER MEANS TO CURE AND PREVENT GRAVEL.

CHAPTER I.

Of the General Treatment of Calculi.

ART. I.—*Of the medical treatment of red sand and powdery deposits.*

I have stated that many persons pass a sandy or powdery deposit with their urine, of a reddish, tawney, deep yellow or bright red colour; that this deposit appears sometimes immediately after the emission of urine, but that most commonly it is not seen till this has cooled. In the first instance, the sediment is formed in the kidneys or bladder, and in the second it is only produced by rest and a decrease of temperature. In these facts there is an important distinction to be made.

When the sediment is the result of the repose and cooling of the urine, it shows a diseased state which is but little advanced, or rather a simple tendency to a disease, whose development will require an assemblage of peculiar circumstances. Thus it is by no means rare, to see persons whose urine has formed these deposits for a number of years, without their health having undergone the least change. These cases are more common than is thought; whether the grains adhere to the sides of the vessel or remain loose at the bottom of it. This deposit is sometimes purely accidental, reappearing each time that the same cause reproduces its influence. In other cases it is of daily occurrence, sufficiently abundant, yet not producing any alteration in the general health; and it is therefore necessary that the attention be drawn to it by some special circumstances, in order that it should be perceived. I repeat that it scarcely ever causes pain. As it shows rather a predisposition

to disease than disease itself, the physician ought to confine himself to some hygienic precautions and the removal of such causes as he may discover. There is here no indication for a special treatment. We direct the patient to drink a little more freely of water, to keep his bowels open, and to bathe from time to time. Should the deposit continue, we must resort to the more rigorous measures that I am about to indicate.

When the sandy deposit seems to be fully formed at the moment of its expulsion, the tendency to the disease is more advanced. Indeed the sand is produced either in the kidneys or in some other part of the urinary apparatus, notwithstanding the heat, the continual movement of the liquid and a number of other circumstances which seem to oppose a like formation. In reality the formation and expulsion of the sediment takes place without fatigue or pain, or the patient's being aware of it if he does not see it. This deposit is thus formed, and if it takes place frequently and in a considerable quantity, it requires the greater attention, as it indicates a permanent superabundance of uric acid or its components in the secretion from the kidneys, and consequently a constant disorder in the functions of these organs. It is evidently the origin of a kind of calculary disease, whose developement requires only the reunion of favourable circumstances.

If the formation and expulsion of sand is accompanied with general uneasiness, and vague pains in the loins, the other symptoms being rarely seen, it would not seem to have much that was alarming. Besides we shall see hereafter, that these pains are very often independent of the cause to which they are generally attributed; but if this state is unimportant in respect to the sensations, it is not so as regards the consequences, about which we cannot think too seriously.

The predominance of solidifiable matter in the urine and the formation of sand, seem to me to be essentially connected with a state of superexcitement of the kidneys, whether this superexcitement be direct and have its origin in the urinary apparatus, as is commonly the case, or be indirect, and arise from a totally distinct region of the animal economy. This observation, which is of the greatest practical importance, is supported by a great number of facts, as I shall have frequent opportunities of showing when the cases are presented.

The principal difficulty of the treatment consists, therefore, in determining the cause of this superexcitement of the kidneys, as I presume no one would willingly prescribe any one of the remedies vaguely employed against these irritations, and under whose influence they could at best be made to terminate only a few moments sooner, for this would be only an empirical treatment as often injurious as useful, instead of a rational and scientific one. I have said that this cause is owing commonly to a diseased state of the urinary apparatus, and experience confirms it, as I every day see patients who have been passing sand in their urine for a long

period, and in whom I find a stricture of the urethra, spasmodic contractions, a neuralgic state of this canal or of the neck of the bladder, or an inertia of this viscus, &c. &c. I overcome these diseased conditions by the means that I have shown elsewhere, and in the course of some days the sand disappears without my having undertaken any special treatment. I have seen so many examples of this as to have no doubt of the exactness of the fact, and in confining myself to well marking and then removing the primitive diseased state I obtain a durable cure, a thing that can never be obtained by the aid of a purely empirical treatment. There are however, cases in which the kidneys have been so long under a morbid influence, that the vicious secretion persists, although the first cause has disappeared; but these are cases which enter into the category of those where the disease is further advanced, and of which I shall soon treat.

In general, in those which we now speak of, the indications are very simple. If constant exercise of the mind has been always followed by one or more emissions of sand, we must insist on the moderation of such labours or even their suspension; although we shall often find strong opposition to it on the part of patients, as was the case with a member of the English parliament, who passed a large quantity of gravel every time that he spoke, but who often repeated to me that he would like better to be attacked with gravel, or even with stone, than to give up his defence of the rights of his constituents.

The same is true in regard to fatiguing corporeal exercises, as riding on horseback, forced marches, the excesses of the table, &c., which provoke that superexcitement of the kidneys, from which we see sand in the urine. When this result is reproduced sufficiently often to prove that it is not a fortuitous coincidence, but rather a special action, we must endeavour to remove the cause or moderate its action. The indication is plain, and it will suffice to note the fact and to know that it is possible. As regards fatiguing exercises, especially that on horseback, the thing has been long known; and I have had more than one occasion to verify the exactitude of the observations made on this point.

As to the excesses of the table, I cannot partake the opinions of M. Magendie, which have been repeated in so many late works, and to which I shall hereafter refer. It is sufficient now to remark, that it is not exclusively by the quantity of nitrogen contained in the food, that the excesses of the table bring on emissions of sand with the urine; these excesses act as the other causes that I have enumerated, in producing a disturbance in the economy, which reacts on the kidneys as well as on the other organs; and that which proves it, is that the excesses of food which contain little or no nitrogen, are not less injurious than those of articles which are rich in it. Besides certain drinks, which are far from containing an excess of nitrogen, and which are even advised against gravel, as the waters of Vichy and Contrexville, produced sometimes

emissions of sand to such a degree, that we were obliged to discontinue their use.

There are also cases, in which we cannot discover the cause which keeps up this renal superexcitement, as there are those, where the removal of the cause is not sufficient to produce a cessation in the formation of sand. We ought then to resort to means whose efficacy has been proved by experience, even though they may act indirectly. I would place cups and leeches to the region of the kidneys, among the first of these, emollient applications, general baths, abundant drinks, slight diuretics, the use of some mineral water, as those of Vichy, Carlsbad, Contrexville, Boussang, Pougues, and Wildung, and lastly, purgatives in divided doses, so as to cause one or two evacuations daily. But an important object which ought never to be lost sight of, is the necessity which occurs sometimes of continuing the use of these means for a long time. We ought to proceed quietly and gradually, for it is only by long continuance that we are enabled to re-establish in its normal state, the deranged functions of the kidney, when a considerable length of time has elapsed and they have extended far. The employment of active remedies or of an energetic treatment, with a view of hastening the cure, will sometimes have the contrary effect; and experience also proves that it fatigues the patient without benefitting him. I have already made known the cases which claim more particularly a long continued treatment, and to which an energetic one is particularly applicable, and I shall have many occasions to return to this highly important distinction.

Some patients continue to pass a considerable quantity of an extremely fine red powder with their urine, after having undergone the operation of lithotomy or of lithotripsy. The same, simple treatment still suits them best; but we must, above all, learn how to wait, for it is often many weeks, or even many months after the operation, before we see the kidney perform its functions as in its natural physiological condition. The influence which the irritation of the bladder exercises upon the kidneys, and which is well demonstrated every day as a consequence of the operation, is here a circumstance which favours the superabundant formation of uric acid. The duty of the physician then is, to combat the remains of this irritation in the bladder, and the too frequent neglect of this precaution, is, as we shall see, the sole cause of the return of the calculary disease.

I repeat, that in these cases we must know how to temporise, and the effects of the treatment should be made to wait as long as the deposit in the urine is either more continuous, or more abundant. The quantity, is also sometimes prodigious, and if in place of the grains being separate or in an impalpable powder, all this deposit should unite into one mass, it would soon form a voluminous calculus. I have treated many patients who were in this state, which is seen in both sexes, especially during adult life, in all classes of society, and in subjects from various climates.

In certain patients who were more alarmed than others by the presence of sand in the urine, or in whom the quantity of the deposit was such as to render it right to prescribe for them, all the remedies employed remained without effect during a long period; but at the end of a certain time when it was least expected, the sediment ceased, without causing any inconvenience to the general health. There are other and graver cases in which all the treatments are of no avail. It is here, that there is some deep seated lesion of the bladder or prostate, the effects of which react on the kidney, and determine the production of sandy deposits, as I have often seen. We ought to give our attention to the organic lesion only, and not torment the patient with alkaline substances which ordinarily have no effect. I have not observed, that the treatment ought to have been considerably modified, when the powdery deposit of the urine was of a bright red, or lighter, or tawney, or dark yellow, or black—the last is rare. But although the colour of the sediments of the urine has not the importance which has been attributed to it, there is yet no doubt, that it constitutes differences either in the degree or in the manner in which the renal function is deranged. This difference has, however, not been as yet discovered, and we are obliged to confine ourselves to the strict facts of observations, and these prove that, under the influence of a general treatment, such as I have laid down, the various powdery depositions in the urine disappear. It is only in some exceptional cases, that we are forced to resort to more active treatment, and to the special means that I am about to indicate, in showing those which are demanded by the second class of the disease, viz. gravel.

It is rare to meet with a black sediment in the urine which is formed by the oxalate of lime. I have only seen two examples, and these patients passed so small a quantity, and during so short a time, that it was impossible to try any means; moreover, the treatment did not seem to vary in this case, from that which was proper for the red gravel; it is a subject on which I will speak more fully, when treating of black gravel. The same may be said of some other deposits, especially those of which cystine is the base.

The gray, ashy, and white sediments which are more rarely seen, will form the subject of a special chapter on gray gravel.

ART. II.—*Of the medical treatment of gravel of uric acid.*

By gravel, we understand the more fully formed concretions which are more clearly defined than the sand and powdery or crystalline deposits of which I have just spoken. Gravel often results from an agglomeration of several sandy grains, which then are of a rounded form, unequal, rough, and generally easily broken. Sometimes, on the contrary, it is polished, firm, irregularly rounded or ovoidal, the last variety having a greater hardness and compactness, is formed by layers of solidifiable matter superposed.

◦ This gravel is passed by some patients spontaneously, without

pain or difficulty, in the same manner that a large number of those with sand, or a powdery deposit, have it carried off by the passage of the urine, only perceiving the pebbles after they have heard the noise of their striking the bottom of the vase. But in others, these emissions are preceded or accompanied by a collection of symptoms known under the name of nephritic colic, and which have often sufficient intensity to require a special treatment. Under certain circumstances, the nephritic colics are violent, and pass through their different periods without being followed by the expulsion of gravel. These different cases form so many series which ought to fix the attention of the practitioner, because they constitute different degrees of the same disease.

FIRST SERIES.

Spontaneous expulsion of pebbles, without pain.

In gravel, as in sand, patients often end by regarding it as natural, when they pass it without difficulty or pain, or any derangement of their health, and consequently neglect it, and undergo no methodical treatment, or if they do, seldom or ever carry it out. It is in consequence of the false security in which so many physicians allow themselves to rest, that the greater part of the stones form and develop themselves either in the kidneys, or in the bladder, or ureters, where they constitute an almost always incurable disease; or in the bladder or urethra, where they become a serious affection. The frequency of these emissions of pebbles, and the quantities which are expelled in a given time, are here of considerable importance; we ought also to take an account of the size of these sandy grains, as all these minutæ give an effective idea of the proportion of solidifiable matter contained in the urine, as well as of the concurrence of circumstances likely to favour its solidification. When the gravel is abundant, and frequent, and the grains are voluminous, we cannot but see that the defect existing in the renal function is well developed, and its exciting cause ancient. In these different cases, the question is often a complicated one, and the practitioner cannot unite too many elements, in order to obtain a complete solution of the problem, or at least in order to procure all the facts that an attentive observation will permit him to collect; for we cannot but admit, that important ideas of them are still wanting. We do not as yet know why uric acid is sometimes in excess in the urine, without its forming sand, or a powdery deposit, or gravel, nor why one of these deposits is formed rather than another. We see clearly, that a deposit is daily formed, that it unites and forms a solid body, but the cause of these different forms is unknown. If on the one hand, we have been able for some time to attach only a certain importance to these powdery deposits, when they take the same form, prudence commands us on the other hand, to watch carefully those cases in which the conditions are favourable to the formation of grains of sand, and their agglomeration a short time after their for-

mation. On these different points of view, the practitioner ought to be all attention, always taking care not to alarm the patient too much, but to observe his diet, and his habits in the exercise of his different functions. If he cannot discover one or a series of causes likely to inform him of a rational treatment, he ought not to hesitate to prescribe means which, though empirical, will nevertheless, sometimes produce the happy effects of those based on experience.

From this, we may readily understand, how circumstances cause us to vary the treatment. At the beginning, we must use the rational means that I have indicated against sand and powdery deposits, but employ them a longer time and more energetically, and after having removed any special causes which we may have discovered, should the disease persist, we must change the diet, and render it milder. The starting point of these disorders is almost always in the alimentary canal, and that which in these obstinate cases I have found to succeed the best, is the prescription of purgatives in small doses, repeated every eight or ten days; as well as the reiterated application of leeches and cups to the region of the kidneys. I have observed that these local bleedings produce more effect than the application of leeches to the anus, as is often practised. But we must not fear these applications, but repeat them every two or three days, as blood drawn in repeated attempts is more useful, than when it is all taken at one time.

We should never, in the medical treatment of gravel, lose sight of the connection which exists between the skin and kidneys. Disorders of the perspiratory functions have a great influence on the formation of gravel, whether there be a diminution, suspension, or excess of perspiration: this fact which is daily open to our view, is directly contrary to the opinion of some physicians, who, supporting themselves on error, contend that the calculary affections are rare if not unknown in warm climates, where the perspiration is ordinarily very abundant. Indeed, we cannot pay too much attention to the functions of the skin in all kinds of gravel, and we give a preference to external means of exciting it, especially by bodily exercises, frictions, baths, and sulphurous douches, which are not properly appreciated. Neither ought the internal use of diaphoretics to be omitted, but there are often contra-indications to be regarded, especially in the state of the digestive organs.

The employment of the turpentine in affections of the bladder, has been within a few years much insisted on, and has been proposed as a means against gravel, as favouring the expulsion of pebbles, but it seems only to act by modifying the vital properties of the bladder. Its action is, however, very uncertain, and its use offers also inconveniences which I cannot overlook, to the injury of those which I have already recommended, or am about to enumerate. When we have succeeded by a strict regimen, repeated baths, enemata and abundant drinks, in overcoming the superexcitement of the kidneys, and when we are led to believe that the renal secretion, the source of gravel, is the consequence of the bad

habits contracted by the economy, we shall find great assistance in derivatives, revulsives, and all the agents likely to produce a change or disturbance of the functions of the urinary organs. But the resorting to them at an opportune time is an important point; their premature employment rendering them at least useless. We ought, I repeat, never to forget, that the formation of gravel, especially when it is abundant and of long standing, indicates a deep-seated vice, and an almost continual derangement in the functions of an organ whose position does not allow us to act on it in a direct way. It is only therefore, by a prolonged treatment, that we can hope to bring it to its normal conditions; active and energetic means only shake the economy, and weaken the patient, without permanently curing the gravel.

Here a remark presents itself, which I ought not to omit to offer. It is extremely rare that the emissions of gravel are continuous, they present variable interruptions which are sometimes prolonged; but these suspensions which are natural, and have regard to the essence of the disease, have been a source of error in appreciating the means employed for its cure, effects being attributed which did not belong to them. However, this is a point of practice like many others; if we could deduce from the results attributed to such or such a medicine, the effects which depending on other causes are only simple coincidences, it would greatly simplify our therapeutics.

Be this as it may, it is by no means rare to meet with obstinate cases, in which we suffer from grievous miscalculations. Many even offer the greater resistance from the fact of patients, who suffer no pain in passing gravel, becoming negligent in seeking medical aid; so that we only obtain cure at the end of two, three, or even more months. The varying of the treatment is an important precaution in these long cases. Here the waters of Bussang, Vichy, Carlsbad, Contrexville, Pougues, and many others, associated with or rather succeeding to curative means, produce good effects, especially when drunk on the spot. If we are not in a favourable season for this, and can not have them ready for use in a state of good preservation, we can resort at least temporarily, to some of the alkaline preparations: such as the bicarbonates of soda, potash, lime and magnesia, in graduated doses, though small at the commencement; or what is better, the simple alkalies sufficiently diluted. All the observations lately collected seem to prove that the bicarbonates of alkalies are preferred, and that they are given in solution from twelve grains to a half ounce, and even more, increasing gradually; they may also be given in enemata or baths, when they derange the stomach, as is often the case.

I shall refer to this point when treating of the dissolution of the stone. I shall only add here, that when the bicarbonates of alkalies are employed solely to oppose the formation of gravel, their dose is rarely sufficiently large, and their usage continued long enough to have an injurious effect on the general health. The most striking fact in regard to these preparations, is the pre-

eminence which each has had in its turn, every epoch, each country, each writer, having his predilection, and hence the uncertainty of the practitioner in regard to them.

What has been said in regard to the alkaline preparations, is equally true respecting the mineral waters which have been recommended against gravel, and here I pass over the sulphurous ones so warmly defended by Borden, in order to speak of the gaseous chalybeates, and above all alkaline springs, whose praises are sung by a hundred tongues; each spring having its supporters, so as to make it a difficult matter for the patient to choose. They hear the powerful voice of Carlsbad calling them, and promising to compensate by its energetic action, (as proved by its long reputation,) for the distance to be travelled, or those of Recoaro, whose powers according to M. Brera, are equal to the most celebrated. Vichy, Wildung, Spa, Contrexville and Evian invite them on the other side, and show their claims to confidence in the power of their waters, as established by the cases, both ancient and modern, which have been made known to the public with more or less emphasis.

Come to us, cry in their turn, Bussang—Vic—Pougues—Chateldon, &c.: we make less noise, but we avail as much as the others, for many of those with gravel leave here their pebbles and their pains; we act gently but surely; and besides, there is less to fear from us in regard to the unforeseen effects of more powerful waters. These eulogies, more or less merited, but all highly coloured, give rise to an uncertainty, as much the more fatal as each particular case offers certain special indications. Every day brings us patients who have derived no benefit from the waters, and who have even been injured by them, only because their choice had been made rather from motives of convenience, or of fashionable routine, than from the advice of an experienced practitioner; this latter does not confine himself to the prescribing of a certain spring because a certain disease exists; but after having examined the disease under all points of view, studies the connection which it can have with the other organs, and seeks to determine the influence which each of these waters may have in their action on it. There is one striking circumstance in regard to the influence attributed to these waters over gravel; it is that those which appear the least likely to produce the effects ascribed to them, act nearly in the same way as those which on account of their composition are reported as most favourable. This phenomenon, which ought to cause some doubts of the panegyrist of alkaline springs, seems to support the opinion that in the expulsion of pebbles, the mineral waters act less by a specific virtue than by means of the quantity of liquid introduced into the economy. Is it not indeed surprising that all the partisans of solvents of stone, and of lithontriptics, under which class the greater part of the waters said to be efficacious in gravel have been included, should have paid no attention to the action exercised by the admission of large quantities of water into the economy, nor to the influence of the hygienic precautions observed with more or less

care during the treatment? We cannot but see, that these circumstances have a strong bearing, and that they alone are often sufficient to produce the effects which are ascribed to the remedies that they wish to support. In whatever way then we regard the employment of mineral waters in the treatment of gravel, important facts yet remain to be obtained, and they will become as much more profitable, as they may be published with exactness, and in complete observations: the only ones likely to show the as yet unperceived shades of difference. I shall confine myself for the present, to a small number of summary indications drawn both from ancient and recent facts.

1st. When the gravel is of uric acid, or of urate of ammonia, and the patients have passed it in large quantities, for a long period, in a continuous or temporary manner, with or without nephritic colics; if the simple treatment that I have examined, has been without the hoped for success, if there is a necessity to produce a decided perturbation, if the circumstances permit the patient to undertake the journey to the springs, if the stomach performs its functions with pain, in a slow way, and incompletely, if there is an obstinate intestinal irritation, if the liver is in a state of permanent super-excitement, in fine if there are strong contractions of the neck of the bladder, I think that the waters of Carlsbad or Vichy deserve the preference. Taken for a long time, and with the modifications commanded by the state of each patient, these waters often become a salutary aid to other treatments; they change advantageously the secretory action of the kidneys, and in the same time contribute to re-establish the digestive organs. My practice has already offered me many facts in support of this; but I ought also to state that some persons have been much incommoded by them. At Vichy their digestion was so deranged that they had to renounce these waters and take those of Bussang, which have perfectly succeeded. I have seen analogous effects in those whose health has been less affected, but who were so acted upon by the waters of Vichy as to prevent their continuing them. In others, these same waters have produced effects on the urinary passages, different from what they had expected: that is to say, instead of soothing irritations, rendering the expulsion of pebbles more easy, and relieving the renal secretion, more sand has been expelled than there was previous to their use; the passing of urine has been rendered more painful, and they have added to the constraint and embarrassment of the loins. These derangements are however not confined to Vichy; we see them sufficiently often also at Carlsbad. Thus Doctor Bigel speaks of the violent fever caused in him by the innocent, mild, harmless Theresienbrunn: one of the sources of that celebrated locality. Doctor Held, of Prague, was also strongly affected, after having taken two tumblers of this water daily, during a week.

2d. When we can suspect that large pebbles have stopped in the kidneys or ureters, that the prostate is not tumefied, that the

urinary apparatus, and especially the neck of the bladder, is not in an irritable state, and that there is more or less obstinate constipation, the waters of Contrexeville, taken with all the proper precautions, produce advantageous results. Numerous cases that I have seen fully justify the ancient reputation of this spring. But their activity ought to be observed both by the physician and patient: it is owing to a want of attention to this point that many of those with gravel who have the prostate engorged, and the urethra and neck of the bladder irritable, have suffered from such serious accidents. The same is true, when independently of gravel, there is a stone in the bladder; when there is also slight hypertrophy of this viscus, and it is disposed to strong contractions, the vesical tenesmus becomes soon insupportable, under the influence of these waters, and the patient is obliged to be freed from his stone before going farther. In this respect, and only in regard to the facts which have been submitted to my observation, the waters of Contrexeville differ remarkably from those of Vichy and Carlsbad, where a large number of those with gravel, who also have stone in the bladder, are daily seen without that tenesmus, and those contractions, which are so often presented at Contrexeville. A certain number of those with calculi, especially at Vichy, cease to suffer from the stone in the bladder, from the simple use of the waters; and this result, which is far from being rare, has induced the belief that these waters acted on, disaggregated and destroyed the concretion; a question which I shall hereafter consider.

It suffices here to mention this peculiarity in the action of the waters of Vichy, the ordinary effect of which appears really to be to diminish the violence of the contractions of the bladder, instead of increasing them; so that the explanation which has been given of their influence in the expulsion of pebbles, contrasts with that which takes place in cases of stone in the bladder. This sort of contradiction does not exist in regard to the waters of Contrexeville, which cause contractions of the urinary apparatus, and especially of the bladder. Many of those whom I have sent there immediately after the operation, have on their return direct from the springs, shown me this effect in a striking degree. There are without doubt exceptions; especially where the atony of the bladder was strongly marked. Experience may probably make known other peculiarities; it suffices me at present to prove here the fact, which I think is demonstrated, that the waters of Contrexeville possess the property of strongly exciting the contractions of the urinary apparatus, and that this property renders them useful in the expulsion of large pebbles, at the same time that it leads to a more certain diagnosis of stone in the bladder; a question of more importance than is thought; whilst the waters at Vichy, I repeat, are especially fitted to modify the renal secretion, and exercise such a sedative effect on the contractions of the bladder, that many patients cease momentarily to suffer, and believe themselves cured. This effect

of the waters of Vichy offers two dangers, which ought to be shown.

1st. Of keeping both patient and surgeon in a state of false security, by preventing them from being informed of the true nature of the disease. 2d. In inducing them to believe in cures which do not exist; indeed, in a large number of patients believed to be cured, this delusion has been of short duration; and we shall see, when examining the question of the dissolution and disaggregation of stone in the bladder, that the patients in general, have had to regret their having delivered themselves to these fallacious amendments with too great confidence.

Be this as it may, there are many errors in the results from the waters just spoken of, even when they are taken with the precaution recommended by the experienced practitioners who have been able for a long time to appreciate properly their effects. Some physicians of the present day, have believed that they could act with greater boldness, and neglect the precautions which time appears to have decided on as requisite; and the new method will, without doubt, show some changes and symptoms that practice may be able to fix. This is the only remark that I can make here, where our subject is the medical treatment of gravel. My practice as yet has not permitted me to collect sufficient facts as to the other waters, whose action is less powerful, or whose reputation perhaps is less firmly established, to enable me to make a choice. I have however been consulted by many patients who came from Bussang and Pougues; some had there passed large pebbles, and were relieved of the functional derangements previously existing, and perceived no return of the gravel, even after two or three seasons; others complained of severe symptoms, caused by the waters. In going to Vic-sur-C ere, the waters of which have but little celebrity, I have been able to satisfy myself that they were useful in the treatment of gravel.

In the use of mineral waters in general, especially those possessed of great power, there are some peculiarities presented, which have not received sufficient attention. That which has been said of Vichy in particular, is applicable to others. Some persons who have never passed pebbles or sand with their urine, and who have taken the water rather from choice than necessity, have been surprised to see pebbles in the vase. These patients, and even many physicians have thought that this result was highly useful, regarding it to use a trivial expression, as the driving of the wolf out of the sheepfold. If this was the case with large pebbles of some duration, and they were driven off by the increased action of the organs, nothing would be more just than this reasoning, and the patients might well congratulate themselves on their having resorted to the waters. But this is not so; the sand in question is very fine, it is a powdery deposit that the urine brings away as soon as formed: the patients pass it from day to day, and this is so true, that if they omit the use of the waters during one or two days, they see no more

sand, whilst it is reproduced when they again commence to drink. But in these cases the waters are decidedly injurious, and may cause the disease that they are believed to prevent. This peculiarity is by no means rare, it is mentioned in many observations, where it is always spoken of as a benefit received, and engages unfortunately too many practitioners and patients to persist in or even to double the dose, imitating in this respect the practice of the partisans of Leroy's¹ specific, who repeat the purgatives as long as the patients evacuate the humours. The mineral waters act then on certain individuals as determining causes of gravel which they provoke by inducing the same modifications in the organic functions, as are produced by other hygienic causes, that they suspect rather than know positively.

There are many other mineral springs, especially the sulphurous, whose waters produce in those with gravel, effects which ought to be studied with more care than they have as yet been: they modify usefully the secretion of the kidney, and exercise a salutary influence on the functions of the urinary apparatus. Therapeutics offer an opening in this point of view which the inspectors of mineral waters ought to fill. The facts which I alone have been able to observe, permit me to think that happy results might thus be obtained, not only in the treatment of gravel, but also in numerous other diseases of the urinary apparatus.

SECOND SERIES.

Of Nephritic Colics with emissions of Pebbles.

There is a class of cases, in which the formation and expulsion of the gravel, is accompanied with morbid phenomena, whose reunion constitute what is called nephritic colics. These colics are almost always observed toward the commencement of the disease; it is at this moment that they offer the most serious character, whilst in the greater number of cases, they diminish in intensity and duration in proportion to the march of the disease, and this occurs without the expulsion of gravel, varying in proportion, as it sometimes goes on increasing. The most striking fact at first, in comparing these cases with the first series, is that the quantity and volume of the pebbles passed does not offer essential differences, whether colics exist or not; very often the patient who has had the most severe colics, passes pebbles of the smallest size and least in quantity. Daily experience offers cases of this kind with inexplicable peculiarities. I shall cite the following as an example.

M. Grosjean of Paris, aged thirty-six years, of a strong constitution, and leading a very active life, had had many nephritic colics, which offered no regularity either in appearance, intensity, duration,

¹ (Not Leroy d'Etiolle.) Translat.

or results. This state had lasted two years when I was consulted. The crisis was then on, the urine was scant, red and burning; the pains, commencing in the lumbar region, were excessive, the passage of the urine was difficult, with burning in the urethra, and tenesmus at the neck of the bladder. My first care was to overcome the general symptoms. I next assured myself that the bladder contained no foreign body, and then prescribed the ordinary treatment. The pebbles which he passed were of uric acid, small, and presented nothing remarkable; the most important facts in the case being the frequency and obstinacy of nephritic colics in an adult, who led a very active life, the violence of the symptoms, and especially the pain in making water. All these phenomena were out of proportion to the volume of the pebbles expelled.

The violence and duration of these nephritic colics require sometimes a very active treatment, and it is in order to calm these kind of symptoms, that they have proposed the long list of remedies belonging to the classes of antiphlogistics and sedatives, such as local and general bleedings, the quantity of which ought to be proportioned to the constitution of the subject and their repetition to the violence of the symptoms, as emollient and anodyne applications to the region of the kidneys, or on the course of the ureters, prolonged and often repeated baths, copious drinks, mild diuretics, opiate preparations by the mouth and anus, or even locally applied, &c. &c.

Sometimes we are obliged to await the result, and sometimes find difficulties in the employment of these different means. The vomitings which often accompany nephritic colics, deprive us of the aid of drinks. The renal secretion, on the other hand, is almost always diminished, if not suspended, at the moment when these symptoms offer the greatest intensity. These two circumstances which have not been sufficiently regarded in the indications of the treatment, recommended by authors, place the practitioner in a painful embarrassment, especially when he thinks that a pebble is arrested in the ureters. In many of these grave cases, I have been compelled to hold the patient plunged, during several hours, in an emollient or slightly alkaline bath, prepared by putting from six to ten ounces of a bicarbonate in an ordinary bath, taking care to preserve the same degree of temperature; at the same time I give a few doses of opium in the shape of small enemata or suppositories, but should the patient have a diarrhœa, it will deprive us of this resource.

When the medicines, whether given by the mouth or anus, cannot be retained, there is no resource left but baths and bleedings. We may try from time to time, a small sedative enema, composed of two spoonful of mucilage of flaxseed, one teaspoonful of oil of sweet almonds, and from a half to a grain of extract of opium. If the patient passes this, give him a second, third, or fourth, until he absorbs a certain quantity, and soon after there is a relief produced, which enables us to resort to the other means, which I am about to

mention. Here, as in the greater part of the affections of the urinary passages, opiates ought only to be employed to facilitate the application of other remedies.

If the small enemata are immediately expelled, we may try suppositories made of half a drachm of butter of cocoa, (*Theobroma Cacao*), half a grain extract of opium and as much extract of *hyosciamus*, introducing several one after the other, when the patient cannot at first retain them. However it is necessary to employ opium in moderation when applied to the anus, recollecting that the absorption by the rectum is very active, and also that narcotism may be produced, which in its turn will give rise to serious inconveniences.

I cannot too often repeat that these cases often become exceedingly embarrassing, and that as soon as the vomitings cease, we ought to prescribe some drinks, preferring those which are agreeable to the taste of the patient, and when we can, those which are reputed as most likely to favour the secretion from the kidneys, such as lime water with carbonic acid, or soda water, or the mineral waters previously spoken of. When by these general means we have once succeeded in calming the local pain, and reducing the general excitement, the treatment becomes more and more simple, and we soon see the pebble brought away by the urine, at least if not stopped in the bladder by one of the causes that I have spoken of, and which are more important than might be thought, the silence of authors on this point proving that it has not as yet been studied.

I lately met with two very obstinate cases. In one I caused the patient to drink several bottles of the water of Contrexeville, whilst plunged into an alkaline bath, where he rested five hours. In the other, the pebble was expelled after a brisk purgation, during the efforts that were made to go to stool.

There are some cases in which the whole urinary apparatus is attacked, and is in such a state of excitement, that we know not at what point to commence. Baths, enemata, opiates, and all the ordinary means fail, (though their employment has been much insisted on), even when they have produced a debility which it is impossible to overcome. No special indications are discovered, no symptom likely to show us the cause of the disorder is to be seen, there is more general than local pain, the malaise is sometimes in one place, sometimes in another, there is fever, loss of appetite and sleep, and loss of flesh; the urine is scanty, deep coloured, and often fetid, forms a deposit, and is accompanied with pain in its expulsion. These states are the more embarrassing to the practitioner, as they last sometimes for a long period. The treatment that has best succeeded, has been that which I employ in cases of neuralgia of the urethra and neck of the bladder, but pursued with extreme gentleness. The first bougies produce a little irritation, although we confine ourselves to simply introducing them into the urethra without allowing them to rest there; but as the sensibility of the canal diminishes, the general health improves, and the injections into the

bladder of first tepid, and then cold water, by which we terminate this treatment, generally produce good effects. If in introducing the bougies, we should be abrupt or violent, or wish to force it to enter too rapidly, there will be a reaction, and the disorders against which we had made some progress, will resume their violence, and we shall be forced to recommence. The patient sometimes become so much discouraged as to refuse all treatment, or rather to confine himself to the simple means that I have spoken of, which produce no effect during a long time. The effects of these bougies or sounds when thus employed, ought not to be lost sight of by the observer, as they confirm what I have just said as to the seat of the disease, and the point of commencement of the disorder. If the urethra and neck of the bladder did not perform so important a part, these exacerbations would not occur from a cause which evidently acts only on them. I shall resume this subject in a special chapter on the influence exercised by neuralgia of the urethra and neck of the bladder in patients having gravel.

THIRD SERIES.

Of Nephritic Colics without the expulsion of Pebbles.

A large number of nephritic colics are not followed by the expulsion of the pebbles or sand, to whose presence they generally ascribe the symptoms. This circumstance is the more calculated to excite our fears, as it is reasonable to suppose that these pebbles have stopped in the kidneys or ureters, events of which art as yet has not enabled us to acquire a precise knowledge, either in regard to the diagnosis or treatment. Different cases present themselves, and as many are of considerable importance, suppositions are not wanting, although experience has not always confirmed their exactness. It is by no means rare for patients to suffer during a long period in a similar manner to those with gravel, with pain in the kidneys and loins, without pebbles ever appearing in their urine. Moreover, we have had occasion to make autopsies of these cases, and have found the urinary organs perfectly healthy, and containing no concretions. In other cases, much more frequently the patients have ceased to suffer from the kidneys, and have afterwards lived a long number of years without the least inconvenience. Those who pretend to explain every thing, say that the pebbles, the cause of all these symptoms, escape without their being perceived. I am content to believe, that phenomena belonging to an entirely different cause, are here taken for nephritic colics or for indications of gravel.

The conduct of the practitioner in this case is at first very plain, and it is only at a later moment, when the morbid phenomena appear and go on as if it were a true case of nephritic colic, that he can have any uncertainty, as the symptoms are the same, and there is no means of distinguishing between this case and those of

another kind. Besides it is very evident that these disorders belong to the inflammatory class; and it is to the true antiphlogistics, such as blood-letting, both general and local, baths long continued and repeated; diuretic drinks taken in large quantities; emetics, purgatives, &c., that we are to resort. After the cessation of the early symptoms, we employ simultaneously or successively, the different remedies that I have indicated as favouring the expulsion of the gravel, but which seem here without effect. Then commences our embarrassment. Have we before us a false nephritic colic? or is the pebble arrested in the kidneys or ureter? We cannot say. Analogous facts throw no light on the question, since we see true nephritic colics which are not followed by the expulsion of pebbles till some years after, as the restlessness, caused by the non-appearance of these foreign bodies, diminished in proportion as the attacks were renewed; each one terminating in the complete establishment of the health, and the patients regarding them only as lumbago; an opinion in which many practitioners coincide. Experience shows that this security has not always a foundation; but as yet we do not possess more efficacious resources than those that I have just enumerated.

Practice presents, from time to time, cases yet more extraordinary. Several attacks of nephritic colic succeed each other at variable periods, and without there being the slightest portion of sand expelled: at last the moment or crisis comes on, which terminates in the expulsion of one or more little pebbles, and the symptoms on the side of the kidney do not again appear, or are at least much milder. I have been consulted by a magistrate, from the environs of Nevers, who had only passed pebbles after three years, during each of which he had had two or three attacks of nephritic colic of a high grade. Could the pebbles expelled in the fourth year, have been formed during the first attacks, and were the subsequent colics the result of the presence or displacement of them? We cannot say. The pebbles did not differ, either in volume or hardness, from those passed by other patients, after an attack of nephritic colic.

Whatever may be the fact, these observations, which are daily increasing, ought to engage the attention of the practitioner, and keep him on his guard, both as to the diagnosis and prognosis. The treatment does not vary from that given in the preceding paragraph.

It always consists in the use of antiphlogistics of the most energetic kind; and in a continuance, for a long period, of the means likely to correct the renal secretion; modified according to the peculiarities of each patient. I have seen some patients—and the magistrate just spoken of, was of this number—who were not cured of gravel until after an eighteen months or two years treatment.

I have already cited a number of facts which show that the pebbles may remain for a long time in the ureters, without acquiring any great volume. We also know—and many of the cases that I

have related, confirm this—that large pebbles, even after a long sojourn, can be expelled. I shall add the following example.

In July 1833, I had been consulted by an adult of strong constitution, who had gravel, and had suffered for some years from violent nephritic colics; the greater part of which terminated in the expulsion of smooth, rounded and brown pebbles, formed of uric acid. At the termination of one of these colics, which were accompanied with serious accidents, and which only ceased at the end of twelve days; the patient passed two large, spherical, oblong and flattened pebbles, five lines in length, by four in breadth, and three in thickness. One of them presented upon one of its flattened faces, a well-marked furrow, in the length of which the urine had run during its sojourn in the ureter. The expulsion of these two large concretions, put an end to the disease, as the patient has since been free from colic, and passed only sand; his bladder containing no foreign body. He had followed no special treatment, and I confined myself to prescribing for him copious drinks; there being nothing to restrict him in his diet. As I have not since heard from him, I conclude that his symptoms have not returned. We cannot lay down any thing definite in regard to the developement and progress of the morbid phenomena, likely to make us suspect the existence and stoppage of a pebble, either in the kidney or ureters, as the phenomena vary considerably, not only in different cases but even in the same individual. The attacks are sometimes near together, sometimes very distant. I have elsewhere mentioned the case of M. Gibert, in whose family calculi were common, if not hereditary. When this patient came to consult me in 1832, he had had, more than thirty years previously, a violent nephritic colic, followed by the emission of a small quantity of red and very fine sand. At a later period, and from time to time, he had seen sand in his urine, but without any previous symptoms. Ten years afterwards he had a new attack of colic, which was so violent that they feared a fatal termination; still this time there was only a little sand expelled, which was reproduced afterwards, but without colics; and it was not till fifteen years after this last attack, that the symptoms of stone were shown, but yet in so vague and irregular a manner, that the disease was not recognised, it being supposed that he had an ulcer in the bladder. Finally he came to Paris; the existence of stone was proved, and it was destroyed by lithotripsy. From this time he had no more colics; but from time to time he remarked a small quantity of sand in his pot-de-chambre, but he did not know whether this sand was produced on the repose and cooling of the urine, or had been passed ready formed.

ART. 3.—*Of the medical treatment of the gravel of cystine and oxalate of lime.*

Whether the gravel is of uric acid, oxalate of lime, or of cystine, the treatment is not materially different, although certain modern

authors, supported upon theories which they have formed, or upon experiments without a basis to give credit to their special inventions, have said so. Indeed these three kinds of gravel seem to be formed in the kidneys, in consequence of a simple functional derangement of these organs from temporary causes, often not to be attained, or nearly always problematical. To wish to assign the circumstances which cause a predominance of this or that principle in the urine, as some have done, is to sustain a theory to whose support we only bring speculations, and which is opposed in a body by the most decided facts. At first the symptoms, constituting nephritic colic, are absolutely the same in the different cases, or if they present any differences, they are inappreciable; and the most penetrating observer, in weighing minutely all that is presented, can never tell beforehand what kind of gravel will be passed by the patient.

In the second place, these pebbles themselves offer nothing constant or special in their physical characters likely to modify the sensations of the patient, or which may show us the differences noted by some authors. The latter seem to have based their theory rather on deductions à posteriori, drawn from the examination of the pebbles which have been passed, than on the direct observation of the phenomena. I will offer in proof of this the facts relative to the calculi of cystine, but on which I shall not now stop, because I have made them the subject of a special memoir.

As to the pebbles of oxalate of lime, I have treated at length in my treatise of the different and often bizarre shapes which they take. These shapes do not seem to exercise any appreciable influence in the production of the symptoms, and they only exact greater modifications in the employment of the curative means. I have seen many patients pass pebbles of this nature almost always granulated, of a moderate size, and a colour varying from a clear brown even to a deep black, sometimes after a nephritic colic, and sometimes spontaneously. Some were unequal, knotted, and covered with rough points. We now know that they are much more common than was formerly believed, when they only regarded as such those which were absolutely black. Every time that I have met with them, I have overcome the general symptoms in the same manner as in the pebbles of uric acid. This gravel is rarely produced twice in the same subject. I have never had occasion to resort to the different special treatments which have been proposed, and to which I shall refer, in my observations, and also when speaking of the dissolution of the stone.

ART 4.—*Of the medical treatment of white or phosphatic gravel.*

This kind of gravel is not so rare as the small number of cases given by authors might induce us to believe. Indeed we often find some solid deposits of a white, gray, or ashy colour, with numerous shades, and crystalline or amorphous shapes, in the vessels which receive the urine. But these deposits, as I have said in my

Treatise on Calculi, present considerable differences in density, shape, and the arrangement of their molecules. We can not, however, mistake it, whether it be a soft, regular, or granulated mass, a powder of more or less fineness, or regular or irregular grains, rounded or totally different in shape. Whether the patient passes these deposits ready formed or more or less consistent; whether rest and cooling of the urine be necessary to the solidification of the mass, it is yet the same disease in different degrees, and with special dispositions that our means of investigation do not permit us as yet to seize on. Most commonly the pebbles are found united together at the bottom of the vase; sometimes, and principally when they have been discharged in a semifluid form, they adhere to the parietes of the vessel where they are, if we may so speak, mixed and confounded with the mucosities contained in the urine. Should the latter fall on linen, the deposit will be there formed, and become solid in detaching itself.

All the peculiarities which I have just mentioned, may present themselves in the same individual, in different phases of the disease; and I have cited very curious instances of this, taken from different authors, giving the details of many others not less remarkable, that practice has offered me. I shall not, therefore repeat what I have said on this subject, in my treatise in the article on *Gravelle Pileuse*, which is only a variety of the gray gravel.

It is chiefly on this point that the mistakes of those who attribute to the alimentary regimen all the cases of gravel, even in its different kinds, is shown; for M. Magendie says positively that the quantity and nature of the food has no influence in the production of uric acid, or in the other saline substances in solution in the urine. The red or yellow gravel, of which I have just spoken, is formed chiefly in the kidneys, and only as a result of functional derangements in the secretion of the urine. That which I am about to examine, takes its origin more especially in the bladder, although it is also met with in the kidneys and ureters; it is a consequence of a more advanced morbid state, having often the characters of a deep-seated and continuous inflammation. The pebbles of this nature, which are found outside of the bladder, are the result of analogous influences. Thus whenever we meet with white, gray or ashy ones, we may be led to believe that there is a continuous inflammation more or less acute, with or without organic lesions. When we examine patients attacked with this kind of gravel, we are at a loss to understand how certain physicians can have ascribed it to a too succulent diet. Among the numerous patients that are daily offered to me, I have seen very few who presented the characters of a too rigorous nutrition; almost all, on the contrary, were weakened by other diseases, or by a catarrh of the bladder, or some organic alterations of the urinary apparatus; were pale and thin; there had been constipation, which is not rare in diseases of the bladder, the digestive organs were debilitated, and the stomach had been able to support only a very unsubstantial

diet for a long time, refusing, the greater portion of the time, food taken from the animal kingdom.

The symptoms developed by this kind of gravel are totally different from those of the others. In this, we rarely see the nephritic colic, with its train of frightful symptoms, and if any thing is noticed about the kidneys, it is a series of phenomena which announce a chronic disease. But most frequently there is no indication of lesions in these organs, (which, however, does not prove that they do not exist), whilst the bladder is the seat of apparent disorders, and the symptoms are ordinarily those of an advanced vesical catarrh, or alterations in the reservoir of the urine and its appendages. If the symptoms peculiar to gravel are present, they almost always result from the passage of pebbles by the urethra, or from their presence either at its internal orifice, or at the neck of the bladder. In truth, the accidents seen in these cases are sometimes serious, especially when the pebbles are very numerous; but it is worthy of remark, that the largest bodies do not cause greater suffering than the others. We are also above all astonished at the quantity that some patients pass in a short time. A woman, whose case will be hereafter reported, and who was in the Necker Hospital in 1838, passed two boxes full in a few weeks. The urine in other patients is so charged with the matter, improperly called chalky, that by cooling and a slight evaporation, it becomes a granular mass, which is found at the bottom of the vase, or which, if it falls on linen, covers it with a thick layer, which may be detached by rubbing. These cases, which are fully treated of in the work on calculi, have not sufficiently fixed the attention of practitioners, and the works on diseases of the urinary passages offer, in this respect, a gap which I shall endeavour to cause to disappear.

Such is also the undoubted signification of another fact that I have recently observed at the Necker Hospital. A man died of a deep seated lesion of the kidneys and of a cancer of the bladder. In the midst of the cancerous mass we discovered many rough and knotted pebbles, of the size of a pin's head or pea; their colour was ashy, and they were of slight consistence, though no adhesion was seen between them and the ulcerated surface of the bladder. In this the case differs from those that I have just cited, but the analogy between them is, that the pebbles were phosphates, as are all those produced under the influence of an organic lesion of the bladder.

We have had occasion to make the autopsies of several cases of this kind, and have met with gray pebbles on all the points of the urinary apparatus, but especially in the bladder. I will here mention two facts, which I have observed since the publication of my treatise. The first was in a woman who came to the hospital in such a broken down state, that she sunk soon after. At the autopsy we discovered, among other lesions, many fungosities of the bladder, and a large number of gray pebbles, the most of which were glued to the fungous tumours, with which they had contracted a kind of adhesion. The other relates to an old man, who was received into

the surgical wards of the same hospital, exhausted by a pulmonary affection, and by disorders of the urinary passages; their destruction was so far advanced, that only a few demulcents were prescribed. As he suffered greatly in urinating, my colleague was induced to order some injections into the bladder, which are ordinarily attended by such good results; but in this case, the pains occasioned by the introduction of the catheter caused them to be given up; the patient died before they had collected any complete notes on the progress of the disease. The bladder was hypertrophied, and had the mucous membrane destroyed on the greater portion, its internal surface unequal, knotted, sieve-like, and covered in nearly its whole extent with a layer of earthy matter, of an ashy gray, which appeared to be phosphate of lime. In some points, especially towards the bas fond and neck, this layer was many lines thick, and could be detached in great plaques; but the separation took place in the whole thickness of the layer, which adhered so strongly to the internal surface of the bladder, that in seeking to detach it entirely, they raised at the same time the mucous membrane. In truth, the latter was reduced to a state of pulp, (*bouillie*) and yielded to the least efforts. The same took place where the layer had less thickness; the grains were perceptible to the touch, and seemed to be of one mass with the tissue of the bladder. This incrustation was continued into the urethra, even to its sub-pubic curve. The autopsy was not complete, for I could not examine the kidneys or ureters, which had been taken away before I was called. It would have been curious to know if the internal surface of these organs offered the same dispositions.

Although very incomplete, these facts are of great importance in respect to the adhesion of the calculary matter to the parietes of the bladder, and in regard to the order in which the gray gravel is formed and developed. Other analogous, but not less conclusive, facts tend to support the deductions which I have made in my treatise in regard to the first point, and they add to the second a new proof of what I have just said respecting the formation of gray gravel, and the circumstances in which it is seen.

Thus it is especially under the influence of a deep seated lesion of the urinary apparatus, or the neighbouring tissues, that the different deposits, as the phosphates, are produced, taking sometimes the form of a gray or ashy powder, sometimes of very friable plaques of the same colour; and lastly, soft, porous, spongy agglomerations, which are divided at the slightest shock, or at the lightest shaking, so that certain patients pass them with a cracking noise, as I have seen more than once. When these agglomerations are neglected, and remain a long time in the bladder, they there take a certain consistence, increase by the addition of new grains, and thus constitute those friable stones of which I have given a description.

In some circumstances the tendency to gray gravel or stone remains for a long time, or is reproduced at more or less distant intervals. I will offer among other facts the following case.

M. Hardy, an old apothecary in the army, was operated on by

lithotomy when five years of age, and a large stone of phosphate of lime taken from him, but broken in the removal. After the usual symptoms, after the operation, he was cured, and enjoyed good health until the age of sixty-two. At this period he perceived wandering pains in his urinary passages, and passed at different times three pebbles of phosphate of lime, which he examined with great attention, and after an analysis of them, compared with that of his urine, submitted himself to a medical treatment, founded on the facts that he had acquired. The remedies employed had the effect of soothing his pain, and of relieving him entirely from the passage of pebbles, and he believed himself cured, when new pains came on; he had recourse to the same means, to wit, diuretics and alkalies, united with opiates, and in two or three days his symptoms disappeared. However, his security was soon again troubled; the treatment which he had thought so beneficial became useless, and his sufferings increased so rapidly as to oblige him to seek medical aid; but it was too late, the stone had acquired such a size that lithotripsy was inapplicable, and he was obliged to undergo the operation of lithotomy, the results of which were fatal. I have never seen a patient regret more deeply his having so long deceived himself in regard to medical treatment, a deception which had led him to his grave, by causing him to lose the precious time, during which the stone had become so fully developed.

This fact is remarkable on account of the identity of the deposits formed in the urine at the age of five years, and at that of sixty-two. The patient had no recollection of having passed pebbles in his infancy; we know that at this period of life it is difficult to expel gravel, either from the bladder not contracting with sufficient force, or from the want of size in the urethra. But that which has chiefly induced me to relate this case was the uselessness and the inconvenience even of the medical treatment, as generally advised, for it only results in masking the sufferings of the patient, and leading him into error. If instead of confining him to the use of sedatives, of diuretics, and of alkalies, they had examined his bladder at the moment when the pebbles cease to escape, they would have seen that this viscus had lost a part of its expulsive force, and that it emptied itself incompletely of its contents; they could have overcome this morbid state; they would have recognised the existence of pebbles; would have been able to have extracted them, and to have saved the patient.

A practical remark is here offered, which we ought not to allow to escape; either the patient continued to pass these plaques of sandy grains or agglomerations that I have just spoken of, or the urine had ceased for some weeks or months to bring away gray gravel, and this had given rise in the bladder to porous stones, the sensations from which differ but little. We shall easily understand this if we recollect that in almost all cases the bladder empties itself incompletely of urine, and that it never applies itself upon the foreign body when it is not all in one mass. Be this as it may, there is there

a period of transition between the gravel and stone which escapes most observers, and the consequences of which error are serious to the patient. It is the more difficult to avoid this mistake in like circumstances, as the examination of the bladder often leaves the most experienced practitioner in doubt. I will cite the following case.

M. Testulat, adult, of a feeble constitution, had suffered for a long time in his urinary organs; but had not the symptoms likely to induce a suspicion of one lesion rather than another, except some grains of gray and reddish gravel contained in a thick, muddy, and fetid urine. The necessity of urinating was frequent, the patient was embarrassed, and suffered pain in satisfying it; his health became more feeble; his strength diminished, and his constitution gave way. But the cause of these disorders was not decided on. Numerous consultations and numerous soundings of his bladder had been without result, although the patient was in charge of able practitioners. Some made him keep a catheter constantly in the bladder, and applied caustic to the urethra. Others sent him to Contrexeville. From the result, this last advice was the most useful, as under the influence of the waters the symptoms of the real disease were more clearly shown. The inspecting physician of the springs sent the patient to me, and I discovered the stone, which was a soft calculus, exceedingly friable, porous, and not resonant to the blow from the sound. Nothing was easier than to destroy it by lithotripsy; the cure was more prompt and more complete than might have been expected, and in the course of some weeks his strength and flesh were completely re-established. Nevertheless after some months, wandering pains in the loins came on—the urine, by intervals, was turbid and filled with mucus, and the patient passed many little white pebbles. Rest, diet, copious drinks, slight diuretics, baths and enemata, caused the removal of these symptoms, but they reappeared two months afterwards with more serious characters. After an attack of indigestion, he had several accesses of fever, accompanied with vomiting, the pains in the loins were more acute, and he passed spontaneously a large pebble of the same nature as the first.

Nevertheless, the symptoms instead of calming, became more violent, the vomitings continued, hiccough came on, and the patient expired from a progressive exhaustion. At the autopsy, which was made by M. M. Oliviers and Costello, we found the right kidney presenting traces of inflammation, the left very large, and the seat of numerous abscesses, and in its pelvis were three pebbles similar to those expelled during life. Above this kidney there was a large abscess, which was adherent to the stomach, spleen, liver, and diaphragm, and the ureter on this side was largely dilated, but there were neither pebbles nor traces of inflammation in the bladder. The portion of the pleura contiguous to the supra renal abscess was inflamed. The other portions of the body were not examined.

Independently of the practical deductions to be drawn from this

fact in regard to the difficulties of establishing a diagnosis, of the effects of the waters of Contrexeville, of the etiology of gravel and its coincidence, with deep seated organic lesions, it confirms that which other cases have established, to wit, that the gray as well as the other kinds of gravel can be formed in the kidneys, although modern authors say to the contrary. It is a proof to be added to those which I have presented in my treatise. As to the symptoms of this gravel they were as they almost always are, very vague and uncertain. Indeed, the series of profound lesions here existing were the commencing points of the morbid phenomena. But when it is strictly a case of this gravel in the kidneys and ureters, there is almost always a total absence of the symptoms likely to cause us to suspect it.

The functional troubles which we have seen in M. Testulat, and which made if we may so say, an exception to the rational signs of gray gravel, were less dependent on this last itself than on the organic lesions of the kidneys. The autopsy has given us all the evidence on this point that could be desired.

As regards the acute pains that the stone in the bladder caused to this patient, they are often seen as the effect of the presence of this kind of calculus, even when the bladder contracts so feebly that the patients are obliged to resort to the catheter to draw off their water. I have seen many cases of this kind together; among others, that of a man who was last year in my wards, his stone was small, and all the symptoms ceased when it had been destroyed by lithotripsy.

The treatment to be employed against the gray gravel does not differ less than its causes and symptoms. The means which I have before indicated as well as the greater portion of those which have been advised, will not suit here. If we have a muddy, chalky urine, bringing away little masses of hardened gravelly matter, we must act against the catarrh of the bladder, without occupying ourselves with the gravel. The treatment consists in giving injections which tend to disembarass the bladder from the deposits that it may contain, by changing its mode of vitality, and by reanimating its almost always enfeebled contractility. The result is the more prompt and certain in proportion as the atony of the bladder (almost constant in like cases) is less considerable, and the inflammation less ancient and less intense. The injections are to be increased and rendered more active as the state of the viscus improves. The first days the urethra is sometimes so irritable, as to render it almost impossible for the patient to support the passage of the sound; here we must proceed with great care and gentleness. Sometimes it is proper to begin with soft bougies, which cause less suffering, especially those of a small calibre, taking those which are larger as the irritation diminishes, and when they pass easily substituting a middle sized catheter for the injections. It however is not proper to repeat these, in some patients, oftener than every two or three days, in order not to produce too great an excitement. At

first we employ tepid water, of which we throw in only a small quantity at a time, stopping as soon as the desire to urinate is shown. It must not be forgotten, that the first introductions of the catheter irritate the urethra and neck of the bladder, and the patient confounds these with those which might be produced by the contact of the water with the parietes of the bladder. The peculiar sensation that this contact produces is less strong than might be thought; it is the distention alone of the bladder which brings on pain, and sometimes a reaction, which is afterwards shown by the necessity of urinating becoming more frequent and painful. But I repeat that accidents of this nature may be prevented by injecting very little of the liquid at a time, and at the end of a few days the urethra becomes accustomed to the passage of the catheter, and the bladder better supports the presence of the liquid. It is at this moment that we may give many injections, *coup sur coup*, always taking care to force them in gently, without shaking, and to stop as soon as the desire to urinate is felt. As the over distention of the bladder always produces bad effects, we must take care not to produce it. In certain cases it is the more necessary to insist on all these precautions, as the reaction of the bladder provoked by this over distention may bring on serious symptoms, and even be followed by death. But yet, even though it occasion only an accession of fever, it is necessary to guard against it, and I have just made known the means to prevent it with certainty.

The moment soon arrives when, the catheter producing no more pain, we can introduce a larger quantity of water, and repeat the injections, taking care to allow the first to escape whilst we fill the syringe, and thus continue till the patient feels fatigued, which soon comes on, especially when there is a hypertrophy of the bladder, and a tendency of this viscus to contract. In the contrary cases, as atony and atrophy of the bladder, the injections of tepid water produce no effect; we must replace them by cold water at the temperature of 15° at first, which may be reduced to zero.² Cold in this circumstance has appeared to me to be the most appropriate stimulus, and that which the least exposes to an inflammatory reaction; whilst all the tonics and excitants of a different nature, and to which I have had recourse, have not succeeded, and some patients have suffered such grave accidents from them, as to induce me to renounce them.

Although injections constitute the principal part of the treatment, it is proper to resort to different accessory means likely to facilitate and insure success. Thus copious drinks, baths of a moderate warmth, purgative enemata, lotions and emollient applications, local baths, a mild regimen, repose, &c. are successively or simultaneously employed with great advantages.

Here, as well as in other cases, we may meet with a disease which opposes all treatment, the happy effects that are ordinarily drawn

¹ (Reaumur,) about 65° Fahrenheit.

² Zero= 32° Fahr. (Translator.)

from the prescribed means remain very imperfect, if they are not even entirely wanting. Thus, notwithstanding the repeated introductions of the bougie or sounds, the urethra preserves its morbid sensibility, the bladder remains idle, or if it contracts, does so with pain; the urine which was at first clearer, becomes at intervals muddy and fetid, the general health instead of improving, deteriorates more and more, the functions remain perverted and disordered; in a word, the treatment is almost without a result. In the greater number of cases of this kind which have offered to me, I have found organic lesions which rendered the cure impossible. I have cited many of these cases in my treatise on the diseases of the urinary passages, and I shall hereafter have occasion to refer to others. Unfortunately, the autopsy alone permits the verifying of the diagnosis.

When we can suspect that the kidneys are the principal seat of the inflammation, and the place of formation of the pebbles, it is to them that we must direct the treatment. It is easy to understand that here the injections of the bladder will only have a secondary effect. But as we can only attack the evil in an indirect manner, it will not be reasonable to count on as certain and prompt a result. It is besides in these cases, that the general health and constitution of the patient have received the rudest attacks. The treatment ought consequently to be based on more extended combinations, and becomes more complex and embarrassing for the practitioner. Here, are presented the circumstances that I have indicated when describing the treatment preparatory to the operation of stone.

Scarified cups upon the renal region, when there is no contra-indication, favours the success of the treatment; then come emollient applications, repeated on the same place, and general baths. Frequent purgatives, but in feeble doses, produce also good effects. But our chief reliance must be on diuretic drinks taken in large quantities; those which I have found the most successful in the greatest number of cases, were the gaseous *acidulated*; simple and sulphurous waters. Those of an *alkaline* nature do not generally agree so well.

Daily experience proves that patients who employ the mineral waters on the spot, can drink with impunity much greater quantities than when they take other kinds of drink, and this is a motive for sending those there whose symptoms persist with great obstinacy. The springs which are slightly sulphurous have appeared to me to be those which have been of the greatest efficacy in similar cases.

I have often had occasion to employ the treatment of which I have just given the principal indications, and have obtained happy terminations, except in some cases where it has been shown at a later period, that there were deep seated lesions in the kidneys, bladder or prostate which were entirely beyond the resources of art. The most embarrassing thing in many of these obstinate cases is the difficulty or even impossibility of establishing the organic lesions during life. But when once we have succeeded in deter-

mining them, it is useless to torment the patient by active remedies or journeys, which are almost always painful. We confine ourselves then to keeping the urine abundant, by means of appropriate drinks, to favouring the emission of this liquid by the use of the catheter, and to moderating the progress of the vesical inflammation by means of simple injections, repeated as often as circumstances may render necessary; that is to say, as often as we see the urine thick, troubled, muddy, or fetid, we may repeat the injections, whilst we diminish their frequency when the morbid characters of this liquid become less.

In many cases which have seemed to me at first very serious, I have obtained from this treatment a result which I should not have hoped for. It is then also, that I have derived the most happy effects from sulphurous mineral waters, in drinks, in baths, and in douches, taking care to proceed in a cautious manner. I cannot too highly recommend this treatment. I add the following to the different cases of gray gravel, that I have already cited.

M. Lefebvre of Paris, of feeble constitution, aged fifty years, but seeming older, had suffered for a long time from a catarrh of the bladder, of which I could not determine the cause. At the time when I saw him, he had frequent desires to urinate; difficulty and pain in satisfying it; the urine was slimy, thick, and contained some plaques of calcareous matter, which hardened on drying, and was afterwards reduced to powder; this was the gray gravel, of which he had collected several boxes full. Besides he could retain only a small quantity of urine, but had no stone. The urethra and neck of the bladder were excessively irritable, the general health exhausted, and there was a great disorder of all his functions, besides a total derangement of his spirits. I combated the irritation of the urethra by the employment of bougies, taught the patient himself how to make the injections into his bladder, advised him to eat as much as his stomach would bear, and to take a little exercise. Under the influence of these means, the symptoms were calmed, the quantity of mucus in the urine diminished, and no more calcareous deposits were formed, though his health continued bad, and his constitution very debilitated. Some time afterwards I lost sight of him.

M. Salomon, of Marseilles, adult, of a feeble and very irritable constitution, and debilitated health, suffered for a long time from his urinary organs; the desire to make water was frequent, and accompanied with pain, the urine turbid, fetid and often purulent. The disorder of his digestive organs was not less advanced, and he could only take a very small quantity of food in a liquid form, his emaciation being attributable to this. The disorders of his digestion were the most ancient, but those of his urinary organs were the more developed, and it seemed right to attribute the destruction of his health to the latter. However, this might have been, M. Salomon had for a long time passed cretaceous deposits with his urine, of a dirty white colour, and most generally in plaques or by

grains, which were very easily divided; the result of this division, especially on drying, was a grayish white or reddish powder. An examination of his bladder showed me that this viscus contained a mass of these plaques and deposits of phosphate of lime, of which the patient passed a large quantity after the operation; the injections also brought away other parcels. Every thing induced the hope of our succeeding in clearing the bladder, but the patient was obliged to leave Paris before the termination of the treatment. I advised him to continue it at Marseilles, but am ignorant what has been the result.

The pebbles in M. Salomon were formed sometimes with astonishing rapidity, a box full being passed in the course of a few days. Long intervals happily existed between these emissions. We see the same peculiarity produced in a great number of analogous cases either from the existence of an appreciable cause, as a profound lesion of the prostate of the bladder or kidneys, capable of causing death, or from an organic lesion which permits the preservation of life. I shall offer many examples in treating of special cases; let it here suffice to note a case in which the treatment had been badly pursued, and the calculary affection reproduced.

M. Poullard, horticulturist in the environs of Chartres, aged fifty-nine years, and of a strong constitution, suffered for a long time from some disorder of his urinary apparatus, and passed parcels of ashy gravel. Recourse was had to diuretic drinks, to pretended solvents, which were without effect on the progress of the disease, which grew worse and worse, and he came to Paris. I found that the bladder contained a soft and almost diffuent mass, against which the shock of the instrument produced no sensation analogous to that which would have resulted from an organised tissue. I learnt without difficulty the nature of the mass, of which I had previously seen several cases. It was easily divided by the processes of lithotripsy, and the patient passed a great quantity of the remnants under the forms of flakes, grains, or a whitish gray powder. The vesical catarrh was of slight intensity, and the general health was pretty good, so that we may readily understand the great abundance of this phosphatic deposit. As the bladder performed its functions badly, I advised him to continue the daily injections of cold water. This he neglected, and in fifteen months returned to Paris, new pebbles having formed and become agglomerated in the bladder, and his sufferings having returned. I again removed these deposits, assuring the patient that if he did not follow the advice which I had given him, that others would follow, and my predictions were realised. At the end of a year he had new deposits of the same nature, which seemed especially to be formed under the paralysis of the bladder, which was shown from their taking place only after a long omission of the means likely to stimulate the urinary pouch and to prevent the catarrhal inflammation. During many months after each of the three treatments that he had undergone at Paris, he felt himself very well, but in proportion

as he was removed from these periods, he lost the effects of this stimulation, the inflammation returned, and the calcareous deposit came with it. Nevertheless he could not resolve to follow the treatment indicated, which at least proves that the manœuvres which were necessary to extract these deposits were not very painful to him.

There are inexplicable but nearly constant suspensions in the white, gray, or ashy gravel, the cause of which is connected with more or less deep-seated organic alterations, as in the other kinds it is dependant more particularly on a temporary super-excitement. The progress and duration of the disease cannot be determined, as it varies according to the individual, and on account of causes which are unknown to us.

I have seen many patients who have passed white, gray, or ashy pebbles with their urine, who have been rapidly attacked with stone from their not submitting to an appropriate medical treatment. Examples of this are given either in my treatise or in the parallel, and it will be easy for me to add many others, all confirmative of what these first had formally established. It is in these circumstances, also, that relapses frequently take place, and when we do not establish the contractility of the bladder, the patients are obliged often to submit to lithotripsy. There is one on whom I have operated a great number of times within a few years; it is rarely that six or eight months elapse without a reproduction of his stone.

It sometimes happens that a very small quantity of gray gravel remaining in the bladder gives rise to formidable symptoms. I recollect an old gentleman to whom I was called and who had suffered for many months. In examining his bladder, a very small ashy pebble became fastened in the eye of the catheter; excepting this I discovered no other foreign body, and all his symptoms ceased from this time.

The gravel called *pileuse* or *hairy*, is only a modification of the gray, and does not require a different treatment. I ought however, to remark, that it almost always coincides with a considerable atony of the bladder, and a vesical catarrh which is generally far advanced. The injections of cold water are here the most efficacious means that can be prescribed, recollecting the precautions and taking care when the case requires them to prepare the urethra for the passage of the catheter. This proceeding is nearly always sufficient both to disembarass the patient from whatever his bladder may contain, and to prevent the formation of new pebbles. As the hairy (*pileuse*) gravel is a purely nominal species, there is no necessity to discuss the assertion of M. Magendie, who besides does not oppose the treatment as to the other kinds of gravel, that is to say, combats them by a non-azotic regimen.

CHAPTER II.

Of the Medical Treatment of Calculary Disease as modified by particular circumstances.

Such is the treatment that we may use against the deposits contained in the urine, either when seen under the form of powder or sand, or when they constitute gravel strictly speaking. The expulsion of these foreign substances is sometimes easily caused under the influence of the means that I have mentioned, and we may also succeed in arresting their formation or preventing their reproduction.

But there are numerous cases in which they fail; the deposits in the urine continue, and the functional derangement remains or even increases. These cases become serious to the patient and embarrassing to the practitioner. Ordinarily there exists some morbid state which paralyses the efforts both of nature and art, and we must endeavour first to discover and remove these states.

It is in the same manner that numerous peculiarities exercise an incontestable influence on the production of gravel, on its development, gravity, mode of expulsion and treatment.

I am about to enter on some details both in regard to the morbid states of which I have just spoken, in showing the conduct of the practitioner in each case, and also in regard to the peculiarities that I have equally described, endeavouring above all things to show the practical inductions arising from them.

ARTICLE I.

Of the medical treatment in cases where the pebbles cannot escape.

I here suppose that the general treatment whose basis I have just laid down, although employed with all the precautions and modifications commanded by the state of the subject, and the characters of the disease has not been successful; let us see what can oppose the emission of the pebbles, the source of all the symptoms, let us see also what is the point of departure in the vitiation of the renal secretion, the origin of the gravel, and in order to do so, let us successively pass in review the principal cases which may present themselves.

SECT. I.—*Pebbles retained in the kidneys or ureters.*

It is by no means rare for us to see pebbles stopping in the kidneys and ureters. If the diagnostic signs which would enable us to recognise the event during life are wanting, the autopsies establish the fact in an incontestable manner, and the numerous examples that I have mentioned in the treatise on calculi, do not permit us to raise the slightest doubt on this point. It will therefore be

useless to reproduce these facts here, or to review the frightful series of disorders caused by urinary concretions when they remain in the glands destined to secrete the urine, or in their excretory ducts. These are truths acquired by science. It is therefore for the practitioner to prevent the disorders from the knowledge of which he draws so largely, and chiefly in the points which concern the resolutions to be taken in a surgical light. The most astonishing thing when we think on the normal condition of the kidneys and ureter is, that the pebbles are not stopped there more frequently. The knowledge of the force with which the economy drives out foreign bodies whose presence deranges it is not less necessary, to enable us to account for the many phenomena which occur in like cases, and which so act, that fortunately it is uncommon for the urinary concretions developed in these organs to constitute an incurable disease. Let us also recollect that the kidneys generally only perform their functions badly and become the seat of more or less serious lesions when a morbid state exists in the bladder or urethra, which interferes with the expulsion of the urine. The proof of this is, that in the greater portion of these cases, it is sufficient to attack the disease of the bladder or urethra to which we had previously paid but little attention, in order to cause a cessation of the symptoms in the kidneys. The medical treatment to be prescribed in like cases does not differ from that which I shall indicate for those cases of calculi in which all surgical operations are impossible, except in the state of the patient being here much less serious, and his general health still pretty fair or at least but slightly affected. But we should never forget that this treatment offers nothing but uncertainty and difficulty; all is problematical, even to the disease which we seek to overcome; we are therefore reduced to insisting for a long time on general means, to augmenting the dose, to changing the form and to varying them in every way in order to prevent the system from becoming accustomed to their effects.

SECT. II.—*Pebbles arrested in the Bladder.*

Although the primitive organic dispositions are infinitely more favourable to the escape of pebbles from the bladder than from the urinary organs which precede it, these bodies nevertheless are there arrested much more frequently. The expulsive power with which this pouch is gifted, and the condition of the urethra, naturally wider, less long, and less sinuous than the ureter, are not sufficient to diminish the frequency of this accident. There is here then a contrast between the disposition of the organs and the effects produced, which ought to fix the attention of observers, but on which it has not yet been arrested. This contrast is easily explained by the multiplicity of circumstances which are capable of impeding the course of the urine, and of interfering with the escape of the bodies that it may carry. Let us then examine what ought to be done in

each case where a special cause prevents the bladder from being freed from the pebbles which descended into it.

FIRST SERIES.

Pebbles retained in the Bladder by a spasmodic state of the Urethra, or Neck of the Bladder.

Books very often suppose things to be known of which practice is ignorant. In the present instance it is more difficult than might be thought, to determine whether the patient who consults us really suffers from the presence of a pebble in the bladder, or whether this body is there retained by spasmodic contractions of its neck. The symptoms offer us nothing decisive. The greater part of the time we can only attain a knowledge of the true cause of the symptoms by examinations, by feeling, and the successive application of many curative means. Thus some of the patients whom I have seen had frequent desires to urinate, and difficulty and pain in satisfying it, wandering pains about the pubic, perineal and sacro lumbar regions, malaise, anxiety and derangement of their different functions; they had used sedatives and antiphlogistics in all shapes without obtaining any permanent relief. I resorted therefore to the treatment directed against spasm of the urethra and neck of the bladder, and in a few days the patients passed the pebbles, whose existence it had been impossible to determine. These facts, which are already numerous, resemble those which I have elsewhere cited, and establish, in the most positive manner, the utility of the precepts that I have recommended to the practitioner. Some modern authors have doubted the reality of these spasmodic contractions of the urethra and neck of the bladder. Not only, however, do these morbid states exist, but they are frequently found, exercise an important influence not only on many diseases of the urinary apparatus, but their influence in all that relates to the expulsion of the pebbles is the greater, as there is almost always at the same time atony of the bladder. The concurrence also of these two circumstances renders the expulsion of the pebbles impossible, whilst if they were absent they would easily escape. I shall show when treating of lesions of the bladder, that a great number of the diseases of this viscus are caused by nothing else than the simultaneous existence of spasm of the neck and atony of its body.

Nothing is easier than to prove the existence of these two states, or of one of them. It is sufficient that we introduce a sound immediately after the patient has urinated; if the passage of this instrument produces at the curve of the urethra and at the neck of the bladder more pain than is usually seen; if there is in these two places a stiffness or an extraordinary contraction without organic lesions on which it could depend; if in the same time a certain quantity of urine escapes by the side of the sound, which had not been emitted spontaneously, there can be no doubt of the patient

being attacked at the same time with an increase of the contractility of the urethra and neck of the bladder, and of a diminution of the expulsive power of its body. A practised physician distinguishes without trouble the concurrence of these two states from those effects, which might be produced by a tumor in the neck of the bladder, by an engorgement or other lesion of the prostate, or by an organic stricture of the urethra.

The state that I refer to is not uncommon in those having gravel, and we will understand how if the urine itself has difficulty in traversing the urethra, when the bladder cannot completely free itself by its own contractility, that the phenomena will occur with still greater reason when it is an affair of the expulsion of a pebble. But this state, with which practitioners have not occupied themselves as much as they ought to have done, is extremely common at all periods of life, in the infant as well as in the adult, and in old age; but in the latter, the induration of the prostate offers a troublesome complication, to which I shall hereafter refer. The measures that I have indicated against spasm and neuralgia, and those which I shall make known when speaking of paralysis of the bladder, ought here to be combined; we must also continue their use until the neck of the bladder recovers its suppleness, and the body its contractility. We shall see at the termination of this treatment pebbles escape whose existence had not been suspected, and which would never have been expelled had we been content to prescribe only alkaline drinks for the patient. Let us add that by this treatment we re-establish the normal course of the urine, which results in the disappearance of a series of other morbid phenomena, which had been excited by the gravel. It is then useless to insist that we ought to associate the means likely to increase the renal secretion, as copious drinks, diuretics, baths, enemata, purgatives, &c. to the treatment specially directed against spasm and want of tone in the bladder: for I have only in view for the moment the noting of the simple modifications that we are obliged by especial states to add to the treatment in general. I also confine myself to the relation of these states, and the means that they claim, in order that we may appreciate the influence exercised by them on the sojourn of pebbles in the bladder, since I reserve it for future study when considered under more general points of view.

Among the facts drawn from my practice, I shall here relate the following, as the complement of those that I have already published.

M. Benoit, of Paris, an adult of fine frame, and in other respects in good health, had several attacks of nephritic colic, followed by the expulsion of a red sand and some pebbles. These symptoms were suitably treated; nevertheless they continued, and became so serious as to make the patient believe that he had the stone. I was consulted; an examination of the bladder proved to me that there was no calculus, but I found that the urethra, and above all the neck of the bladder, were exceedingly irritable. A treatment directed

against this neuralgic state removed the symptoms; pebbles were expelled, and the patient afterwards had no symptoms of gravel.

I cannot too strongly insist on the seriousness and variety of the disorders which produce in the urinary apparatus a derangement, although slight, in the excretion of urine, determined by the setting on edge (agacement), the irritation or too powerful contraction of the neck of the bladder. In M. Benoit, as in the greater number of the patients in this category, it was sufficient to establish an equilibrium of the expulsive powers of the urine, in order to terminate the symptoms, and also to prevent the formation of new pebbles. These neuralgic states of the neck of the bladder may be reproduced, and with them we see the symptoms of gravel reappear; I know of no means to effectually prevent this super excitement of the nervous apparatus; when the neuralgia reappears, it is to be combated in a similar manner. The treatment is always simple, and not fatiguing. If these states of the urethra and neck of the bladder are neglected, the gravel soon becomes a calculus, notwithstanding the other means which may be resorted to.

M. Lambert, merchant, of Paris, of strong constitution, and leading a very active life, had had many attacks of violent nephritic colic, accompanied with serious disorders of his general health. It was during one of these colics that I was called. A pebble, already engaged in the urethra, had caused a retention of urine, from which the patient had suffered greatly for some hours. Long continued baths, copious drinks, sedative enemata, all had been tried without effect: it was urgently necessary to evacuate the urine. The catheter met with the pebble in the membranous portion of the urethra: I did not endeavour to force it back, but prepared to extract it by means of the forceps with two branches, when new efforts to urinate came on, and the pebble was forced out with the jet of liquid, and all the symptoms ceased. The patient was afterwards submitted to an appropriate treatment. New attacks, however, came on afterwards, which required the employment of the same means.

The catheter here acted in two ways: in causing a cessation of the spasm of the urethra, immediately before the pebble, and in displacing the latter. In many cases I have obtained the same results from the employment of a simple bougie, with which it is generally better to commence. We know besides, that in certain complete retentions of urine, it is sufficient to insert only the end of the bougie in the urethra, in order that the patient should immediately commence to urinate. This is a fact of daily observation; some old patients know this so well that they introduce a bougie to the middle of the canal before commencing to urinate, and the liquid immediately passes out, whilst without this precaution they are obliged to make considerable efforts.

M. Leclerc, of Paris, sexagenarian, of a very irritable temperament, had suffered from the gravel for a long time: he confined himself to following a severe regimen, to drinking a great deal, and

to avoiding all excesses ; the symptoms were reduced, he ceased to pass pebbles, and he believed himself cured. But the pains of stone soon came on, and sounding proved that this viscus contained many calculi, which were destroyed by lithotripsy. Before practising this operation I submitted the patient to the treatment that I am accustomed to pursue in neuralgia of the urethra, a morbid state which exists here in a high degree. When the bladder was relieved of the calculi, M. Leclerc resumed his usual habits and labours. During the fourteen years that he has since lived he has not been tormented with gravel, and his bladder has not ceased to perform its functions with perfect regularity.

This case, to which I might join many analogous ones, proves the good effects of the means that I have indicated against urethral neuralgiæ, not only in order to procure the evacuation of the urine, and the expulsion of the pebbles, but also to prevent a return of the gravel.

In a great number of cases, the simple presence of a pebble at the neck of the bladder, brings on serious symptoms, which persist even after the expulsion or extraction of this foreign body.

I have seen many examples of this, the principal of which are either related in this work, or in some of my preceding publications. I shall here only mention one.

M. Dereste, attached to the Naval Office, suffered for a long time from the gravel. The pains although vague, and without especial characters, ended by acquiring sufficient intensity, and resisted the different sedatives which were prescribed. This obstinacy of the morbid phenomena, induced us to think that there might be some pebbles in the bladder: this was proved by sounding. A very little pebble, which presented at the internal orifice of the urethra, excited all these disorders. No doubt the obstacle to the expulsion of a pebble, was only the excessive irritability of the neck of the bladder, and the foreign body thus retained had increased to such a degree as to form a calculus. This irritability persisted even after the preparatory treatment destined to combat it ; the remnants of the calculus also had great difficulty in escaping ; and moreover, M. Dereste had malaise, and a painful irritation (agacement) during some weeks, with frequent desire to urinate, accompanied with pain in satisfying it. Indeed the prostate in him offered the first degree of engorgement. Here was one of those cases in which the calculus, although small and recent, gives rise to a series of serious symptoms. A like collection of circumstances rendered the cure much more difficult than it is ordinarily. Under the influence of a mild diet, a few baths, sedative enemata, copious drinks, and cessation from the labours of the office, his symptoms ceased. The patient afterwards went to Contrexeville, where he took the waters with benefit. On his return he continued the use of these waters, and all his symptoms finally disappeared. In the greater part of the simple cases that I have observed, the nervous state of the urethra and neck of the bladder has ceased, sometimes

with a promptness which agreeably surprised both practitioner and patient. But in the complicated and more advanced cases analogous to that of M. Dereste, the symptoms persist sometimes with an obstinacy that is discouraging. We must then no longer occupy ourselves with the gravel, for it is only a secondary affection: it is against the excessive irritability of the neck of the bladder that we ought to direct all our efforts. I have shown, when treating of the diseases of the urethra, the principal means that are employed; I have given a short account of them in this work, and I shall enter more fully into details when I shall treat of the affections of the bladder and prostate.

SECOND SERIES.

Pebbles retained in the Urethra, or in the deep-seated portion of the Urethra, by one or more strictures of the canal.

Daily practice presents us with cases, in which one or more organic strictures of the urethra oppose the escape of the pebbles, no matter how great the expulsive force of the bladder may be, or the medical means employed to favour their discharge. I have in my preceding writings, quoted a number of cases of this kind, which are much more numerous, and many of them much more serious than the almost entire silence of authors on this point, as well as the truly extraordinary manner in which this question has been examined, in some recent publications on the treatment of gravel, might induce us to think. If we needed a new proof of the empiricism which is attached to the greater portion of these treatments, it would suffice to note, that in prescribing the means suitable to favour the expulsion of the pebbles, they have taken no account of the state of the canal through which they ought to pass. I have shown that on this account a large number of pebbles had remained in the bladder, and there become calculi; as to those which are found engaged in the urethra, behind an organic contraction of this canal, we may safely say that they truly constitute one of the most embarrassing cases that can occur to the physician or surgeon. The science of diagnosis itself, as I have shown, often is at fault, and we may easily conceive how embarrassing is the situation of the practitioner, in regard to his therapeutic treatment, when face to face with a patient, who is a prey to the anguish from a retention of urine, caused by a pebble lodged behind a contraction. These are two causes which act simultaneously, and which are so conducted that one prevents our removing the other, and thus endangers the life of the patient. I will add some new facts, which furnish me with an opportunity to speak of the conduct to be pursued on a like occasion, to those which I have given in my work on the diseases of the genito urinary organs.

M. Dehargne, an old soldier of Vendome, aged fifty-five years,

had had gravel during several years, but never suffered from very severe symptoms. He took baths, enemata, a few bottles of mineral waters, or some diuretic drinks, and passed his gravel without troubling himself about its consequences, being already if we may so say, familiar with the disease. New symptoms, however, came to disturb this state of repose. For a year he had passed no more pebbles, but the symptoms of stone became every day more intense, and he came to Paris. I found a slight stricture of the urethra, the neck of the bladder very irritable, and the bladder containing many small calculi, which were destroyed by lithotripsy.

This simple fact proves how important it is not to become inattentive to gravel, only because its symptoms are not severe. If the patient had thought seriously of his state, the stricture of the urethra and the neuralgia of the neck of the bladder would have been overcome in time; the bladder would have retained its expulsive power, and the pebbles would have been driven out. By establishing also the urinary excretion in its normal state, and by the employment of appropriate internal remedies, they would, without doubt, have prevented the formation of gravel, and we would not have had to overcome a calculary affection.

Every time that there is a stricture of the urethra, sufficiently advanced to render the excretion of the urine difficult, the pebbles may stop and accumulate in considerable numbers, without our ever thinking of them. I have elsewhere cited some remarkable cases of the kind; here is yet another, which is chiefly interesting from the severity of the accidents which endangered the life of the patient.

M. Pélican, of Paris, had had for a long time, strictures of the urethra, which, among other accidents, had brought on a catarrh of the bladder, which was of some standing. The patient was, besides, in the most unfavourable conditions; he had a horror of every operation, and he only decided on seeking medical aid when his constitution was entirely destroyed by his acute and prolonged suffering. I however succeeded in re-establishing the freedom of the urethra, in making the emission of urine easy, and in curing the catarrh of the bladder. His health returned; but improbable as it seemed, there was found a considerable quantity of pebbles in the membranous portion of the urethra, and in the bladder, which escaped as the dilatation of the stricture progressed. This gravelly affection, of which M. Pélican was thus freed, was not shown by any special symptoms. No doubt if the treatment of the urethral coarctations had been delayed much longer, numerous calculi would have been formed, instead of pebbles. This patient is not the only one that I have treated for strictures of the urethra, and which were cured at the same time, with a gravel with which he did not believe himself attacked. We act in two ways on gravel, in bringing the urethra to its normal state; the expulsion of the pebbles, which was before impossible, becomes easy; provided always that the bladder preserves its ordinary contractility, and

their production ceases ; not being kept up by the irritation of the neck of the bladder, whose powerful influence on the renal secretion is at present well known.

In some of the patients in this category, the pebble retained in the bladder by the urethral stricture had increased, as in M. Dehargne, and thus formed a calculus ; but the presence of the latter had not even been suspected, and it was only recognised after the cure of the stricture. The same thing may occur in the urethra.

General Bl——, of a strong constitution, had had some symptoms of gravel, when towards the end of March, 1838, symptoms arose, from the bladder and urethra, which caused him the greatest uneasiness. He suffered at first from difficulty in urinating, which was combated by a medical treatment, which though directed by an able practitioner of the province, was not followed by any durable or complete effect. A short time afterwards, instead of diminishing, the symptoms became so serious, from the retention of urine, that he came post to Paris. At the moment when I saw him, he had just travelled thirty leagues without being able to urinate, except by drops, and with the most terrible pains. Extreme suffering and fatigue of travel, were here united, and he had also a pebble engaged in the spongy portion of the urethra, which was firmly contracted on this foreign body. The sensations of the patient had otherwise undergone no change ; the excretion of urine, although more difficult than at the commencement of the disease, did not offer any marked differences to induce us to think that the pebble had advanced. Everything, on the contrary, led me to suppose that it had been there for some days. I introduced successively, coup-sur-coup, many soft bougies, which were larger and larger, and forced them in sufficiently to dilate the strictured point, and push back the pebble. Immediately afterwards, the patient took a warm bath, drank abundantly, and the pebble was expelled with the stream of urine. I cannot express the joy of the general, when he announced to me this result, only a few hours after having withdrawn the large bougie. From this moment all his symptoms ceased ; but it seemed to me right to overcome the spasmodic state of the urethra, and the little stricture which existed in the canal, in order to prevent a more considerable coarctation at the point where the pebble had remained, a thing which would soon have happened. Bougies of soft wax, of a size increasing from two lines to three, and three and a half in diameter, were introduced, and retained from five to ten minutes each day. A few baths, enemata, copious drinks, a mild regimen, and the use of a suspensory truss, were the adjuvants of this treatment, which lasted fifteen days, at the end of which the general was able to return to his post. I have seen him several times since ; he has continued in excellent health, has never had gravel since, and preserves nothing of his ancient sufferings, except the remembrance of them.

If we regard the position occupied by the pebble, which may be easily known either by introducing a sound, or by applying the

fingers on the course of the urethra, and if we regard the position of the eminent practitioner who had charge of the case, we shall find it difficult to understand how the cause of the symptoms had been mistaken. The course which was pursued does not, however, leave the least doubt but that it had been so.

This fact, to which I might add many others, proves incontestably that it is more difficult than is supposed to recognise pebbles in the urethra. A similar difficulty, which is not explained by theory, is each day shown in practice, even when there is no stricture of the urethra, and we can introduce a sound even into the bladder. I have shown in my fourth letter many facts which prove that long experienced surgeons have committed serious errors in this respect. As the urethra offers a series of dilatations and contractions, a small pebble might exist in the larger points of it, as the bulbous and membranous portions, without the sound meeting them, and giving us the peculiar sensation which results from the rubbing of two bodies against each other. The surest method of removing all doubts is to introduce a large bougie of soft wax, on which we shall constantly find the print of the pebble, either from its having produced a furrow upon the portion of the bougie with which it has been in contact, or from its leaving a more circumscribed trace. The prints produced by these pebbles have, however, such characters as can never be confounded with those resulting from a stricture. Experience constantly proves it; nevertheless it has all its efficacy only when the urethra is free. If there is a stricture, the very small bougies, which are the only ones that can penetrate, may pass alongside of the pebble without bringing away the mark of it, especially in the bulbous or membranous portions. When the coarctation is considerable, it only permits the passage of a very small portion of the extremity of a soft bougie; nevertheless the portion of this which succeeds in escaping the obstacle may abutt against the pebble placed behind it, and then it is not rare to see two prints at the same time, that nearest the end being rough, unequal, and fringed, or cut perpendicularly (*à pic*), owing to its contact with the pebble: that which is seen further on is more regular, with smooth and rounded edges, embraces sometimes circularly a certain portion of the bougie, and sometimes is confined to a single side of the instrument; sometimes the external layer of the wax is pushed back in a kind of ruffle, as if we forced the bougie through a wire drawer, which was too narrow; this is the print of stricture. These two kinds of prints are easily distinguishable one from the other.

Small metallic sounds, or simple button pointed stilets, may serve to prove the presence of a pebble behind a stricture, provided that the latter will admit the exploring means. In the contrary case we are reduced to the facts furnished by the touch in the rectum, by feeling the perineal region, and to the rational signs which so often otherwise lead into error. Happily we may almost always succeed in making a little explorer traverse the stricture, and when we have found the simultaneous existence of both a pebble and a coarctation,

we must first attack the latter. For this we proceed as I have indicated in my treatise on the diseases of the genito-urinary organs, adapting to each case the modifications that I mentioned, and which it is useless here to repeat. When the stricture is once destroyed the pebbles are expelled spontaneously, as in the case just cited, but sometimes we are compelled to proceed to their extraction in following the methods that I have described in the work referred to.

Here two circumstances present themselves which the practitioner cannot too well consider: these are the necessity on the one part of a prompt, but rational and methodical treatment, based upon a diagnosis severely formed, on the other the difficulties, embarrassments, and ennui that this treatment can bring on.

I have said that it is necessary to cause a cessation of the accidents from a retention of urine, which progress sometimes with a frightful rapidity, but that it is important to avoid all shocks, and not to use violence, the latter being almost always followed by energetic reactions, which too often compromise life by exasperating the disease before the patient has had time to profit by the treatment. Here is a question of an important fact, to which I call the attention of observers. The first applications that are made in the urethra of a curative means determine frequently a reaction, which may become the more serious as the patient preserves all his strength: it may, and does result from this, that in many cases the action of the first remedies becomes a cause of disease, which is added to those already existing.

In the greater portion of the circumstances to which I allude they insist too much on the medical treatment, properly speaking. We must not forget that in most cases this treatment is nearly useless, and that it may become injurious by causing us to lose precious time. We ought, therefore, only to resort to it with the view of aiding surgical means, whereas in general practice, besides the horrible and prolonged pains that the patient finds himself condemned to by the difficulty of urinating, we expose him to accidents, the consequences of which it is impossible to calculate, as eversion of the urethra behind the pebble, to inflammation, and to the abscesses which follow it, to the disorders of the prostate and its excretory ducts, to those of the *vasæ differentiæ* and *vesiculæ seminales*, to ruptures of the urethra, to effusions of urine, and more frequently still to a complete retention of this liquid in its reservoir. The details of these cases form a very sad page in the annals of surgery; we cannot study them with too much care, in order, if possible, to diminish the sad consequences that strictures of the urethra bring on in those having gravel. The *Gazette des Hopitaux* of 1837 contains the case of a man of thirty-two years of age, in whom a coarctation of the urethra was followed by a rupture of the membranous portion of the canal with urinary fistulæ, and the formation as well in these fistulæ as in the perineum and scrotum of calculi, of which they were obliged to extract thirty-one. Unfortunately in these complicated cases the existence of a pebble is at first rarely

thought of, and when suspected and recognised it is no longer a fitting time. This is a new proof of the insufficiency of the ordinary means of exploring the bladder, and the faults of its progress adopted by the greater part of those who have occupied themselves with the diseases of the genito-urinary apparatus, deciding almost entirely on these, and their approximations, and passing smoothly over the difficulties. In reading the precepts, traced in books often with infinite art, the practitioner is persuaded that nothing ought to stop him; dangers are nevertheless swarming around his steps. This is particularly striking in the work just published by M. Segalas on stone and gravel, and also in the *Medecine Operatoire* of M. Velpeau. In the first of these works the question of pebbles being stopped behind a stricture in the urethra is treated, if I may dare so to speak, with levity, (*pardessus la jambe*), in the second it is almost passed over in silence. It is true that the work of M. Segalas, judging from the context, seems to have been especially composed as a popular work, and the author has feared to frighten the public by a true picture of the difficulties which spring up in similar cases, and of the disorders too often brought on by the manœuvres resorted to. But this also is against science; it might come into the hands of practitioners wanting in experience, and lead them into very grave errors if they risked the following of the precepts there traced, both in regard to the diagnosis and treatment. This, I cannot too strongly declare, may become extremely serious, and I know few things that are so embarrassing. Indeed strictures of the urethra in cases of gravel have a trebly unhappy influence; they are one of the most powerful causes of gravel; they oppose strongly the spontaneous escape of the pebbles, and often render the extraction very difficult. My previous publications contain many cases in which this triple influence was felt. It would be tedious therefore to add others here in regard to the first of these, that is to say, to the action that these obstacles to the course of the urine exercise upon the renal secretion, and consequently on the formation of gravel. This influence has already been fully proved. But I think I ought here to offer some remarks which will enable us to appreciate the difficulties that stricture of the urethra offers to the escape of pebbles.

The application of surgical means is the sole resource of efficacy against pebbles arrested in the urethra when there is a coarctation, and above all when these bodies have remained some time in the canal. But as these procedures do not suit all cases, it is necessary that we should establish some distinctions. These must vary not only from the volume of the pebble, the symptoms that it excites, and the idiosyncrasies which may exist in the individual, but mainly also from the point where these concretions have stopped.

The external orifice of the urethra being small, and the portion behind it larger, and possessing a feeble power of expulsion, it is by no means rare to see pebbles arrested here. By means of a scoop, or a branch of the trilobe, or of any other analogous instrument that

we can pass behind the foreign body, we may extract them without difficulty or pain, if the diameter does not exceed that of the orifice of the canal, in which case we unbridle the latter with the urethrotome, as I have shown in the parallel. All this operation is simple, easy, but slightly painful, and as prompt as it is certain in its effects. It is not necessary either to dilate the bridle, as is advised by M. Segalas, or to destroy it by cauterisation, as recommended by other authors; these means, especially dilatation, are slower and more painful; to persist in their use is to condemn the patient to useless sufferings. I shall hereafter have occasion to refer to a manœuvre employed by M. Petit, which consists in tearing the orifice by a strong pressure exercised upon the pebble from behind forwards; this may determine serious accidents, besides the acute pain that it occasions. Dilatation and cauterisation have also the inconvenience of bringing on a state of induration or stiffness of the gland, which sometimes lasts a long time, and which is difficult to cure. It is the more difficult to understand why they persist in praising these bad methods, when daily experience confirms more and more the efficiency of my means, in procuring an instantaneous relief without pain or danger; we may equally apply it whether there be or be not an accidental stricture of the urethra; only in this case, when the coarctation is considerable, we must employ a smaller urethrotome, as those which are generally employed are with difficulty passed into the retracted portion, between the calculus and the parietes of the canal. The medico chirurgical treatment demanded for the extraction of pebbles in other portions is sometimes as simple as it is easy, yet in others it offers as many difficulties as there is trouble in diagnosticating their existence. We ought, however, never to forget that these difficulties are owing more to the state of the organs, which do not allow their escape, than to the gravel, strictly speaking. Here the presence of the pebbles is only an accident, which may, to be sure, become the principal disorder, and bring on serious symptoms; but the treatment of the gravel is subservient to that of the diseases of the urinary apparatus in general. It is also so infinitely modified by these diseases, that no one as yet has thought to isolate them, or to consider them in an abstract manner. This fact alone demonstrates that certain measures which have been advised in order to aid the expulsion of gravel, are the result of systematic speculations, where no attention is paid to practice.

To reproduce here the developments that I have elsewhere given would exceed the limits of this work, and a simple extract would not suffice to the practitioner. I therefore pass over in silence all that relates to the surgical means by whose aid pebbles have been removed from the urethra, where they had stopped, and which, from their volume, form, or some disposition of the canal, could not escape of themselves. I shall refer to the pain and accidents produced by these artificial extractions when treating of the consequences brought on by large pebbles when their expulsion is abandoned to the efforts of nature. In the chapter which will be

consecrated to this in the parallel I will show some new facts, which support what I have just established, so that some very short remarks upon the means adopted by my brother practitioners will suffice here.

Some surgeons still give a preference to Hales's forceps and to the dressing forceps. I have shown in another work that Hales's forceps, as found in the shops, are defective; that its employment is uncertain, and sometimes followed by serious symptoms; inconveniences which have caused it to give way to the modifications that I have indicated, and the utility of which is confirmed by experience. Nevertheless many yet recommend Hales's or Hunter's forceps, so great is the influence of routine, for I cannot suppose that my fellow practitioners have retrograded. Most probably there is some delusion in regard to the dressing forceps, for it is impossible to open them sufficiently to seize a pebble when in the deep seated portions of the urethra. Neither do I comprehend another method proposed by M. Segalas, which consists in an injection into the bladder, in order that the escape of the liquid may bring away the foreign body. It is neither without difficulty nor pain that we can force water into the bladder without having commenced by introducing a catheter; and the contraction and situation of the pebble renders this arrangement of the catheter impossible, besides increasing the pain and difficulty usually caused by the injection in the free state of the canal. This method has undoubtedly been proposed from theoretical ideas, as practice repels it.

When M. Segalas foresees the difficulties of extracting a pebble which occupies the membranous portion of the urethra, he pushes it back into the bladder by means of an ordinary sound. This indeed sometimes succeeds, but there is not certainly a worse, more dangerous, or even more painful method. Should the sound pass between the pebble and the parietes of the urethra, we should be obliged to undertake long and painful examinations with the touch, during which the latter may be wounded, and the pebble very often escape. Experience also has taught us, that by means of a very large soft bougie we may succeed better, more promptly, with less pain, and without running any risk of bruising the urethra. It has also shown that by introducing a large flexible catheter as far as the situation of the pebble in the membranous or prostatic portion of the urethra, and forcing in strongly and quickly an injection of warm water, the patient being placed in the position for lithotripsy, the pebble may be carried into the bladder by the column of the liquid; this result I have very often obtained, and with very little pain. Each time that the bladder is not full of urine, and that it can still receive a certain quantity of injection, we begin with this method, which is the most easy and the least painful.

The existence of a pebble stopped behind a considerable stricture of the urethra, no matter where placed, is, as I have said above, a serious circumstance, and one which has often embarrassed the most experienced surgeons; yet, if we are to believe some modern

authors, the difficulties are reduced to nothing. "We dilate rapidly the stricture by means of bougies, and the pebble escapes of itself, or is sought for." The confidence with which they recommend so singular a practice would lead us to think that they had never had occasion to treat any of these cases, which are, I repeat, among the most embarrassing that the surgeon can meet with. It is very probable, that instead of the actual they have given us the presumed results of their theoretical conceptions, and that in writing they have found themselves under the influence of those inspirations which did not permit them to see that they were deceiving themselves. It may also be that the author has wished to elevate the talent of the practitioner by creating for him favourable positions, in order to place his success in a more conspicuous point of view. However this may be, there ought to be no romance in surgery, and if the work of M. Segalas falls into the hands of an inexperienced practitioner, who cannot distinguish the true from the false views, it will lead him into the most serious errors.

The instrument of Jacobson, and that which is called the instrument à pression et à percussion, is recommended for the extraction of pebbles from the bladder. Have the authors had occasion before giving this advice to employ these instruments, which they wish should be preferred to all others? The manœuvre is indeed so very difficult and uncertain when they are employed, that we ourselves are forced to give them up on account of their causing such suffering to the patient, and also from their not attaining their end, as will be evident to any one who will take the trouble to reflect on their mechanism. Chance alone has caused the success of some cases, but it can never enter into the mind of M. Segalas, or of those who entertain his views, that we ought to reduce a surgical operation to the sole effect of chance. On the contrary, I am certain that with a slight examination we shall see the advantages offered in this respect by the trilabe and lithoclaste, with flat and broad points, and that we shall feel the necessity of relieving the patient from the fingerings, which are the more fatiguing from our being obliged to continue them a long time. Many of the pebbles extracted from the urethra present special characters, which have given rise to false interpretations. Some of them are of a dark colour, verging on black, smooth, and covered with a kind of varnish, which renders them so to speak transparent, and causes them to resemble prostatic pebbles. This I saw but a short time since in a patient in Paris, M. Jacquet, aged fifty years, and of a strong constitution, who had had gravel for many years: many of these shining pebbles existed behind a stricture at the meatus urinarius, after division of which several escaped of themselves, and others were removed by the curette or scoop. There was no other disease, and the extraction of the pebbles was followed by a cure.

In certain cases, where one point of the urethra contains many pebbles adherent to one another, these concretions present plain surfaces, a yellow marble-like colour, and a peculiar brightness.

It is now some time since I made known this peculiarity in the case published in my third letter. I have seen it several times since, especially in M. Leo, of Manchester, whose history is given in the treatise on the diseases of the urinary apparatus.

THIRD SERIES.

Pebbles retained in the Bladder by a tumefaction, or any other disease of the Prostate.

Every one knows that the tumefaction and induration of the prostate is by no means rare in old age, nor yet is it uncommon in the adult. The most striking effect of this lesion is the deformity and deviation caused by it in that portion of the urethra which is embraced by the gland, and the difficulty produced in the passage of the urine, whence there results a permanent state of irritation, which becomes a source of disorder to the functions of the urinary apparatus. I have already said that this irritation was not without influence on the production of gravel, and is also frequently met with in cases of it. If the deviation and deformity of the urethra which this brings on prevents the free emission of the urine, there is the greater reason that it should oppose the escape of pebbles, which, thus being retained in the bladder, there increase, and become stones, properly speaking, especially as in many cases the want of tone in the bladder coincides with the intumescence of the prostate. I am persuaded that this is one of the most powerful causes of stone in the bladder among old men. In cases of this kind, and in many others that I have made known, the bladder contains a great many little pebbles, rather than one single large stone. We regret that the authors who have treated of gravel have not paid attention to this peculiarity which exercises so great an influence on practice, for it alone is sufficient to render useless the various treatments on which they have founded such high expectations. It is indeed very evident, that when we leave at the neck of the bladder the obstacle that we have just spoken of without even thinking of increasing the expulsive power of the bladder, the escape of the pebble becomes altogether an affair of chance; in other terms, when we proceed, as has been done up to this moment, the result is entirely fortuitous.

The conduct to be pursued is not however always so clearly traced as in the preceding case, and resources are even often wanting to the surgeon for the attainment of the object that he has in view. If we confine ourselves, as is generally done, to the medical treatment that I have indicated, it is almost certain that we shall not obtain the expulsion of the pebble, since this treatment allows the obstacle existing at the neck of the bladder to remain, and it will be necessary, in order to remove it, to obtain the resolution of the prostatic tumour, or to greatly increase the expulsive force of the bladder; but this faculty is more frequently weakened than increased in old men. There are, however, means which are proper to cause

the disappearance of these obstacles, or at least to diminish them. We know that the greater part of the organic lesions of the urinary apparatus increase the contractility of the canal, the spasmodic strictures of which are frequent and almost continuous in like cases. I have also shown, when treating of the diseases of the urethra, and have just referred to, the means which are likely to cause a cessation of these spasms. We must therefore resort to them here in order to favour the expulsion of the gravel, as well as to facilitate the emission of urine. I have thus succeeded in a great number of patients, whose history it would be useless to retrace, in exciting almost immediately the expulsion of pebbles which had remained in the bladder for many months, notwithstanding diuretics and solvents had been used in large doses. It is not necessary, I think, to remark that the curative means should be so combined that the quantity of urine and the expulsive power of the bladder should increase in proportion as we diminish the contractility of the neck of this organ. Thus, when the largest bougies pass without either difficulty or pain, we prescribe long continued baths, diuretic and alkaline drinks in abundance, we administer cold enemata, or give injections of full force, and of a low temperature, &c.

We cannot however but admit that the cases to which we now allude, often offer great difficulties. The treatment that I have recommended, and which generally succeeds when there is only a spasmodic state of the urethra or neck of the bladder, even when there is inertia or incomplete paralysis, does not offer the same resources when the prostate is tumefied and indurated. When these latter diseases have reached a certain point, they are almost always incurable, and all that we can hope from the means indicated is the diminution of the vital action which tends to cause a contraction of the neck of the bladder in an abnormal manner.

The persistence of the morbid states of the prostate often then compels the exciting of the expulsion of the pebble by surgical means. We remove it entire if it is small, and break it if it has already too great a volume. But the employment of these means becomes sometimes difficult and painful, and the result is even not certain; as it does not always succeed, and we have frequently to resort to the expedients that I have made known in the parallel. When we reflect on the different forms that the morbid effects of the prostate may take, we can readily conceive the different difficulties which may present themselves, as well in regard to the introduction of instruments into the bladder, as in the discovery and seizure of the foreign body. For means of removing these difficulties, I can only refer to what I have said in the surgical treatment of calculi, and recommend in a still more impressive manner our proceeding with the greatest precaution, and with an excessive prudence. It is owing to a departure from this circumspect course that otherwise able practitioners have failed in their attempts, and that some even have had to regret being drawn into violent efforts which have terminated fatally. When it is necessary to recognise

the presence of a pebble in the bladder behind a tumefied prostate, we must expect difficulties, particularly if it is impossible to use the trilobe. The seeking of the pebble by means of a curved instrument, even when the spoon portion is as flat and broad as it can possibly be, offers an uncertainty; we must recommence often rather than prolong the manœuvres, which are very fatiguing. When we have succeeded in seizing the foreign body either with an instrument in three branches, if the size of the prostate permits our resorting to it, or with a curved instrument every thing becomes easy. I have treated in this manner a very large number of cases of gravel, and in almost all I have had the happiness to find and seize the pebbles with sufficient rapidity, especially when I employed the three blades, which are decidedly the best. An instrument of two lines and a half in diameter, has sufficient force to break the pebble, no matter what may be its hardness, and when we can extract the latter entire, this little instrument is preferable because the thickness of its branches add but little to the volume of the concretion.

It will be found useful in these researches, to introduce only a very small quantity of liquid into the bladder, as two or three ounces at most, in order to distend as little as may be the parietes of this viscus, and render the field of examination the more circumscribed. Sometimes, however, it is proper to make many injections one after the other in order to excite the contractility of the urinary pouch. This manœuvre requires much lightness of hand. There are two particular circumstances which ought not to be forgotten; the first is that the pebbles offering but a small surface can escape by the slightest shake when we close the instrument: the second is that the abnormal deviation of the ureter and neck of bladder caused by the tumefaction of the prostate often gives the foreign body an isolated position, or one at least very unfavourable to the operator. This manœuvre is also subordinate to the different degrees of development of the diseased state of the neck of the bladder and to the deviation of the urethra.

Many diseases of the bladder, especially want of tone, or weakness often complicate the lesions of the prostate, and render the examination more difficult. It is chiefly in cases of atony that we must commence with injections of cold water coup sur coup, in order to re-excite its contractility: for although it is important to the success of the research that the bladder should contain but little water, it is not less essential, that at the moment of the examination its parietes should be firm and contracted. When these are relaxed and in a state of collapse, the difficulties of the examination increase and we are obliged to recommence. This occurs especially when there is more or less perfect paralysis, and when the injections one after the other, and the cold irrigations, with the other means indicated, have been without effect.

It is not uncommon for tumefaction of the prostate, in cases of gravel, to contribute to produce an inflammation at least temporarily

of the mucous membrane of the bladder. When this complication exists, the manœuvre must be conducted with still greater care, as without this precaution we may make a chronic inflammation pass to an acute state, which might bring on serious accidents. When the bladder contains thick and copious mucosities resulting from this inflammation, it is of consequence in the success of the search that we should give several injections of warm water of full force in order to bring away the mucus, which might be an obstacle to the seizure of the pebble. We must in like manner suspend the examination when the bladder bleeds with great facility and at the least rubbing, and must inject cold water several times and introduce the instrument anew, as the clots of blood as well as the floculi of mucus would prevent our feeling the pebble.

When the tumefaction of the prostate, in cases of gravel, coincides with hypertrophy of the bladder, and this viscus possesses at the same time a great expulsive power, it is rarely necessary to resort to the extraction of the pebble. The diminishing of the contractility of the neck of the bladder by the employment of sounds or bougies, and the stimulating action of cold injections, will suffice ordinarily to facilitate the expulsion, especially when by copious appropriate drinks we have rendered the urine as abundant as possible, and have also employed the treatment that I advised. This point deserves the attention of the physician, because the pebbles are rarely expelled without this special treatment. To show this I will cite the following.

M. Baudu of Saint Germain, aged seventy-nine years, and of a good constitution, had had for some time the symptoms of gravel, and among pebbles of uric acid, had passed one oblong pyriform, and slightly curved on itself, being seven lines in length, and four in diameter in the other direction. Among the less voluminous concretions he found some flattened, spherical, &c. some smooth, others knotted, and unequal, and almost all granulated: but the granulations were flattened, and the intervals almost filled, so that at first sight we might have supposed them to be lamellated pebbles. There existed also in this patient an engorgement of the prostate which rendered the expulsion of these foreign bodies difficult, although his bladder contracted with sufficient force, more indeed than is usual in old men. This engorgement kept many of the pebbles in the bladder, where they became so many calculi, which were destroyed by lithotripsy.

The expulsion of a large pebble of the dimensions that I have given, through a canal deviating from engorgement of the prostate, and in a very aged man, proves how much we may obtain in the expulsion of foreign bodies from the contractions of the bladder. This is a peculiarity to which I cannot too strongly invite the attention of practitioners. The bladder of M. Baudu was also very much hypertrophied, but there was no catarrh, the contractions of this viscus were also more marked, more energetic, and the calculi and pebbles were exactly of the same nature, differing only in volume.

If, however we had neglected the employment of the means that I have indicated, it is very possible that one or more pebbles would not have been expelled even in this favourable case. I have treated a large number of patients, who like this one would not have been able to pass all the pebbles which had escaped from the kidneys, even though they had been submitted to special treatment, wisely administered and followed with scrupulous exactness; but on the contrary, instead of the good effects that might have been expected from it would only have resulted in loss of time, in concealing the pain, and in inspiring a false security: indeed in many cases the calculi which would have resulted from it would have become sufficiently large to render the treatment by lithotripsy more difficult, painful, and especially much longer, obliging us even sometimes to resort to lithotomy, which generally at this period has not been successful.

This disposition of the neck of the bladder brings on other inconveniences that I ought to mention: the greatest of all of which is, the exposing the patient to a return of the gravel or even of the stone. I have seen many cases of this kind, which I only refer to here to show more fully the necessity of resorting to the means that I have prescribed, as alone capable of aiding the bladder to relieve itself of the urine, of preventing the development of a catarrhal affection, and at the same time facilitating the expulsion of the new pebbles.

The engorgement of the prostate, and the consequent deviation of the urethra, whether accompanied or not by inertia of the bladder, is often complicated with spasm or neuralgia of the urethra, which adds to the gravity of the case, in regard to the treatment which then becomes longer, more difficult, is followed sometimes with other disorders, and in regard also to the accidents from the gravel, which is then expelled with greater difficulty.

Independently of the inertia of the bladder, and the partial or total intumescence of the prostate, there is a disposition of the vesical neck which I have described in the parallel and in the treatise, and which offers great obstacles to the escape of pebbles. I refer to the transverse fold which is often formed at the internal orifice of the urethra, and which sometimes greatly diminishes the capacity of this portion of the canal. It is not difficult to believe that the pebbles cannot be expelled when these three causes exist; we therefore find them accumulated by hundreds in the bladder, often when there had not been the least sign of their existence during life. I have seen many cases of this, and many others are found in authors, especially in the treatise on the bladder, by Mr. Wilson, all of which prove that we may be singularly mistaken as to the true cause of the various symptoms experienced by patients.

I have elsewhere marked the difficulties which are offered in the introduction of the catheter, or even in exploring with the trilabe. I have also shown the precautions that ought to be taken to prevent the certain consequences of these examinations; I can

therefore only repeat it here. Let it suffice to recollect that searches with the new instruments ought to be made with the greatest care, in order to obtain all the effect that we might expect from them, that we must repeat them, and that it is of consequence before introducing either the trilabe or lithoclaste, to take the precaution of making successively several injections of cold water into the bladder and then allowing almost all to escape. In other respects the treatment is the same as in the examinations destined to prove the cure after the operation of lithotripsy.

I will add here a new fact, to show that too much attention cannot be paid to the effects of engorgements of the prostate, and the organic lesions of the neck of the bladder, on the expulsion of the gravel and urine; and that this effect is much greater when a spasmodic state of the urethra or atony of the bladder is joined to them.

M. Fosse, of Palaiseau, almost a sexagenarian, had had for some time, an increasing derangement of the functions of his urinary apparatus. The passage of some sand, difficulty in urinating, the thin stream of water, which was often bifurcated, fixed the attention of the patient; but as there was nothing special in these symptoms, all treatment was put off. The pains, however, soon increased, especially when walking: he did not pass any more pebbles, but he suffered a constraint both moral and physical, an uneasiness, with a more frequent desire to urinate. I was consulted: sounding the bladder did not show me any foreign body: I made another examination with the trilabe, and satisfied myself that the bladder contained many little calculi or pebbles, whose expulsion had been prevented by the tumefaction of the prostate, and the neuralgia of the neck of the bladder, so that they had grown larger. I had not, however, any trouble in breaking them, but the patient recovered with difficulty. I endeavoured to reanimate the contractility of the bladder, to overcome the contractions of its neck and of the urethra, prescribed copious drinks, some laxatives, many enemata, and an active life, and have not heard that his gravel returned.

The persistence of some symptoms, in cases of gravel and of calculi, in consequence of the disorders that the presence or passage of foreign bodies cause at the neck of the bladder, is not rare. I have cited many examples of it: it is sufficient to note this peculiarity in M. Fosse, who has suffered less from it than some other patients, especially M. M. Roulet, Daudet and Felix, whose cases I have published.

FOURTH SERIES.

Pebbles retained in the Bladder in consequence of Paralysis of this Viscus.

It certainly is not rare to meet with inertia of the bladder, in cases of gravel. This single peculiarity is sufficient, without there being any spasmodic contraction of the neck, to cause the pebbles

to be passed slowly and with difficulty, to let them rest in the urinary pouch, and to allow them to grow so large as to be thereafter unable to pass through the urethra. It is then that we find the numerous vesical calculi that I have spoken of above. The examples of this, that I have cited in another place, some of which are very curious, show that the bladder cannot always free itself from the gravel, as fast as it descends from the kidneys. The development and quantity of solidifiable matter with which the urine is impregnated, shows itself rather by the number, than by the largeness of the concretions. This collection of gravelly matter may, as I have before said, form in all other points of the urinary apparatus; but at present we will consider only that which occurs in the bladder, and the principal cause of which is a more or less complete paralysis of this viscus. I have seen some very remarkable cases of it, which I have related in the *Parallel* and in the *Treatise*. In these cases, the medical treatment was very often powerless, and we had to resort to a surgical operation, in order to extract the pebbles. We ought, in all cases, to commence with the treatment of the affection of the bladder, and with the greater reason, as the patients suffer but little from the gravel; whilst if we succeed in establishing the contractility of the bladder, the pebbles may be expelled naturally. Here the cold injections of full force, given *coup sur coup*, ought to be resorted to, using a large metallic catheter, with large eyes, and a large syringe. We force in as much water as the bladder can contain, and charge the syringe, in order to recommence, whilst the liquid is escaping, and continue this until the patient is fatigued. We must, however, in these injections, especially in the commencement, proceed with the precautions that I have already indicated.

At the termination often, of fifteen days, if the contractility has not increased, we resort to irrigations, always using cold water, and continuing the stream, until the patient complains of pain, or malaise from it. We can force into the bladder from ten to thirty pints of water at each operation. If, at the end of a few days, the use of these means, of enemata, of cold baths, of the waters of *Con-trexeville* internally, &c., &c., have not produced a change, we ought to proceed to the extraction of the pebbles. The smallest ones often escape through the catheter with large eyes, in the liquid injected, especially if the patient stands up whilst the fluid is escaping. I have mentioned the procedure for extraction; but I ought to add that many circumstances may produce an atony of the bladder, and oblige us to modify somewhat the medical treatment. Thus, it is not uncommon for the gravel to be spontaneously developed in a person who is kept in bed by some other disease. I have seen several similar cases; among others, that of *M. Paillé*, a sexagenarian, who became affected with gravel, and afterwards with stone, in consequence of an inflammation of the lungs; his bladder was so torpid, from his long continuance in bed, that we were obliged to pass the catheter, in order to re-establish the course

of the urine, but the pebbles which had formed did not escape. Many old people are in this situation; and in getting about after tedious affections, which have confined them to bed for a long time, they are not a little surprised, either at passing pebbles, or at their having stone. One of my patients, M. Chétetal from Arpajon, felt the pains of stone, from the moment that he commenced to move about, after being compelled, by a luxation of the femur, to keep the horizontal posture during many months; the state of exhaustion to which he had been reduced, did not allow of our resorting to the operation of lithotomy; and besides, his sufferings from the stone were still endurable; when they increased, the patient sought the aid of lithotripsy, but it was too late, and death soon followed. These cases are the least serious; the cause which has produced the inertia of the bladder, and consequently, or perhaps simultaneously, the gravel, is temporary; we may put a stop to it, and even prevent its effects. Nothing is easier, as I have said, than to satisfy ourselves if the bladder empties itself completely of the urine that it contains, and since experience has shown what may be the consequences of this continued rest in bed, especially in old men, there is not the least objection to the use of the catheter, to our resorting to injections, in a word, to our employing all the means recommended against commencing paralysis. I call the attention of practitioners to this very important peculiarity, in treatment which confines the patient to bed, or keeps him from moving about. We occupy ourselves only with the principal disease, and neglect the accidents which may result from it, and which end in their turn by becoming diseases of a very serious nature. It is especially in old men that this remark finds a useful application. We must not, however, believe that the accident of which I speak is uncommon in the other ages of life; all are equally exposed to it. Thus, every time that a patient has kept his bed during a long time, we ought to observe with the greatest care what is going on in the bladder, when they recover their strength, and take up their usual course of life.

If the precaution of which I have just spoken, has been neglected, and there are pebbles already accumulated in the bladder, we proceed, as I have also said, either in aiding its spontaneous expulsion, or in causing their extraction. The treatment is more simple, and the result the more certain, in proportion as the patient is less exhausted, aged, and the disease for which he has been condemned to rest, has completely terminated. It is then rarely necessary to resort to a prolonged medical treatment: it almost always suffices to free the bladder from all the pebbles which may be retained there; others are rarely formed: at least if the patient be not predisposed to gravel, and one in whom it would be necessary to apply the treatment that I have indicated, or a person who should be attacked by new causes of this disease.

In some cases it is the want of exercise, bad nourishment, exhaustion from care, or some like cause, which brings on this inertia

of the bladder, and the formation of gravel. Among the cases of this kind that my practice has offered me, I will give the following.

M. Bouchet, of Paris, septuagenarian, feeble, exhausted, taking but little exercise, and having a poor appetite, suffered some time from disorder in the functions of his bladder, with pains which were at first wandering, but which terminated in resembling greatly those felt by patients with gravel. The character of his pains, the passage of some sand, and a strangury, excited his inquietude. The first surgeon called in, had much difficulty in introducing the catheter into the bladder. A second was more successful; he drew off the water, and recognised the existence of pebbles in this viscus; he even endeavoured to extract it at the moment, but the effort was so painful, that the patient would neither hear of the surgeon nor of the operation, and I was consulted. M. Bouchet suffered greatly. He had no indication more urgent than that of calming the local irritation, and the general excitement, by the usual means in like cases. When a general quiet was produced, I diminished the irritation of the urethra, by the use of bougies. Injections of warm water, then those the temperature of which was gradually diminished, brought back the contractility of the bladder. Several pebbles of uric acid were expelled, others extracted, and his health re-established. I advised the patient to continue the cold injections, to improve his diet, to keep his bowels open, and to drink a few bottles of the waters of Contrexeville. For five years he has had no symptoms of nephritic colics, nor difficulty in urinating; except that in 1834 he passed, spontaneously, a little ashy pebble of phosphate of lime. I have since twice assured myself, by sounding, that there were no other foreign bodies in his bladder.

Cases of this kind are far from being rare, and the treatment that I have employed in the case of M. Bouchet is that which has succeeded the most frequently with me.

The violent and precipitate manœuvres that had been at first employed, had alarmed this patient, and excited disorders which might have become serious. The care and precautions which ought always to be used in the treatment, had here the result that they constantly produce; I cannot, then, too much insist on the necessity of paying attention to them.

The gravel of uric acid has not been reproduced in M. Bouchet, although this patient has not changed his diet, has not taken a more substantial nourishment, and has not employed alkaline substances in sufficiently great quantities to alkalisise his urine. The stagnation of the urine in the bladder, and the irritation of this liquid, from its nature and from the difficulties of expelling it, kept up in this case as in many others of gravel, an irritation at the neck of the bladder, which reacted on the renal secretion.

If by means of the precautions and measures that I have indicated, we succeed in freeing the bladder from the pebbles which are there accumulated, and in re-establishing the action of this organ, it will not be necessary to persist for a long time in the

medical treatment. When, on the contrary, the bladder remains torpid, and this state is the result of a serious lesion, either of the urinary apparatus, or of any other organ of the economy, which shall have resisted the resources of our art, we must depend chiefly on the means for preventing the catarrh, and for facilitating the evacuation of the urine.

M. Lehoux, of Paris, sexagenarian, of weak health, having had many slight attacks of apoplexy, felt some of the symptoms of gravel. He passed a small number of pebbles of uric acid, one of which was spherical, lamellated, a little elongated, but chiefly remarkable for the regularity of its form and the polish of its surface; it was five lines long and four broad. There had then been nothing to trouble its development. Indeed under the apoplectic tendency, M. Lehoux's bladder contracted but feebly, and many of the pebbles had remained there on account of the want of tone, till they became calculi, and were destroyed by lithotripsy. The regular forms of these calculi proved that they were developed slowly and without being disturbed, and like all other concretions of this kind they were very hard.

The tendency to gravel was but little marked in this patient. It was therefore sufficient, in order to prevent the formation of new pebbles, to engage him to drink copiously, and to excite from time to time the contractility of the bladder by means of injections. To do this we had only to preserve the effects produced by the manœuvres of lithotripsy, which are always useful in a like case. We must not, however, expect constantly to obtain as satisfactory a result, when we allow the cause of the atony of the bladder to exist. But in M. Lehoux, as I have said, the tendency to gravel was not marked, and the calculi were extracted before they had excited serious disorders, which are two great elements of success. In other respects the medical treatment offered nothing peculiar. As to his diet, there was nothing to be restrained, and the necessary manipulations in the extraction of the vesical calculi were without effect, either on his general health, although it had been much shaken, or on his brain, which had also suffered. The spontaneous expulsion of the large pebble of which I have spoken, cannot be cited as a proof that there was no atony of the bladder, for we see from time to time cases in which chance alone brings a pebble to the orifice of the urethra, whence it is driven by the urine after the bladder has become greatly distended. But the thing which shows that these results are the sole effect of chance, is that they are rarely thus expelled, and that less voluminous pebbles remain in the bladder.

I have treated many other patients in not less unfavourable circumstances, whose bladders were equally weakened and inert, and had not expelled all the pebbles that had come from the kidneys. I will cite among others M. M. Dauza, Vallon, Morin, de Zach, Baboin de la Barolliere; all of whom had many calculi, with more or less complete paralysis of the bladder, and in whom the medical and surgical treatment had all the success desirable; although the

disease in several of them was greatly developed, and had serious complications.

We must never forget that in these cases, the gravel is exceedingly insidious. Some patients pass only a very small portion, and if symptoms do exist, they are so vague that they hardly suffice to attract the attention of the most experienced practitioner. I do not refer to nephritic colics, they rarely exist, and even when they do, they have not well marked characters. Thus when the patient has not passed any pebbles, which is often the case, or when some have been expelled by chance, there always remain sufficient in the bladder to form numerous calculi. As this viscus contracts feebly, there are no true pains of stone, the patients deceive themselves, do not think they have it, and only seek medical aid at an advanced period, or sometimes even when there is no resource left. I have seen many of this last kind where there was absolutely nothing to do, all surgical treatment being impossible, medical means producing no effect, and the subjects of them condemned to an inevitable death.

In a large number of cases of gravel attended with atony of the bladder, there also exists a spasm or neuralgia of the neck of the bladder, and lesion of the prostate. These complications are sometimes developed in the course of the disease, and this reunion of circumstances is extremely serious. The symptoms are even yet more vague and uncertain, and are often the cause of removing all idea of gravel and stone from our minds during a long period, which loss of time is always injurious to the patient. The application of the curative means also offers difficulty; we have greater reason to fear the accidents that I have indicated when treating these diseased states, and the cure is much less certain. Sometimes even at the moment when it is least expected, a series of disorders supervene, which cause the death of the patient.

M. Lechanon, a sexagenarian of a dry temperament, nervous, and very irritable, had suffered for some time in his urinary passages, and each pain produced an inexplicable perturbation of the economy. This remark had already been made by his assistants. I first examined his bladder by means of a sound, which made known the existence of many little calculi, and assured me that the bladder did not entirely empty itself of its contents. The urethra also was very irritable, sounding, although practised with many precautions and great care, was followed in the evening by an access of fever, which was, however, without sequelæ, as the patient started the next day for the country whence he did not return till eight days afterwards. These two little journeys fatigued him greatly. The bladder freed itself of the urine with great difficulty; so that it became necessary to make injections into it, and at the same time to facilitate the escape of the remains of the urine which was turbid, fetid and thick. The passage of the sound, and some too rapid movements on the part of the patient, gave rise to an engorgement of the testicle. The inflammation extended to the

spermatic cord, and to the neck and body of the bladder, so that he suffered agony when he attempted to urinate: the catheter also excited such acute pain, that it was impossible to resort to it as often as would have been necessary, and the urine accumulated in the bladder until it made a tumour in the hypogastric region, when we were obliged to resort to the catheter, and at the same time to use antiphlogistic measures. The symptoms were calmed, his strength returned, he learned to introduce the catheter and make the injections himself, and returned to the country, but died two months afterwards. I have never heard of the rest of this case, and am completely ignorant under what influence the amelioration that was already obtained, was stopped, or what gave rise to the new symptoms which caused his death. But from what I have seen in analogous cases, I am led to believe that they had not emptied the bladder as often as was necessary, or that they had not introduced the catheter with all the care that was requisite, especially in irritable patients. Many live sometimes during entire years with gravel and atony of the bladder, complicated with a neuralgic state or other vague and temporary affections of their urinary apparatus, in a state of hesitation, which is always injurious to them; persuading themselves that the smallest pebble that they pass is their last, and that they have obtained their cure. Patients who are the most enlightened, and the best able to appreciate the advice given them, cannot resist this illusion, and postpone till to-morrow the means likely to arrest this state of things.

At this moment I am treating one of our magistrates, M. le Baron de G——, who has suffered at different periods from symptoms which would have led us to suppose that he suffered from the formation of pebbles in his kidneys, and indeed he passed several of them, but the bladder was so sluggish that even retentions of urine supervened. I was called in 1838 to remedy this state of things. The bladder contained a large quantity of urine, which was drawn off by the catheter. The suffering of the patient did not allow of an examination which would have, perhaps, determined accidents. I therefore postponed it, and after a few days many small pebbles escaped. The symptoms having ceased, they had no idea of further treatment. Towards the beginning of the year 1839, the difficulty of urinating reappeared, accompanied with pain and constraint, with difficulty in walking, and changes in the colour of the urine. I was again consulted, but there were other reasons for adjourning the application of curative means. During this time, under the influence of repose, of baths, of enemata, and of copious drinks, the symptoms ceased, and the patient could not persuade himself to undertake a more continued treatment. I took care to inform him that in thus temporising, he would end in having stone, perhaps also organic lesions, which it would be difficult to arrest. The result has but too truly justified my predictions. I have just satisfied myself that the bladder of M. de G——, contains a large stone; and there is here a circumstance that I have

before spoken of, and which has contributed to keep the patient in a deceitful security: large granulated pebbles of uric acid, of an irregular form, but without facets, or any indication likely to make us think that they belonged to a more considerable mass, had previously escaped from time to time.

The state of things in this patient is what is most frequently seen: they do not decide on undertaking any thing serious for the cure of their disease, till the moment when the pains are insupportable; at this period the surgeon ought to fear a reaction which may become serious, and prudence ought to make him await it, especially when there is no urgency; when the favourable moment arrives, the patient hesitates, recoils before an examination or manœuvres that he fears, and which he always thinks he may perhaps escape. Thus the greater number of cases of gravel end in becoming stone, which even is left to develop organic lesions, and render their position more and more critical.

ARTICLE II.

Of the influence that age, sex, climate and diet, exercise upon the curative and prophylactic treatment of stone.

SECT. I.—*Influence of age.*

Gravel may exist at all ages, and notwithstanding its greater frequency in the adult, it also is developed in the infant and in the old man. The symptoms which characterise it, and the accidents that it determines, vary at these different epochs of life, and the treatment that it requires also offers marked differences.

In infancy the general symptoms are slight, and the true cause may therefore be easily mistaken. The disease is almost always taken for strangury, and the true nature of it is only understood when the patient begins to pass a few pebbles. There is a special disposition also existing among children, which has not been generally noticed; it is that at this age the calculary affection does not long persist under the form of gravel; the deposits of the urine instead of uniting in an isolated state, and thus forming pebbles entirely distinct from each other, have a marked tendency to unite together, and to produce stone strictly speaking. Thus we see more cases of stone than of gravel in children, and the cases of the latter rarely offer the frightful train of morbid phenomena, known under the name of nephritic colics, which are on the contrary so commonly met with in a more advanced age. The therapeutic indications are consequently less numerous, and also less distinctly marked. This is perhaps the reason why the treatment of gravel in very young persons has been so much neglected. I have seen many patients who had suffered for a long time from this disease, their pains being attributed to tormina, to dentition, to intestinal worms, to a thousand imaginary causes, and it was only after they had exhausted all the imaginable sedatives, sometimes even after

many months of useless care, that they began to suspect stone or gravel. There is, perhaps, no more obscure subject in the diseases of children, and the little attention that has been given to it, has only led to too sad consequences; for the prolonged sojourn of the pebbles in the bladder of children also results in calculi, and determines morbid states of the urinary apparatus, from which arise the layers of gray or ashy matter which cover the pebbles, whatever be their nature or composition. This I have seen in numbers of children who have passed pebbles surrounded with a gray envelope.

The nurses and mothers who see these little unhappy beings tormented by the continual desire to, and great difficulty in, urinating, compress the urethra and draw out the penis, in order, as they say, to force out the last drops of the urine contained in the canal. They also regard these manipulations as a kind of sedative, because a little comfort is often derived from it, or rather because the pains from gravel, having only a determinate duration, come to an end themselves, and they gratuitously attribute the result to the frictions. I have seen these last followed by the expulsion of a large pebble in two cases; but here it is only one of those coincidences which give rise to so many false interpretations in medicine.

The uncertainty of the diagnosis in children is the cause why they have paid so little attention to the treatment applicable to this interesting class of patients. It is of consequence that so fatal a gap should be filled.

The narrowness of the urethra, which would seem to oppose the escape of pebbles, is not, however, a circumstance which authorises us to despair of obtaining the expulsion of the gravel in children. We often see very young cases of gravel, who pass sufficiently large concretions. We must therefore endeavour to remove obstacles of another kind. Two of the conditions that I have mentioned are frequent in infancy, viz. spasm of the urethra and atony of the bladder, and we must hasten to destroy the spasm and increase the activity of the contractions of the bladder each time that we suspect the presence of a pebble. The means which I have indicated in the preceding chapters are also those which are proper in these cases; we must resort to them without permitting ourselves to be arrested either by the cries or movements of the young patient, as they are owing more to fear or a spirit of contrariety rather than to his real sufferings, experience proving that in these cases the treatment is but slightly painful.

If the pebble is too large to pass through the urethra, we may crush it by means of a small instrument, for even at this age lithotripsy may be performed with advantage, especially if it is of a large pebble or a small stone. By this we free the child from the anguish of the disease, and also from the equivocal chances of lithotomy. A difference of opinion has lately sprung up among physicians in regard to the application of lithotripsy to children. The volume of the stone is here the principal point, and if they had taken the trouble to well consider the question, all would have been of the

same opinion. In cases of gravel, or of very small pebbles, either in the bladder or urethra, lithotripsy ought to be preferred; in cases of large stone lithotomy ought to be chosen.

When pebbles are stopped in the urethra we must resort to the procedures that I have spoken of, only employing finer instruments.

Among other cases of this kind that I recall, I will cite the following. A child named Boisvieux, aged thirty-three months, and of feeble constitution, had always been complaining. Tormina, worms, and dentition had successively been accused of producing this state, and were combated in turn by the different means that general therapeutics taught them to oppose to them. They almost always obtained a suspension of the pains and cries of the patient; but the accidents also almost as constantly reappeared at more or less remote periods. The nurse had for a long time noticed that the child carried its hand to the penis, and she also thought that frictions of this part relieved its sufferings. At last a pebble of the size of a pea was expelled, but the pains did not abate. The child was brought to me. The necessity of frequently urinating increased, and each time that the little patient wished to satisfy it he suffered very much. I prescribed two baths and four enemata daily, copious drinks, and a mild diet. After the lapse of some time I sounded him, and found no stone in the bladder, but the examination was not sufficiently accurate to leave me entirely without doubts on this point. Under the influence of the means that I have just spoken of the irritation of the urethra became less, and the passage of his urine became natural, less promptly however than is usually seen, which showed that there was still something in the bladder, or that the little patient had suffered much, and that the passage of a rough, knotted pebble, perhaps also the manipulations of the nurse, had produced great fatigue of the canal. One month afterwards the infant was suddenly taken with new difficulties in urinating, with pain in the side, and especially at the end of the penis. The presentiment of the sufferings attendant on it prevented his urinating during some hours; at last, however, he yielded to necessity, and passed two pebbles at the same time, one of which was the size of a very large pea, the other was smaller. Both were covered with a gray layer, of considerable thickness; they were neither smooth nor round. The largest particularly had flattened surfaces, with true facettes, but wanted the shining aspect that is usually seen in the pebbles of uric acid. The child ate a great deal, had a large belly, and thin limbs, was pale, and extremely fretful. The expulsion of these pebbles has each time been followed by results which had not been obtained up to that time. The functional derangements of the bladder have ceased many months since; his food is of service to him, and he has become strong and developed.

This case is by no means the only one in which the long presence of a pebble at the neck of the bladder, and its passage through the urethra, have determined considerable and obstinate perturbation in the functions of the bladder. In this respect it is the same in

infancy as in the other epochs of life. The means to which I confined myself in my little patient consisted of injections, from time to time, of cold water into the bladder. The first pebble that he passed was remarkable; its texture was close, lamellated, and of a hardness that proved it had existed for a long time. The centre was of uric acid, of a pale, tawny colour; the exterior layer consisted of phosphate of lime, and presented considerable thickness; the grains which formed it gave the pebble a granulated and mammelated appearance.

The developement of stone generally takes place slowly in children. In cases where it may be deemed proper to prescribe an internal treatment, we must proceed with great mildness, and continue it for a long time. There is still an important circumstance to be considered, which is, that the frequency of stone among the children of the poor seems to show the influence of poor nourishment. From this the practitioner may learn to remove from his treatment all articles of diet of a poor kind.

Not having observed any special influences in regard to the other ages of life, I have nothing to add to means before mentioned. It will be sufficient to recall the following peculiarities.

In the adult gravel is more frequent than stone, and it appears usually with well marked symptoms, which require a prompt and energetic treatment. It is at this period of life that the bladder has its greatest expulsive power; the gravel is therefore expelled almost as soon as formed. Medical treatment here plays a great part, and it is sufficient to direct the powers of nature to obtain the desired effect; we encounter, however, a certain number of cases in which it becomes necessary to resort to particular means, either to remove complications or to favour the escape of pebbles.

It is not the same thing in old age: here the gravel is less frequent than the stone, contrary to the opinion that they have for some time tried to sustain. But obstacles are presented to the escape of the stone—in the bladder, which has lost a portion of its expulsive force; in the prostate, the increase of volume and induration of which change the direction of the urethra; lastly, in the canal itself, whose calibre is diminished by different morbid states. Such are probably the most frequent causes of gravel at this age. I have made known the different means likely to facilitate the expulsion of the gravel; new facts would be superfluous. I only insist on this point, that it is very often necessary to invoke the aid of surgery in order to remove these complications, and that it is chiefly in these cases that we must join the operations of surgery to the prescriptions of medicine internally.

SEC. II.—*Influence of Sex.*

It is generally believed that the rarity of stone in the female is owing to the urethra, from its shortness, breadth, and straightness, giving easy passage to the calculi before they have acquired a great

volume. This is a theory that all authors have reproduced with a confidence that is astonishing; as it only rests on a simple supposition, and it would have been sufficient to collect some facts in order to see that it is entirely erroneous. If the rarity of stone in the female was really owing to this cause, observation would have shown from this alone that woman is more subject than man to the passing of gravel. Each day, however, can convince us of the contrary, and nothing more is necessary to overthrow this theory, which has slipped into science without our knowing why.

But if we are ignorant of the true cause of the marked difference which exists in the relative frequency of the calculary affection in the two sexes, it is not less settled that certain women are subject to gravel, and that they even suffer serious accidents either during the formation of these foreign bodies in the kidneys, or from the effect of their passage into the bladder, or even their expulsion outwardly. I have seen some who offered the same phenomena as are seen in men, although the different kinds of gravel in many cases was doubtful.

The urine in women commonly brings away sand or powdery deposits, but as in men the formation and passage of this sand does not always produce painful sensations; sometimes even the patients do not perceive it till they discover a deposit in the vessel; others suffer, but modesty prevents their complaining, and peculiar circumstances, as a similar affection in their husbands, are necessary in order to decide them to speak of the pains that they experience. These cases present generally so little gravity, that they scarcely occupy themselves with it. In other respects the precautions to be taken, and the means to be employed, offer here nothing peculiar.

The formation, development, and expulsion of gravel, does not either differ in a more marked manner in women, only the nephritic colics are perhaps more rare: this at least is the result of my observations. As to the other symptoms, I have often convinced myself that they are the same as in man. The local pains and functional troubles determined by the presence of pebbles in the bladder, and by their passage through the urethra, acquire often a great intensity. Thus I have seen many women who suffered much in order to expel these pebbles, even when very small, and we can easily understand why this should be so. It is neither to the length nor to the direction of the urethra that we must, as has been done, attribute the sufferings brought on by the expulsion of pebbles; for when once the latter in man have reached the pubic arch, a point where the canal terminates in women, they run through the rest with facility and without much pain, except in a very small number of cases, where contractions exist at this point. Neither is it the capacity of the urethra in women that we can, at least in the majority of circumstances, consider as likely to diminish the painful sensations; since the pebbles have rarely sufficient volume to fill the canal even in man. We know that this passage admits without difficulty a body of three lines in diameter, and the

greater number of pebbles have not like dimensions. In no other respect do the sensations produced by the sojourn and passage of urinary concretions differ in either sex.

It is principally from the sensibility and contractility of the bladder, especially of its neck, that the pains arise when the parts are excited by the rubbing of a foreign body; but this sensibility and contractility is not less in women than in men. I have seen a sufficiently large number of women, in whom even very small pebbles occasioned very serious symptoms, among others is the following.

Bourgines, a countrywoman, aged thirty-six years, and whose history I have related in the *Parallel*, had suffered during pregnancy from an acute irritation of the urinary organs; a short time afterwards she had the gravel, and passed two pebbles with facettes, one of which was very large. The passage of this body through the urethra brought on horrible pains which lasted many hours; the facettes that they presented, but above all the continuance of the pains in urinating, and other symptoms of stone, led me to think that one yet remained in the bladder: the examination confirmed my fears, and the stone, which had formed, was destroyed by lithotripsy. In woman, as in man, the gravel is manifested under the influence of very serious causes, the action of which we cannot define: but the accidents are not less various, and the treatment offers the same uncertainty. Often also the symptoms cease without our discovering why; in other cases, on the contrary, they persist, notwithstanding the employment of the most energetic means: we are obliged then to vary these *ad infinitum*, in order to prolong their use, as it is only by a continued treatment that we can succeed in establishing the functions of the kidneys in their normal state. As in man, it here also becomes necessary to combine together a medical treatment with surgical means, in order to aid the bladder in freeing itself from the foreign body. The vesical atony, which is so often the cause of stone, from its preventing the expulsion of the pebbles, is also met with in women, and ought to be equally opposed. The same is true of the inflammations and different morbid states of the urinary apparatus. We see in women as well as in men, the confirmation of the remarks that I have made on the subject of the influence exercised by these morbid states, on the composition of stone or gravel, and that each day verifies.

The case of the woman *Cuinet*, that I have elsewhere published, offers a vesico-vaginal fistula, accompanied with an obstinate inflammation, in consequence of which the gravel was developed with an astonishing rapidity in the bladder, as well as in the fistulæ, and even in the vagina. In this case and in that of the woman *Theille*, which will hereafter be reported, we see under the influence of a deep seated lesion of the vesical parietes, and a considerable destruction of health, the gray and white gravel, formed in prodigious quantities; and the patients suffering

horribly in order to pass the pebbles. Otherwise there is nothing to remark in the physical character of the pebbles expelled by women, except the enormous volume sometimes acquired by them, as is shown by a multitude of cases, the principal of which I have presented in the treatise on calculi.

We must never forget that these large calculi have never been directly expelled from the bladder; on the contrary every thing leads us to believe that they have rested a long time in the urethra, and that the facts concerning them on this point, have a great analogy with cases in which we see enormous stones developed in the membranous portion of the urethra in man. It is only then after a dilatation prepared by the gradual increase of the stone in the urethra of women, that these singular expulsions have occurred. This is especially proved by the tentative efforts made by able practitioners, to obtain by the aid of surgical means, results analogous to those produced by nature herself. They have never, however, brought the urethra of a woman to this enormous degree of dilatation, although they have acted with mildness, precaution and care, and each time that it has passed a certain degree, sufficiently serious accidents have supervened, to lay down the law of a renunciation of the dilating plan, on whose efficacy they had counted too much.

The conduct to be pursued in treating gravel in woman, does not differ from that which I have traced for man. There are the same indications to be fulfilled; only we sometimes meet with sentiments of modesty which offer obstacles at least for the moment, each time that it is requisite to act in a direct manner upon the urethra or interior of the bladder. But when this repugnance is once overcome, there is generally more facility and less pain in the introduction of the bougies or catheters, a rule however which has some exceptions. All other things being equal, the diminished length and increased dilatibility of the urethra, are two circumstances equally favourable when we are forced to resort to a surgical operation, in order to aid the expulsive action of the bladder, since they render the manœuvre more easy and less painful. In many cases however, they have abused this dilatibility of the urethra in woman, and alarming or even mortal accidents have resulted from it. I shall not here enter into details that I ought to reserve for another work, but I cannot but observe that they are strangely mistaken, in allowing the violence recommended by some modern authors; it is necessary here as in man to proceed with gentleness, to avoid the employment of force, and not to excite pains, without we wish to fail and to compromise the life of the patient.

The indications as to medical treatment are not different, and obtain analogous results. I confine myself here to mentioning the following facts.

Madame Coudray, of Paris, of a good constitution, had suffered for some time from wandering pains in the hypogastric region and

the sacrum. There was an increased desire to urinate, and pain in satisfying it, in the bladder. Baths, enemata, mucilaginous drinks and diet calmed the irritation; the patient passed a little pebble of uric acid and was cured,—I have never heard of her since.

A not less simple treatment had the same effects in a lady whom I had charge of in January, 1834.

Madame Cauterne, of a strong constitution, and leading a very orderly active life, had had many nephritic colics, with very serious symptoms. These colics terminated in the expulsion of one or more pebbles of uric acid, which were not large. During the course of one of these attacks I was called. They had already employed sedatives, diuretics, antiphlogistics under every shape. I satisfied myself that the bladder contained a very little urine, which was evacuated by the catheter; at the same time I felt a small pebble which seemed to me larger than those already passed. This pebble escaped spontaneously the next day, after a ride in a rough carriage that I had recommended. A long time afterwards I lost sight of my patient, who had no ulterior symptoms.

In another patient, Madame de Tiercelin, the expulsion of a lamellated pebble of uric acid, with a polished surface, was accomplished with great regularity, but not without considerable pain and disorders in the functions of the bladder. In general, with the exception of two cases, of which that of Madame Cauterne is one, I have never seen strong nephritic colics in women: but the existence of pebbles in the bladder is very painful to them.

I have only met with one case of black gravel in women; it offered nothing peculiar.

I will not say as much for the gray, white and ashy gravel, for which women have consulted me. I treated a young woman who had been affected for a long time with a catarrh of the bladder, who passed from time to time, and with strong pains, masses of a gray, porous and very friable matter. In this respect the case resembled that of the woman Cuinet, that I have just spoken of. In another woman I have seen the same calcareous matter, but expelled in plaques, and in a soft state. Lastly, another woman presented me with the white gravel in considerable quantities, and with different characters; this case being remarkable from many important peculiarities, I think I ought to give it in detail.

Marie Theille, unmarried, shopkeeper, aged fifty years, and of a nervous temperament, enjoyed habitually good health, and menstruated regularly, when in 1835 she was attacked without any appreciable cause with renal pains, which had appeared at different intervals from that period. The menses ceased after fifteen months, without causing any of the symptoms usual in such cases. From that time, however, the patient offered unusual phenomena in the excretion of her urine, which denoted some lesion of the bladder or urethra, or perhaps of both. The principal was the spontaneous expulsion at periods sufficiently near to each other of

a great quantity of pebbles and white calculi, the nature of which seemed to be phosphatic. At the period of the cessation of her menses, she had began to feel the desire to urinate more frequently than usual, accompanied with cutting pains in the urethra, during and after the emission of the urine. These symptoms which at first were transient, and appeared by irregular paroxysms, of variable intensity and duration, became almost continuous. During the course of one of them, she discovered that her urine deposited a glairy, reddish, sanguinolent sediment, that she compared to raspberry jam; this sediment contained neither pebbles nor sand. Her health however, was sufficiently established to permit a journey, during which her sufferings returned even more violently than previously; they yielded to hip-baths, repose, and diluent drinks. The patient also took the pastilles of Vichy. Notwithstanding the relief that she seemed to derive from, and which she attributed to this last source, the pains continued; the functional derangement of the bladder, persisted with the train of symptoms already spoken of. After a more severe attack than all the preceding ones, she passed a large quantity of white pebbles, of a variable form and size, friable and almost soft when they escaped, but acquiring a greater degree of hardness. At the end of some months she attempted to come on to Paris, but was obliged to stop at Tours, on account of the sufferings excited by the motions of the carriage.

During the fifteen days that she remained in this town, she used the waters of Vichy, and passed at different times, a great number of calculi, similar to the preceding ones. Finding herself better, she started for Paris, but was forced to stand in the carriage during the whole route; not being able to continue seated, on account of the intolerable pains in the bladder and urethra, accompanied with a constant desire to urinate. Baths, enemata, a drink of chiendent, (Dog gras. *Triticum repens**) and the continuation of the waters of Vichy, were prescribed for her. During the use of these different means, she passed more white gravel, which left her no repose at night, and her digestive organs became deranged; at last she determined to enter the Necker Hospital. I sounded the bladder, though incompletely, on account of the excessive pain that the sound occasioned. I then found neither foreign body nor any organic lesion capable of explaining the disorders shown by the passage of urine. This liquid was of a pale colour, slightly turbid, had some cloudiness suspended in it; and formed by rest a slightly abundant sediment, which when examined with a microscope, by M. Maull, presented the forms of the crystalline ammoniacs, and magnesian phosphates. The neck of the bladder and the urethra, were the seat of an acute sensibility, the desire to urinate was very frequent, and the urine escaped involuntarily. The patient was put upon the usual diet of the hospital; on the use of baths, enemata, diluent drinks, and injections into the bladder. During

* Translator.

the early part of her stay at the hospital, she continued to pass white pebbles at various times, and always with acute suffering. The means employed, were without marked effect; the symptoms persisted, and preserved nearly their original intensity. The injections appeared at different times to calm the pain, by diminishing the frequent desire to urinate, and the copious deposits in the urine; no more pebbles were passed, and many examinations satisfied me that there were no more in the bladder, or at least that they were of no size, though the patient suffered so much that it was impossible to make a complete search. I however learnt enough to be satisfied that the cause of her sufferings was not a calculary affection. For a long time, we were satisfied to prescribe some soothing remedies, in order to render her existence more supportable; and at last she expired in a state of extreme emaciation. At the autopsy, we found a fibrous body, of the size of a hen's egg in the womb, a cancer like a mushroom, in the bas fond of the bladder, a little to the right, with ulcerated edges, and hard in the centre. This portion, as well as the rest of the internal portion of the bladder, was of a brown colour, but without any appreciable lesions. The left kidney was hardened, and presented a cancerous appearance, and many plaques of a dark colour, some of which were ulcerated, were found in the intestines.

SEC. 3.—*Influence of Climate.*

The statistical researches, the principal results of which were published in the *Treatise on Calculi*, have established a peculiarity to which we must pay attention when we undertake the treatment of gravel. I refer to the influence of climate on the form taken by the deposits of the urine. Thus, there are some countries where we encounter a very large number of cases of gravel, whilst those of stone are rare, and the contrary is found in other localities. Moreover, the same general phenomena are not seen everywhere, and if we refer to the facts already collected, we see that the violence of the pains diminish in the same proportion as the average temperature of the place; they are generally feeble in Germany, and especially in Denmark. In France, especially in adults, the gravel is seen, accompanied with long and violent nephritic colics. But the symptoms are still more serious in very warm climates, where gravel commences at a very early age, and preserves an extreme intensity, even to the most advanced epoch of life. I have said that entire families, who inhabited the equatorial climates, had been forced to come, to seek relief in our more temperate regions, where they have experienced, almost on arriving, a marked amelioration, without taking into account the methodic treatment which had failed in the tropics, and which had the desired effect at Paris. Thus, in warm countries, where it has been too generally believed that the calculary affection did not exist, this disease is accompanied with the most severe symptoms, and persists during entire years, with great violence. It there demands the most energetic treat-

ment, which even then is without effect; so that patients are forced to expatriate themselves. I add the following to the facts already cited.

M. Deroulède, brother of a patient whose case has been already published, and the eldest of a family who have been obliged to leave the Isle of France, for the reason that I have given, suffered from his infancy from acute nephritic colics, which had also been the case with his two younger brothers. Each time that the symptoms came on, they were combated by the ordinary antiphlogistics, frequently even without the aid of a physician, the affection being so common that the inhabitants were accustomed to treat it themselves. At the period of puberty, the symptoms became sensibly less violent; the attacks were lighter and longer apart, but towards the age of thirty-six, they resumed their violence. When the patient came to France to be treated, he had suffered for a long time in the left renal region; the pain was fixed, circumscribed, deep-seated, and subacute. This made me fear the presence of a foreign body in the kidney, or towards the superior extremity of the left ureter. He had at the same time, a stricture of the urethra, and an excessive irritability of this canal. I combated these two morbid states, by the ordinary general treatment, and by its temporary dilation, by means of soft bougies; but as he was excessively irritable, and time was not pressing, I only introduced one every second or third day. After this treatment, some sulphurous douches on the perineum, hypogastric region, and the internal portion of the thighs, produced a good effect. The neuralgia of the neck of the bladder, the organic stricture of the urethra, and a slight inflammation, which showed itself from time to time, disappeared entirely. There only remained the pain in the side. Leeches, cups, emollient and sedative applications, procured only a momentary relief. He was put on the use of the waters of Vichy, which he went to take at the springs, when the season came on. I found him on his return, nearly in the same state; the pains, though sometimes absent, returned, and persisted with more or less variable characters, for a long time. The waters of Vichy, which he continued to take in large quantities, baths, douches, local bleedings, sedative applications, and purgatives, were all without effect on the character of the disease, and the result confirmed the fears that I had had at first. At last the most alarming symptoms appeared; a tumour, which occupied almost the whole length of the urethra, developed itself on the course of this canal, after a high fever, which had lasted some days; there was pain and hardness, and it was exceedingly painful to the touch. M. Chomel and myself found it impossible to determine the contents of this tumour. An infinite number of sedatives were employed; the pain seated itself in the iliac fossa, but the symptoms progressed, and we were very anxious about the result. An operation was our only hope; but the circumstances were too unfavourable to hazard it. M. Sanson, who was called in, coincided in our opinion and fears. The patient died three days afterwards. Unfortunately it was impossible to

obtain permission for the autopsy : we should probably have found calculi, and a vast collection of pus in the tumour.

If such is really the influence of warm climates on the progress and production of gravel, and if the general means that may be employed in these latitudes only exercise a temporary and restrained influence, the change of climate is a question of vital importance to this class of cases of gravel. This is the advice that I have given to many of those who have consulted me.

Some of the patients that I have treated by lithotripsy, appear to have contracted the stone in warm climates, where the affection had commenced, as usual, with nephritic colics. I cite the following case on this point.

M. Duqu e, of Nantes, a sea-captain, aged fifty-nine years, came to Paris in 1832, to undergo the operation of lithotripsy. This patient had lived for some time in the Isle of France, where he had been kept in consequence of shipwreck, and had violent nephritic colics. He attributed them especially to the variation of the season and the action of the heat, during the month that he remained on the coast. He had several times passed pebbles of considerable size, some of which had remained in the bladder, and became little calculi. There was always great irritability of the urethra, and an enlargement of the prostate, circumstances which had contributed to the formation of the pebbles, and which moreover had been obstacles to their escape by the urethra.

We also observe in warm climates, the varieties of form and composition in the gravel, that I have already mentioned, as in our own climate. Uric acid, and urate of ammonia are the most common deposits, as long as there is no inflammation or organic lesion ; the red and yellow gravel that I have seen in some patients, differs in nothing as to colour or texture, from that presented in our own country, although the regimen be different. We also sometimes see the black gravel succeed the yellow, without appreciable cause, as in the patient whose case I am about to report.

M. Ozour, of the Isle of Bourbon, aged forty years, had suffered since his infancy from nephritic colics, which however, had presented nothing regular, either in their intensity, or in their duration or appearance ; the pebbles passed were of uric acid. In the intervals between the attacks, he had an aching of the neck of the bladder, and never thought that he had entirely urinated. At last he was attacked with stone, and came to France in 1833, to undergo an operation. The stone, which was of a moderate size, and formed of oxalate of lime, was destroyed by lithotripsy. His constitution was much deteriorated, and his urinary apparatus exceedingly irritable ; but all the morbid phenomena disappeared with the calculus.

In the numerous cases in which they have charged the formation of gravel to a more or less plausible cause, that of climate has been placed first ; and all the circumstances which seemed to exercise any action whatever, have afterwards been attached to it. It is

from this, that we everywhere see the azotic diet attributed as the cause of gravel, when it was owing to the use of alcoholic drinks, &c., &c.

The fact that has most struck me, in the different cases of gravel in those inhabiting warm climates, is the disproportion between the quantity of pebbles passed, and the intensity of the general symptoms. In many other cases of diseases of the urinary passages in patients from the same section, we have had to overcome the nephritic colics, although there was no emission of gravel. Were these general symptoms exclusively owing to lesions of the kidneys, or were they the consequences of a disorder in the functions of the bladder, and was their starting point the urethra or neck of the bladder? This I cannot positively decide on. One reason for my believing that the urethra and neck of the bladder, and the functional derangements of the bladder, have an important effect in the production of these morbid phenomena is, that I have more than once been able to obtain a cessation of the renal pains, by curing the urethra and bladder. If this fact was sufficiently established, no doubt we might derive marked benefit from the treatment that I have recommended, even in warm climates. Be this as it may, the remarks which have just been made will suffice to show the error of those who think that stone is a disease but little known in warm climates.

SEC. IV.—*Influence of Diet.*

Physicians who only see the influence of a too strong diet, or one too azotic in the production of gravel and calculary affections in general, have proceeded with a levity which is astounding, when we consider that it is a question involving the safety of so many unhappy sufferers. It is indeed well proved that the proportional frequency of stone and gravel is nearly the same in those who use the crimated diet and in those who abstain from it. This circumstance alone is sufficient to prove that they are mistaken. In examining the proportional frequency of calculi, in which uric acid or urate of ammonia predominate, substances in regard to which they have thought they saw an intimate connection between the disease and the presumed cause, we soon see that they have fallen into an error, for there are as many calculi of uric acid in those who do not make use of an azotic diet as in those who are nourished by it. The most beautiful stones of this kind that I possess, and in which the uric acid is as pure as possible, have been found in patients who lived almost entirely on vegetables. I will offer among others the case of a patient, M. Lardenais, whom I have lately had under treatment, and to whom the fear of sounding was fatal. The stone which was retained in the bladder was entirely composed of uric acid, and of a very regularly lamellated structure from the centre to the circumference, which alone presented a very thin layer of phosphate of lime. M. Lardenais was a model of frugality; he

led the most regular life, drank neither wine nor any kind of liquor, ate but little, and his principal nourishment consisted in vegetables. This diet, however, did not prevent his attaining the age of eighty-three years, without suffering from any other affection than the gravel, which he had long had, but only in a vague manner, as he had never had the violent nephritic colics that are seen in so many cases. Daily practice, if I may so speak, shows me analogous cases. In all ages, in one as well as in the other sex, we find pebbles or calculi of uric acid, or of urate of ammonia in persons who have not been submitted to a highly azotic diet. On the other side, I have proved, in examining in a general manner the causes of stone, that persons who live almost exclusively on azotic articles of food, as sailors, and many northern nations, do not have stone more frequently than others. A work which was published last year by Mr. Hutchinson, in England, confirms in every respect what I have just stated, to wit, that stone is rare among sailors.

I have shown in one of the preceding chapters that a false interpretation had been given to some facts, which seemed to lead us to think that the excesses of the table could be followed by the formation of sand and gravel. It is less by the quantity of azote introduced into the economy than by the disturbance caused in the digestive, and consecutively in the other organs, that these excesses become injurious. It would be useless to refer to a point which cannot now be contested in a serious manner. What I have said is more than sufficient to show that the effects attributed to a non azotic regimen in cases of gravel reposes only on a gratuitous supposition, and that this regimen, on which they had counted so much, is without effect. Experience has even gone further, by proving that it was injurious, and that the greater number of patients ought to give it up. The following facts furnish evidence of this.

M. Armstrong, aged fifty years, of a high complexion, had had for a long time the symptoms of gravel; he passed a considerable quantity of sand, and often pretty large pebbles, especially when he had taken exercise or fatiguing walks. At the same time he had dull, deep-seated, and almost constant pains in the lumbar and sacral region. Different means were prescribed against these symptoms, and especially a non azotic diet, to which he submitted during many months, and became so feeble and emaciated that his life was in danger. The symptoms increased instead of diminishing in intensity, especially the lumbar and sacral pains. He was therefore obliged to give up this treatment, and to resume by degrees his old course of life, when his health immediately improved, and he continued to pass pebbles without any new symptom, and some months afterwards the quantity of sand was diminished in a marked manner. It was suggested to the patient that he might have stone, since he passed fewer pebbles, and in order to satisfy him on this point he was sounded before undertaking a journey that he contemplated into Italy. It was for this examination that I was called. I

satisfied myself at two different times that there was no stone; the patient then left, and I have since heard nothing from him.

At present, when writing this work, I have received from Mor-moiron, in the department of Vaucluse, a letter from M. le docteur Langier, who has had the gravel since childhood, and who has sometimes passed, almost without inconvenience, a large quantity of sand of uric acid. At the age of twenty-eight years, being in the possession of a large practice in a mountainous country, he was often obliged to mount his horse, in consequence of which exercise a deep-seated pain in the left lumbar region came on, but it was only every second year that a pebble escaped, which was of the same nature as the sand previously expelled. Closely occupied with his profession, he employed the different means recommended by authors, among others the non azotic regimen. But his stomach could not support it, and notwithstanding the confidence that he had in it, he was obliged to resume his old habits. He then resorted to the bicarbonate of soda, of which he took a drachm each morning, but in trembling, as he said, because the salt irritated his stomach. He then remarked that the pebbles had a lighter colour, without there being any other change.

M. Fain, an old officer, who had made the constant occupations of the counting room succeed the fatigues of war, had had, some years since, the symptoms peculiar to gravel, and had resorted to alkaline preparations, especially to the waters of Vichy. But after some months he saw his health deteriorating, his strength diminishing, and his digestive functions so disordered, that he was obliged to give them up. He had also a great enlargement of the spleen, which might have been thought to be the starting point of his disorders, but they soon discovered that these were owing to the alkalis, since it sufficed to renounce these, in order to entirely establish his health, except in the functions of his bladder, which continued disordered. I was therefore consulted. The bladder contained several calculi, and there was a slight engorgement of the prostate, but the most serious point was the depression of his general health. There was also a moral influence which ought to be noted; stone had been frequent in his family, and one of his parents had died of it a short time previous to his attacks, after the efforts of a physician to treat him by lithotripsy. M. Fain feared the same fate, so that he decided on not seeking aid till compelled by pain. I had therefore to overcome a state of mind highly unfavourable, as well as organic disorders which were far advanced. The treatment required great precautions; the operation succeeded, but his health continued bad.

It would be useless to multiply the proofs. Opinion has for some time been returning from the false direction given to it by the experiments and remarks made in France or in England, in order to find the connection between the nitrogen of articles of diet and the excess of uric acid in the urine.

Nothing is more simple than to mark out a diet for one with

gravel. First we must remove the special causes that we have seen in a certain number of them. I have mentioned troubles of mind, difficulties, riding on horseback, and the use of certain meats; it is by removing these causes, that, as I have said, we must begin. We ought, however, to endeavour to distinguish those which have a real and very evident action in the production of gravel, and those which are simply coincidences. More than once articles of diet, which were very innocent, have been proscribed from this distinction not having been established.

As to the diet in general, it offers nothing that is complicated. It is not demonstrated, although it has been so stated, that animal substances have more influence in the production of gravel than a diet taken from the vegetable kingdom. We must therefore regard the quantity more than the quality. Like the generality of men, those having gravel eat too much, much more indeed than is necessary for their support, and more than comports with the power of their digestive organs. But if we add a too nutritious character to a superabundance in regard to the quantity, there is a twofold difficulty that the physician must appreciate. His first care in directing the diet of one having stone will be to bring insensibly his food within limits which may be more in relation with his digestive faculties. But this will vary according to the classes of patients.

In infants we ought especially to regard the diet, to render it more wholesome and more nourishing, as the children of the rich hardly ever have either stone or gravel, and we must place those of the poor as much as possible in a like condition.

In the inhabitant of the country, and in the labouring classes of society, it suffices almost always to remove from their ordinary diet certain meats of a bad kind, or which are difficult of digestion; but the choice cannot be made here, but must be left to the practitioner in each case; here we are rarely obliged to diminish the quantity of nourishment.

The case is different in the richer classes, where the excesses of the table are so common. Independently of these excesses, which it is absolutely necessary that they should renounce, we must diminish the quantity of their usual nourishment, and the more so as that nourishment is more or less substantial. But patients adapt themselves more readily to a reform in the quality than in the quantity: it is therefore better to choose a less substantial diet, and allow them a great abundance of it, other things being equal. The impossibility of tracing farther the conduct of the practitioner in each case will be admitted by all, since it must vary from a multitude of circumstances.

As regards drinks, I have little to add to what I have said in the preceding paragraphs. We must induce the patient to drink a great deal, and to choose those drinks that they like the best, or to which they have the least repugnance; it being well understood that this refers only to watery drinks, for alcoholic liquors ought to be totally proscribed.

In a letter recently read to the Academy of Sciences, M. Donné made known that since the commencement of spring the human urine, when submitted to the action of the microscope, presented beautiful and numerous crystals of a cubical form and appearance, and having at first sight a great analogy with those of marine salt. A more minute examination showed that they were formed of two pyramids, with four faces, most commonly united at their base.

In examining them by the chemical tests he obtained lime, proving as he said the decomposition of an oxalate of this base. He also added that the eating of a small quantity of sorrel was sufficient to produce in the urine an immense quantity of like crystals; in less than two hours after the repast, this liquid by rest and cooling deposited thousands of them. This observation that it would be useful to repeat is very important. It has not however, the bearing that has been attributed to it in the formation of stone since the calculi of lime are found in persons who have never eaten sorrel, or who at least have not made it their ordinary diet, and on the other hand, they have not observed that those who eat a great deal of it have this kind of stone more frequently than other calculi.

Besides I cannot allow this occasion to pass, without making a remark to which I would otherwise attach but little importance; it is that in the modern theory of stone they regard only azote. But taking it exclusively under a chemical point of view, it seems to me that this element would not be the one to which they ought to give the preference, for on the one side, the proportion of azote is the same in urea as in uric acid, the elementary difference of which is owing to the oxygen and chiefly to carbon, whilst on the other side, the azote may be very abundant in the urine, as in patients where the urea acquires a very sensible predominance without its producing on that account calculary concretions. The remarkable work of M. M. Liebig and Wöhler, recently published, would seem to authorise the belief that the investigations of chemical physiology bear more on carbon than on azote; indeed these chemists have rendered it probable that uric acid is a combination of the urea with a substance composed of cyanogen and carbonic acid, a substance which by the action of the peroxide of lead, and very likely also under the influence of a vitiated renal secretion is transformed into oxalic acid and allantoïne. I repeat then, whatever interest these new facts may have when confirmed, I do not think that the microscope ought to exaggerate the importance of the results that may be drawn from them; but they at least prove that the chemical theory of calculi may be regarded differently from what it has been up to the present day, and in such a way, that instead of confining itself to the concretions of uric acid it may embrace also those of a different composition.

The letter of M. Donné, also shows that the use of tea, of coffee, and even smoking of tobacco, has an influence on the formation of stone, because from microscopic examinations, these substances cause the appearance of a great quantity of uric acid, which crys-

talises in yellow rhomboidal spangles by cooling. This is like the azotic diet: deductions drawn from direct observations do not accord with the results of experience. This is a fact in regard to which statistics have furnished the most decisive proofs.

CHAPTER III.

Of the Medical Treatment before the Operation.

I have cited in other works, a great number of facts to prove how useful it is for a patient deciding to undergo one of the operations which may relieve him of stone, to submit during a longer or shorter period to a proper preparatory medical treatment, and I have shown in what this treatment consisted. The details that I have given, seem to me sufficient both to prove to practitioners the value of the applications, and also the service that they may be. I however was deceived on this latter point, as the surgical professor of the faculty of Paris has lately strongly opposed this manner of proceeding, which he deems an excess of prudence, and the slowness of which seems to him to be a fault. On the other hand, we see certain organs of the medical press, adopt the opinion of a physician who practises lithotripsy, and who wishes that we should operate on patients at the first visit, or if we may so speak, as soon as he leaves his carriage. We do not wish to enquire into the motives of a conduct so contrary to the rules of sound surgery, the inconveniences and consequences of which have been more than once proved. I have shown how far M. Segalas was mistaken on this point, and how he had to regret in several cases his having acted with such hazardous precipitation. Neither can I understand how the surgeon of La Charité can have thought, in order to sustain his position, to avail himself of the necessity which sometimes exists of operating immediately, no matter what may be the conditions in which the patient is placed. I shall not therefore endeavour to refute separately the motives on which he has based his opinion, in order, if we may so speak, to place himself out of the ordinary practice. I only wish him to see that in surgical operations there is a strong distinction to be made, which seems to have escaped him, and upon which we have not in general sufficiently insisted, especially in regard to the great influence that it exerts on the results of the operation. The diseases claiming surgical aid may be placed in two great classes. In one is all that is accidental, unforeseen events, fortuitous violence, &c. ; here the surgeon must above all things occupy himself with the actual condition; here the state of the patient is generally good, since he was in good health when he became the victim of the event which renders an operation

requisite which would otherwise not be urgent, and in which we cannot lose a single instant. The exceptions are rare. In the other class, which is the most numerous, are comprised the cases of operations, prepared for a long time previously by the morbid action which has been going on in an organ or series of organs of more or less importance: the effects of this produce great changes in the diseased part, the rather as it is not confined to the affected spot, but extends to the neighbouring tissues, modifying their texture and altering their action, whence there results a collection of diseased states which react on each other, so that the surgeon must study each of them separately in order to appreciate the manner in which he ought to act in regard to the operation and its results. These remarks apply more to the calculary affection than to any other; they may furnish the text of a good lesson to a professor charged with the preparation of the minds of students for the great truths of surgery. Although the mania of the times is the advancing of eccentric opinions, in order as they say, to begin anew, I would wish to think that it is not necessary to return to the inconveniences and the dangers resulting from an irrational practice. If my hope is deceived, I shall refer to it in another work, it is here sufficient to announce it.

CHAPTER IV.

Of the Medical Treatment after the Operation.

We shall now find a new proof of the ordinary treatment of calculary diseases being conducted with empiricism. I do not refer to the general treatment, for that does not differ from what is employed after all great operations, but to the course pursued when the convalescence is nearly complete, and the cure perfect in a surgical point of view. The patient is almost always lost sight of; if he is at the hospital, his dismissal is noted and nothing more is heard of him; if he is a stranger, he returns to the bosom of his family: in all cases as soon as he has dismissed his surgeon, he returns to his accustomed habits. Nevertheless, many important circumstances are here presented which bring on a fatal termination, and to which I should like to call the attention of practitioners and patients.

A peculiarity which is evident to all, accounts for the different phenomena which I am about to indicate. The bladder has been for a long time under the influence of a stimulation produced by a foreign body, and which has even excited in the parietes of this viscus a series of disorders that I have enumerated in my treatise. Deprived after the operation of this permanent stimulus, the blad-

der contracts with less force, it even falls into a state of collapse, which does not allow it freely and entirely to empty itself of the urine. It therefore is by no means rare to see the latter turbid, fetid and filled with mucus; the patient passes it often and slowly; in a word we have all the symptoms of inertia or atony of the bladder. This state is sometimes only of short duration; as soon as the health and strength are re-established, the bladder recovers its normal contractility, and its functions are then performed with regularity. But very often also, especially in old men who have an engorgement of the prostate, and in weak subjects who have long suffered from stone, the vesical atony persists or even advances; catarrh comes on, and new phenomena spring up under its influence. Most commonly a new stone is formed; there is what is called white or gray gravel, which the bladder can hardly expel, so that it remains there, is developed, grows, and renders another operation necessary in the course of a few months. The greater portion of the cases of a return of the calculus, which are by no means rare, prove the truth of what I have just stated. They have not however, thought of overcoming this morbid disposition, although our art possesses almost certain resources against it.

The first distinction to be established, is whether the patient has been operated on by lithotomy or by lithotripsy, and we have only to recollect the effects produced on the bladder by either operation to seize the indications which are presented.

I have related in the parallel and in the treatise, that this return of stone was less to be feared after the operation of lithotripsy, than after that of lithotomy, because the first operation excites less disorder in the bladder, the patients being more surely and completely cured of the catarrhal state which is too often brought on by the continued sojourn of a calculus in this viscus. This fact is incontestably established at the present time, and cannot fail to be of great value, although the spirit of opposition which already is on the wane, does not take an account of it. This important fact would have a great influence on the fate of those with stone. I ought also to mention that the action of the instruments of lithotripsy upon the vesical parietes, in the examinations which are made to prove the cure, after all the morbid phenomena have disappeared, have the direct effect of increasing the activity of the contractions of the bladder, which from this alone is the more disposed to free itself completely of the urine. There is only a small number of exceptions which resemble what we see after the operation of lithotomy, and to which I shall pay attention hereafter. Thus in the majority of cases the medical treatment after lithotripsy is reduced to the examination of the nature of the urine passed by the patient, and to observing whatever occurs in the emission of this fluid. If the urine is limpid, without its usual odour, without a deposit in suspension in the liquid or collected at the bottom of the vessel by cooling and rest, if there is no sand, no frequent desire to urinate, if the patient can instantly satisfy it

without pain, there is nothing to be done except to engage him to drink abundantly at meals and in the intervals, and to recommend to him mild, refreshing diuretic drinks. If sand or a powdery deposit of uric acid is reproduced in large quantities and in a permanent manner, we ought not to lose sight of the patient. When this sand diminishes in proportion as he returns to his normal conditions, we should wait; on the other hand apply the treatment for red gravel. When on the contrary, the urine is troubled and fetid, when a gray or white deposit forms on cooling, when the desire to urinate is frequent, and the fluid does not run freely or without pain, a special treatment becomes necessary. These cases enter into the category of those which are most commonly seen after lithotomy, and the means to be employed do not differ in either operation.

After the extraction of the stone by lithotomy, little or no attention is generally paid to the bladder. The wound in the perineum or the hypogastrium, and the symptoms consecutive to the operation, fix entirely the attention of the surgeon; and as soon as the wound is cicatrised, the patient is left to himself. This is a bad practice in this portion of surgery. Not only have we, in removing the stone, directly taken away the stimulus to which the bladder was accustomed, but the manœuvres act upon the proper tissue of the bladder, with sufficient violence to prevent it from resuming for a long time its normal functions, which are then suspended for a longer or shorter period, by the fact of the operation. Thus, it is sufficient to follow some patients in their convalescence after lithotomy, to be convinced that the greater portion of them urinate but slowly, that it is difficult for them to begin, that the jet is small, or rather that there is no jet at all, and that the liquid falls almost perpendicularly: in many the urine is dark-coloured, fetid, thick or mucous; and if the patient is sounded immediately after he has urinated, a certain quantity of liquid is still found in the bladder, which is often thicker and more turbid than that which has just been passed spontaneously. This proof is decisive; the bladder does not entirely empty itself; the urine, by its longer or shorter stay in this reservoir, gives rise to, and keeps up, an irritation or inflammation, which may pass into the morbid state that has been designated under the name of chronic catarrh of the bladder, and which has been wrongly considered as an incurable disease. Under the influence of this atony of the bladder, the stone is frequently reproduced: pebbles coming from the kidneys cannot be expelled, or others are formed in the urinary pouch itself, which is by no means rare. But in these cases, as well as those where we are called on to introduce a catheter into the bladder, we must proceed with the greatest caution. If the patient has been operated on by the perineum, we must not forget that the neck of the bladder preserves its sensibility for a long time: we should use from choice catheters of a middle size, and with a fixed curve, the extremity of which may more surely tend to the superior parietes of the deep-

seated portion of the urethra. By neglecting this precaution, the passage of the instrument irritates the canal, and instead of blunting the sensibility from use, it on the contrary, exalts it, and excites a kind of neuralgia; whilst in using it the introduction is more and more easy, and the pain diminishes progressively, to such a degree that when the treatment is prolonged, patients soon learn to make the injections themselves. We must recollect never to introduce too much liquid at a time, for all over distention brings on serious inconveniences.

We however sometimes meet with cases which resist, and in which the catarrhal affection of the bladder refuses to yield, notwithstanding all our efforts. This is chiefly the case in worn-out old men, and in patients attacked with deep-seated lesions of the prostate. We must not, however, abate the use of the catheter, and of the injections, not now as a curative means, but simply to prevent paralysis of the bladder, the passage of the catarrh to a chronic state, and the formation of a new stone. I have thus succeeded in keeping alive, during some years, patients who seemed to be fated to an early and certain death. It is true that a serious disease exists, and that the patients are subject to be sounded many times daily; but they attach little importance to so small an inconvenience, for fear that they should show the results brought on by a neglect of the precautions imposed on them. It is in some of these cases that we are led to advise them to wear a catheter, permanently. This practice is especially necessary, when they are not very adroit in, or do not know how to introduce the instrument, and when its introduction is painful. We also know that catheters remaining in the bladder, cause but little suffering, and that their presence in the urethra is without serious inconveniences. But we must not dispense with the injections; neither must we allow the catheter to remain a long time in, and on withdrawing it, it is a good opportunity to examine if a calcareous deposit has begun to form near the eyes. Should this deposit be rapid and copious, we ought the more frequently to change the catheter, or at least to clean it.

The consecutive treatment that I have just laid down, does not offer any marked differences, whether the stone has been extracted by cutting or by lithotripsy.

But cases exist, in which the morbid state of the prostate is the principal cause of the disorders. This state is an obstacle to the employment of the catheter; or at least the irritation produced by the instrument, in passing the neck of the bladder, troubles and fatigues the patient. Such cases sometimes become very embarrassing; especially when there is inconvenience from the catheter remaining in the bladder. This is a point with which I shall occupy myself in the second volume of the Treatise on the Diseases of the Genito-urinary Organs. It must suffice for the moment, to remark, that these cases enter into the same category with those where deep-seated lesions of the prostate produce death. The surgeon and the patient here work in a vicious circle; it is impossible to

live without urinating, yet the bladder has lost the power of relieving itself, and the catheter produces accidents.

Independently of all the cases in which the pebbles are formed, under the influence of a catarrhal affection of the urinary apparatus, with or without atony of the bladder, we find also others in which the patients present the collection of symptoms that they offered before having stone: their bladders possess the normal contractility, they urinate easily, but they pass with their urine, red, black, or yellow sand, and of an analogous nature; and like the primitive gravel or the stone, which has been removed. We have, however, seen that these kinds of gravel are especially formed in the kidneys, in consequence of a functional disturbance of these organs. The identity of the depositions in the urine, does not permit us to doubt the influence of the same cause, and of the same morbid disposition; consequently, if by the treatment that I have indicated, we cannot correct the vicious disposition of the kidneys, we have too just reasons to fear that a new stone may be developed in the bladder, since the circumstances have not changed. These cases resemble those that I have just reviewed, and in which we had to overcome the gravel of uric acid, oxalate of lime, or of cystine. The apparent difference is here owing to the patients having had stone, whilst in the preceding cases they were only disposed to it. This difference has indeed more importance than might at first be believed, for we have seen a great number of persons who have had gravel for a long time, yet never had stone, whence we may conclude that some principle necessary to the production of a calculus, strictly speaking, has been wanting in their urine, or in the deposits; but when they have had stone, we cannot believe that certain principles are wanting. This is another reason for our seeking out the causes to which the vicious secretion of the kidneys is owing, and for our longer insisting with strictness on the use of the means likely to overcome and destroy it. Practice has shown many cases of this kind, and in many of these I have had to continue the treatment, and to vary the means indicated, either in order to find out that which possessed the greatest power, or to prevent the effects of constant use. It would be useless to offer new proofs to those already given of the efficacy of the means that I have proposed, and of which I have given a list, in showing the modifications of which they are susceptible. The tables of returns of stone after lithotomy and lithotripsy, that I have published in my Researches, is the best proof that I can produce, of the efficacy of my medical treatment, and also of the influence of the manœuvres of lithotripsy on the parietes of the bladder. Indeed all other things being equal, there are much fewer new stones formed after lithotripsy than after lithotomy; and in general, the relapses have been comparatively less frequent, as far as seen in patients subjected to my treatment, than in those abandoned entirely to the care of nature: many, however, were owing to the special causes which have been indicated, or to the negligence of patients, some of whom

were exceedingly careless. The following is a new case of relapse. M. Deschamps, a sexagenarian, of a constitution still strong, had had the symptoms of gravel for some time. He had passed many pebbles, some of which were granulated, unequal and friable, the others, lamellated, smooth and hard. One of these last was oblong and rounded, and eight lines long, by four and a half in diameter, and three thick, and its expulsion had caused great pain. After this he ceased to pass pebbles; but the pains in the region of the kidneys persisted; others, not less acute, came on at the perineum, the pubis, and especially at the extremity of the penis. The persistence of these symptoms, notwithstanding the use of sedatives, induced the patient to come and consult me. He thought he only had gravel; the disorders in the bladder, led me to think that pebbles had stopped in this viscus; the sound converted my suspicions into certainty, and the vesical calculi were destroyed by lithotripsy. They were numerous, very hard, and of the same nature as the pebbles passed originally. Neglecting the means prescribed him, he afterwards commenced to suffer from gravel, and a new stone formed. Had he delayed much longer the use of the catheter, new vesical calculi would have grown, and determined more or less serious alterations, which would have rendered lithotripsy impracticable.

The pebbles here referred to, as well as in other cases, differed from the calculi, properly speaking, by the homogeneousness of their composition. It is rarely that the different layers which form them, even when they have a great size, are not of the same nature, which proves a simplicity in the disease which was to be overcome, whilst the calculi generally offer an assemblage of different deposits, which does not admit a doubt of the morbid state being more complicated, and of its having already passed through certain phases and different degrees. This remark is of the greatest importance, when it is necessary to direct a medical treatment, likely to modify the action of the kidneys, in those who have long suffered. In cases of gravel, the question is more simple. I have, however, in my collection, some large pebbles, formed after a return of the disease, which were passed spontaneously, and the last layers of which differed from the centre, in their nature. I have published, among others, the case of M. Heim, who, after a simple treatment, passed a pebble as large as a bean, the centre of which was uric acid, and the exterior layer, urate of soda. These kind of cases are not rare, particularly when the patients have suffered much, and have been submitted to a certain special treatment, which exerts on the nature of the concretions a very different influence from that which recent experiments might lead us to believe. I will here offer the case of M. Barbot-Duplessis: I had not directed his medical treatment, and it was only after having followed it for a long time without benefit, that he came to consult me. Among the pebbles that he had passed, we saw upon the largest, a gray layer, which indicated the predominance of phosphates in the

urine. There are even rare circumstances, and which may be regarded as exceptions, in which the small pebbles offer a cortex and centre of different natures. This was the case in a patient from the department of the Haut Loire, who consulted me in 1838, and who had passed gravel of uric acid, elongated and very thin, the centre of which was oxalate of lime. I have in my collection, many specimens of gravel thus formed. In another patient, one of the pebbles was hollowed in the centre, with a cavity lined by a black layer, which seemed to be a clot of dried blood.

But these, I repeat, are cases out of the ordinary run. Most commonly all the pebbles passed in a given time are of the same nature at the centre as at the circumference, which is a certain indication of a regularity and uniformity in the disorder of the renal secretion, which is rarely seen in those with stone, especially when the disease is chronic. We must recollect this circumstance in the medical treatment, according as the gravel that is to be cured has been preceded or not by stone, for although this is a question of slight differences, at least in the great majority of cases, it is sufficient when neglected to cause their failure.

I have said that certain patients continue to pass pebbles, although they had a stone in the bladder, and that practice often showed this to the attentive observer; others, which resemble these to a certain point, recommence to expel the pebbles almost immediately after the extraction of the stone from the bladder. I have already spoken of MM. Erard, Benezet, Dufrene, Dupuch, &c. whose urine brought away red gravel even during the course of the treatment. M. Houdoin, of Dourdan, that I operated on in 1833, also recommenced to pass pebbles a few days after the last examination, which proved his cure to be complete.

In all these cases the new pebbles are of the same nature as the stone; consequently they were produced by the same morbid action in the renal functions. The treatment in this respect is simple; but the superabundance of matter in the urine capable of being deposited or solidified is sufficient to show that the kidney is greatly disordered, and that a long continued treatment will be necessary to bring this organ to its normal condition.

There are some cases in which all treatment is useless; the gravel is reproduced notwithstanding all imaginable precautions, either as there was nothing but gravel at first, or from the patients being afterwards attacked with stone. But it is rarely in these cases that the patients are so careless of their lives as to allow a considerable development of the secondary affection, at least if the pebble should not have descended into the bladder without producing any special symptoms, which is rarely so. Among other facts of this kind I will offer that of M. Lepaute, on whom I operated in 1834, and who, at the end of 1837, felt suddenly at the neck of his bladder a sensation that his old stone had too well made known to him; the existence of a pebble was proved in my absence by M. Ledain. By means of long continued baths, copious drinks and

enemata, this foreign body was expelled, but not without acute pains, which, however, had no consequences. Thus in the greater number of cases, patients attacked with a return of stone seize the earliest symptoms. Whether it be a question of medical treatment or surgical means, they hasten to resort to it, and thus to shelter themselves from the sad results that negligence might bring on. Some, however, live on with the same carelessness as in the time of their old stone, and deceive themselves as to the nature and consequences of the symptoms that they have, as they did in their first one, so that when they begin again to pass pebbles they are persuaded that they will not have the stone as long as these bodies escape from them; many are thus deluded, for we know that it is common for those having stone to expel pebbles. It is, however, when the disease returns with a train of very light symptoms, as a very little sand in the urine, or a few pebbles, without nephritic colics or pains, or with vague and indeterminate suffering, that timorous patients like to deceive themselves. The absence of all characteristic symptoms is almost certain to become fatal to them; for in the same way as they have neglected the first symptoms of gravel, so they neglect the first warnings of stone, and only seek the aid of surgery when it is too late to resort to it. But I have already sufficiently insisted on this point to render a repetition unnecessary.

CHAPTER V.

Of the Medical Treatment in cases where every operation is impossible.

There are a series of circumstances in which a medical treatment is the sole resource against calculary disease. These are, 1st. When the stone cannot be touched by surgical means, as when it is situated either in the kidneys or in the ureters, or embedded in the parietes of the bladder, or in the structure of the prostate. 2d. When from its volume, the disorders it has caused, or by the morbid states which are beyond its action, it renders the application of artificial means too difficult or too dangerous. 3d. Lastly, when the patient positively rejects every kind of operation.

1st. It is unfortunately by no means rare to see subjects in whom the existence of calculi in the kidneys and ureters is suspected, but in whom we have not as yet found the means of converting our suspicions into certainty, and where it would be more than imprudent to hazard an important operation upon such vague indications as we can procure. The unhappy beings placed in this situation are then condemned to suffering and death, and the autopsy alone verifies the exactness of the diagnosis which had been formed, or

shows where we were deceived. I have reported in my treatise the principal facts of this kind that science has registered.

The practitioner, however, cannot and ought not to rest completely inert. Duty imperiously requires him to endeavour at least to comfort, if he cannot cure, and it is with this view that he calls to his aid the resources of medicine. To be sure these resources are often useless, and their application becomes the more embarrassing as the precise facts to establish a rigorous diagnosis are wanting. Be this as it may, and no matter what may be the circumstances, the practitioner owes aid to his unhappy patient. He ought successively to employ the different means likely to relieve the pain, and render the urine copious, as antiphlogistics, sedatives, alkaline preparations, &c. whether the gravel be in the kidneys or in the ureters, and the result is sometimes more advantageous than might be anticipated. I have seen patients live for years with all the symptoms of renal calculi. The innumerable histories that have been collected on this point, and some of which I have reported in another place, show in the most positive manner that the disorders produced by a foreign body sometimes progress very slowly; that there are interruptions and prolonged suspensions of all the morbid phenomena, and consequently that a medical treatment, when well directed, may be very useful. It is in these cases that it is especially useful to resort to the waters of Carlsbad, of Contrexeville, and of Vichy, but without even forgetting that the treatment will be very long, and that we must vary the remedies so as to prevent the effects of habit. Although the indications offer shades of difference in each case, they are generally easy to seize; longer details on this point would therefore be misplaced, and I should only be repeating what I have before said.

2d. I have shown in an appendix to the Parallel a series of cases relating to vesical calculi, in which the volume or situation of the stone, and certain organic lesions, a long exposition of which is to be found in the Treatise, rendered every operation difficult or dangerous, if not impossible. Medicine is often called to give its aid to the unfortunate patients in grave circumstances, and its task then becomes more painful to accomplish than we might believe. I have shown, either in this work or in my preceding publications, a certain number of facts, which have proved the efficacy of a medical treatment properly directed. For the details of this treatment I refer to the following paragraph, in which we shall see the situation of the patients who themselves have refused the operation of lithotomy. In either series of cases the medical treatment does not differ in a marked manner. There is always an important distinction to be made here; we should never forget that in these circumstances the seriousness of the disorders brought on by the disease arrests the surgeon, consequently there is less reason to count on the resources of art, whilst in the cases that I am about to treat the operation is yet possible; the disorders being less advanced, and the circumstances less serious, it is rational to place greater reliance upon the

efficacy of the means, a short summary of which I am about to give, after offering a few more new facts.

Daily practice presents some cases in which the symptoms begin by a simple gravel, so mild at first in its appearance, that patients hardly pay attention to it. Whilst they pass sand or pebbles, they believe themselves to be free from stone; when they cease to pass it they think they are free from gravel, and think no more of the stone which they have; or they suffer but little, or are withheld by fear or by other circumstances, the principal of which I have made known, and do not seek aid till all resources are powerless. I recollect among others, M. Leclerc, an old gentleman of Paris, aged seventy-five years, who congratulated himself, when in the midst of his family, of not having had any gravel for six years, and of having nothing but slight troubles, as a difficulty in urinating, catarrh of the bladder, and vague pains when taking slight exercise. All of a sudden his symptoms became very alarming. I was called. The orifice of the urethra being very narrow, I was obliged to incise it to introduce a sound. The bladder contained some calculi, but lithotripsy was impracticable; all the means employed to diminish the contractility of the bladder were useless; his general health was also so bad that he died in a few days.

Physicians themselves, when attacked with stone, are not free from the errors which are fatal to so many who have calculi, when any peculiarity in the progress of the disease induces them to change their opinion of the nature of it. I have mentioned M. Guerbois, who thought he had no stone, because he had passed pebbles from time to time, and who allowed the local disease to take so great a developement that it produced a complete exhaustion, when all special treatment was powerless in abating the vesical pains, and when we were forced to resort to lithotomy, which caused his death. I will also mention M. Distel, surgeon to Charles the Tenth. This physician presented an exactly similar case: he passed pebbles in great quantities without suffering pain; the gravel disappeared; he continued however to have difficulty and embarrassment in the region of the bladder. One of the most distinguished men of the capital was consulted, who sounded M. Distel without finding a stone, and this circumstance kept the patient in a security which became fatal to him. When the illusion ceased he was beyond the reach of art, and death took place in the midst of the greatest anguish, the violence of which nothing could abate.

M. Fremont, of Cressy, aged fifty-seven years, came to consult me in 1833, and showed me a box filled with granular pebbles of uric acid, that he had passed in a few years, after nephritic colics. These pebbles were of a singular form, many of considerable size, and especially remarkable from the manner in which the grains which formed them were placed together. They had also so little consistence at the moment of emission, that the pressure of the fingers sufficed to break them. He had taken many baths and a great quantity of demulcent drinks; but he would not consent to

be sounded. The pains in the bladder and urethra increased; the urine became catarrhal in its character, the general health declined, exacerbations of fever came on, his appetite diminished, his sleep was troubled, he lost flesh rapidly, and the means formerly so efficacious, did not relieve his pain. It was at this period that he consulted me. It was too late; the bladder contained two large stones, his constitution was ruined and his sufferings intense. The operation of lithotripsy being impossible, it was decided in consultation with M. M. Marjolin and Sanson, that lithotomy should be resorted to as a last resort and the only means likely to succeed. But our hopes were deceived and he died.

M. Rollet, of Paris, aged seventy years, had had stone for a long time. His pains were intense and continuous: he wished to put an end to them and determined to be operated on, but his general health was so bad that I thought it better to temporise. Opiate enemata, copious drinks and an absolute rest, diminished his sufferings. By continuing the employment of these means, I succeeded in rendering supportable the last moments of the patient.

These facts, which might be increased, prove that at a period of the disease so advanced as this, we ought never to count on a medical treatment, however energetic it may be, and although the general health of the patient might seem to promise a better result. Happily there are some cases to oppose to these unfortunate ones, which may tend to raise the courage of the practitioner. I have seen many in which the means indicated have produced the most satisfactory effects, and have prolonged during many years an existence which was nearly terminated in the midst of the horrible anguish, produced by the presence of a large stone in a bladder greatly hypertrophied. In some even of these cases, the result has surpassed all expectations. Among other facts of this kind, I recollect that of M. Mignot, whose sufferings were so diminished from a treatment that I prescribed for him, that fourteen years afterwards he was living quietly in the bosom of his family. Inexact information had induced me to think that this patient had succumbed, happily it was not true. After using for some months the means that had been prescribed for him, the symptoms of stone, which had been exceedingly serious, diminished in a marked manner, his desire to urinate became less frequent, the pain and effort accompanying it were proportionably lessened, and his life at last became comfortable. It is only now from time to time that he has some pain, but it is of short duration.

3d. There are some patients, who like Franklin, think that the chances of lithotomy are not in their favour, and refuse to submit to it. The position of the practitioner becomes then as much the more embarrassing as the operation leaves less hope, from the result being uncertain, and as in balancing the chances we find more reasons to fear a fatal issue, than to count on a cure. In a like case it is his duty not to propose it, or at least only to recommend it with great reserve. To insist on it in order to cause his

patient to agree, and to conceal the consequences in order to induce him to support it, would be badly fulfilling the mission he has received. He ought on the contrary, to respect his repugnance, as it agrees with the calculations of prudence, and to resort to different means. I have seen several cases of this character, and in many I have directed the medical treatment for a long time. This treatment varies according to the condition of the patient.

Is there hypertrophy of the bladder with hardening, and diminution of capacity, are the contractions of this viscus too strong, the desire to urinate too frequent, the efforts too great? Long continued baths, demulcent drinks in large quantities, absolute rest, the supine position, care to avoid straining when the urine ceases to flow, a mild diet, keeping the bowels open either by enemata or by purgatives in small doses, so as to cause one or two stools daily; or by very small suppositories, as by quantities of opium in graduated doses, from a quarter of a grain to two or three in fifteen days: such are the most efficacious means. Opium, when administered by the anus, is the best way of overcoming the contractions of the bladder, and we have often to resort to it in the medical treatment of calculi, either in order to prepare the patient for the operation, or as an exclusive treatment, always however with restrictions, many practitioners having abused this remedy. We should never forget that the use of opium ought to be confined to the necessity of fulfilling the two following indications. 1st. To calm the pains and contractions of the bladder, in order to facilitate the application of other curative means. 2d. To palliate the symptoms when an active treatment is impossible. Opium is a precious resource, but one of which we ought to be the more sparing, as we shall be obliged to resort to it frequently, and for long periods, and the abuse of it is attended with serious inconveniences. When the patient can retain very small enemata, it is the form which suits the best, and from which we obtain the greatest success. Some precautions however, are necessary to cause this enema to be retained: at first we give an ordinary enema in the full quantity, and immediately after it has been passed we give the small opiate one, which remains without difficulty or pain. Habit often produces good results in these cases, so that the patients who could not at first retain the small enemata, end in keeping them with facility. This is a fortunate circumstance, for I repeat that they are the best means of moderating and reducing the contractions of the bladder in cases of stone. The quantity of opium is to be proportioned to the violence of the contractions and the susceptibility of the individual. I often prescribe the mixture that I have spoken of, when treating of red gravel, and in which there is a quarter of a grain of opium, to be increased every two or three days. This dose is even too strong for some patients; but in the greater number it is much too small, and we have to begin with a half grain or even a grain: it is better however, that it should be too small than too

great, so that it may act with more effect when we know the peculiarity of the individual.

In place of the opium in substance, we may use Rousseau's laudanum, beginning with two or three drops.

But it is generally better to administer several large sedative enemata in twenty-four hours, than to increase the quantity of opium in each.

If it should happen that the patient cannot in any way retain the small enemata, we may give the opiates by another route: only they do not then produce the same effect, and their action will be much more uncertain.

Local and general bleedings, are sometimes indicated in cases of large stone with hypertrophy of the bladder, in order to overcome the general state of excitement which results from the vesical contractions. We must, however, employ them with moderation, either as a preparatory measure to the operation, or as a sedative in the medical treatment. We must not forget that an appearance of plethora comes on from the contractions of the bladder, which dissipates spontaneously when we have calmed the irritation of this viscus by rest and the means indicated previously, especially by the opiates either alone or combined with alkalies.

The form in which these last succeed the best, is under that of carbonated alkaline water, as the water of Vichy. We may also simply use a solution of the bi-carbonate of soda, of from five grains to an ounce. I have seen many cases who said they had been benefited by alkaline drinks; but in those that I could observe, the effects were very restricted, and as the treatment was not confined to the use of alkalies, I avow that it would have been difficult to assign to each remedy the exact effect produced by it in the result obtained.

The opiate preparations in diminishing the vesical contractions, also act on the alimentary canal, and produce constipation. This is without doubt an inconvenience, but one which may be readily remedied, so that we ought only to regard it as to be overcome.

The different remedies just enumerated, are those which we are the most frequently led to employ, with the numerous modifications required by the state of each patient, and the peculiarity of the individual, without forgetting that the presence of a stone in the bladder is a continual source of stimulation; but we can only here hope to weaken the effects of this cause, which accounts for the slight efficacy and even uselessness of all that is done in a great number of the cases where we see the disorders continue, or even increase, and death supervene in the midst of the most acute suffering; the autopsy almost always revealing lesions, against which art is powerless.

In less advanced cases, when once we have succeeded in bringing the contractions of the bladder, if not within their nominal limits, at least to so diminished a state that nothing is to be feared

from the disorders that they cause; the treatment becomes more simple, and the physician has time to study his patient, to appreciate the march of the morbid phenomena, and to follow a series of experiments on which he may base his ideas of the absolute or relative value of the means at his disposition. He is thus led to a choice of those which ought to be most successful in such or such a case, for the same treatment does not suit all cases in the same series equally well, and to know how to choose is a condition of the highest importance. The number of remedies between which we ought to hesitate, is however sufficiently restricted. It is always a choice of opiates in variable doses, of copious drinks slightly alkaline, of the waters of Bussang, of Carlsbad, of Vichy, &c., of bi-carbonated alkalies, in drinks, enemata and baths, of a mild diet, of rest, &c. &c. These means are to be employed simultaneously or successively, care being taken to proportion them to the state of the patient, the nature of the symptoms and the results obtained. We must also observe the new symptoms which may appear. We know that the pains of stone are essentially owing to contractions of the bladder, and that these last are susceptible of being increased under the influence of causes often unknown, and often provoked: it is not always possible to obtain their remission. In these cases the exacerbations are greatly to be feared, and often terminate the lives of the unhappy patients, notwithstanding all the care that may be given them, and our being obliged to resort to them at each renewal of their symptoms.

One of these morbid phenomena which is the most constant at an advanced period of the disease is the inflammation of the bladder, generally known under the term of catarrh. This inflammation which I shall hereafter treat of in detail in another work, offers a series of variations which greatly complicate the principal disease. The bladder under its influence contracts more painfully and at shorter intervals; the passage along the urethra of the mucous matter then contained by the urine is often accompanied with extremely painful burnings, so that in some cases we only regard the catarrh and think only of it: sometimes it is slight, and results from the violence of the contractions of the bladder, a diminution of which brings relief sometimes spontaneously. On the other hand, when it is once established, it persists with light shades of difference, which are inherent to the nature of the disease, and which are often attributed to the action of this or that remedy, which has not had the least effect. The thing that succeeds the best in these cases is rest, the horizontal posture, copious drinks and numerous enemata of the fourth or third of the syringe, in order that the patient may retain them. Baths are sometimes useful; in some cases, however they seem to exasperate the pains and excite the desire to urinate; we must then abstain from them or use them very moderately. Emollient applications or even general or local bleedings may be required; derivatives may also be useful; purgatives in small doses have often succeeded with me. In a

word, we try all that is capable of diminishing the contractions of the bladder, of increasing the quantity of urine, and of facilitating its emission. The use of alkaline substances is not a matter of indifference in this respect. We must not forget that the tendency of the urine is to become alkaline from the simple existence of organic lesions in the organs destined to secrete and contain it. But this alkaline state of the urine resulting either from organic lesions or from the remedies given to the patient ought to fix the attention of the practitioner, who should never forget that it is a diseased state, the consequences of which may become hurtful when they pass a certain point.

By the employment of this treatment modified according to individual circumstances, I have obtained the happiest results, which have lasted often during years. I have reported several instances of it, and shall yet have occasion to report others.

In some cases, however, this treatment is without effect, and I must even say that these are the most numerous. This truth is too well established for me to think it necessary to offer new proofs of it.

In studying the action of urinary calculi upon the economy, I have made known a numerous series of cases in which the stimulating influence of the stone has produced diametrically opposite effects from those usually met with. Instead of super-excitement, energy, force, hypertrophy, we see in the organs near the foreign body, atony, feebleness, atrophy, collapse. The bladder instead of being hardened and applied to the stone, is enlarged, and its contractions are so feeble, that it only expels a portion of the urine each time; even this expulsion is made with feebleness, slowly, and without a jet: the urine runs in a dribbling stream, and the patient suffers particularly at the commencement. I have stated in the *Parallel* that these cases are very serious and insidious in a surgical point of view, and I have at the same time indicated the precautions to be used in order to fit the patient for the operation, and to remove the symptoms that a similar state of things might bring on.

In many cases the operation should not be attempted; and the care of the patient must be confided to a medical treatment: this treatment however differs from that which I have indicated for the cases of stone in the first series. Opiates, on which we must so strongly rely in the last mentioned cases, will here be hurtful, whilst the injections into the bladder, which in cases of hypertrophy would only excite the contractions of the bladder, and increase the accidents from the stone, become of the greatest utility in the others: We proceed as I have indicated in the preceding paragraphs. The greatest precautions are to be taken, especially at the commencement, both in the introduction of the catheter, and the drawing off of the urine, as well as in forcing in the injection; by acting with force, quickness or roughness, we expose ourselves to the production of a reaction which may greatly aggravate the state of the patient, or even destroy him. It is therefore of consequence to

introduce the catheter with great gentleness, without any shock, and only once a day. We allow the urine to escape, but sometimes as the bladder empties itself, and its parietes are applied on the point of the instrument the patient suffers: in order to avoid this suffering, which is a very essential point, we place the finger on the catheter and adapt the end of the syringe to this before all the urine has escaped, force the injection gently, allow about three fourths of it to escape, and withdraw the catheter with care. In some patients who are highly irritable the passage of the catheter occasions too much pain, we must then prepare the urethra by means of bougies.

Generally a few days suffice for the urethra and bladder to become accustomed to the contact with the catheter and warm water. The liquid injected brings away mucous and purulent deposits which have accumulated in the bladder; this viscous each day resumes its contractility, and at each desire to urinate the expulsion becomes more easy and more complete. The general health follows the same course, and a short space of time is sufficient for the patient to become sensible of an amelioration. We must nevertheless continue, rendering the injections less frequent. The state of the patient, the inflammation of the bladder and the results obtained, serve as a guide to the number of injections and the length of time that they ought to be continued.

The rest of the treatment also differs from that which I have given for the cases in the first series. Alkalies have here little success: they may even become injurious by acting as I have shown, and to which I shall refer when treating of the dissolution of the stone; this result is chiefly to be feared when they are too freely used or abused. The diet ought to be stronger, the drinks less abundant. It is also unnecessary to take the precautions that I have mentioned in the preceding circumstances against the contractions of the bladder at the moment when the urine ceases to flow.

The medical treatment based on the principles that I have just laid down, has here the greater importance, as its success is often unlooked for. Indeed its use often removes or at least restrains within narrow limits the catarrhal affection of the bladder which is in these cases the capital point; it arrests the progress of the atony of the vesical parietes, it supplies what is wanting in the contractility of the bladder, sustains its forces, and to a certain point prevents the increase of the calculus. It must not be forgotten that the patients of this class suffer but little from the stone, at least if the bladder by time does not become hypertrophied, and the contractions consequent on the developement of its muscular coat do not supervene.

The patients with calculi, of whom I now speak, may live a long time, not however, it is true, without pain, but with a pain that is quite endurable, and which even ceases at intervals so entirely as to allow the patient to believe that he no longer has stone, examples of which I shall offer when treating of the dissolution.

The same treatment may be usefully applied to cases of hypertrophy of the bladder, if as I have frequently seen, there comes on at a certain epoch of the disease a more or less marked contractility of this viscus. These are phenomena that we cannot account for but which are often seen. Patients remark a change in their position which is sometimes sudden, after having undergone all the accidents of the most energetic and prolonged contractions of the bladder: they no longer suffer when they are ceasing to urinate, they feel no longer the necessity of straining and exerting themselves as formerly, but they have pain in ejecting the first jet of urine; the desire is less urgent and less frequent, yet there is a feeling of constraint, of embarrassment, of weakness, and a general uneasiness; the bladder is full and cannot empty itself, in a word the patient is in the same state as those who have an atony or an atrophy of this organ, and we must resort to the treatment applicable to this class. I must not omit to recall here an important peculiarity; this suspension of the contractility of a hypertrophied bladder in cases of stone, seems to me always to coincide with an exacerbation of the inflammation which has then invaded the muscular coat, which renders the case very serious, and exacts an increased care in the introduction of the catheter or in the injection. We must not hasten too much to begin the latter, and introduce but a very small quantity at a time. In order to give a full injection we must wait till the inflammation of the bladder has ceased; it is true this viscus soon recovers its contractility, and that the injections soon become useless.

I have very often had recourse to the means that I have just referred to, and have only had to applaud myself for it, as in the following case which I choose from among several others.

The Marquis of Brants, almost a septuagenarian, of weak constitution and in feeble health, suffered particularly from gravel and hemorrhoids. The latter sometimes discharged red, sometimes whitish matter, but with such abundance that several towels were soiled each day. The symptoms of the stone increased progressively. I was called and assured myself that instead of pebbles the bladder contained several calculi. I found at the same time that the prostate was enlarged, and that the bladder had lost a great portion of its contractile power. He also had an advanced catarrh, with fever and loss of appetite and sleep. This collection of symptoms seemed to me to require the postponement of the operation of lithotomy as well as to contra-indicate that of lithotripsy. I taught him to introduce the catheter and to inject warm water into his bladder. Each time that he could not urinate he introduced the catheter, and when the urine was very turbid he injected the liquid. These simple means procured him great relief, and from that time he ceased to demand the operation. Baths, enemata, copious drinks, a substantial diet, the use of a suspensoir and very moderate exercise were employed during more than two years that he still lived

with quite endurable sufferings, and at last he died of an inflammation of his chest and not of his calculi.

Other patients have also shown me the coincidence of hemorrhoids and the calculary affections. In the one just referred to, the last was consecutive. Among other analogous cases I saw one of an Irishman, Mr. Henn, who had nephritic colics a short time after the excision of hemorrhoidal tumours; the pains were confined to the lumbar region, but they were so strong that each attack caused considerable emaciation. At last the existence of calculi in the bladder was suspected. The first sounding left some doubt of it, but I was soon certain that the stone really existed. Sir Astley Cooper tried to extract it by means of the forceps that he has long used, but without success, though he prevented his patient from undergoing any bloody operation, by prescribing for him demulcent alkaline substances, and the greatest care both in his diet and his habits of life. This advice was carefully followed and with great benefit. Three years afterwards being in Paris he came to consult me. I found that the stone had increased, that the prostate was tumefied, and that there were fungosities at the neck of the bladder, although his health as yet was not very bad. I advised his continuance of the means prescribed for him by my colleague in London.

It would be useless to multiply facts in favour of the treatment that I have just advised, and the efficacy which experience has already proved. But the general treatment, as recommended by most authors, is often useless; this will be readily understood when we recollect that these authors neglect to overcome the principal cause of the accidents, atony of the bladder, the consequences of which are the difficulty of urinating and the catarrh. These are the three points which chiefly deserve the attention of the practitioner.

I shall not here treat of the long list of complications of stone, reserving it for another work. These complications exert a great influence on the treatment; some even require a special one, or at least modify the ordinary remedies, but these indications are readily seized; to review them would require details which I think would here be unnecessary.

CHAPTER VI.

Comparison (parallel) between the spontaneous expulsion and the extraction of Pebbles.

When a pebble has attained a certain size, is it preferable to extract it by a surgical operation, or to seek to excite its expulsion by stimulating the organs and making the urine more abundant?

This problem is not so easily to be solved as some might think. Almost all patients, from the fear of an operation, and many physicians from the same reason, will not hesitate to answer that the spontaneous expulsion, or that excited by medical treatment, merits the preference, and they decide rightly on the great difference in the application of the two methods. The first, essentially the resort of medicine, can be employed without difficulty; it is only to drink copiously of a water whose composition is known, to take long continued baths, to make great exertion, and to place themselves at the moment of urinating in the position the most favourable for the weight of the pebble to be directed towards the internal orifice of the urethra, in order that it may be brought away by the stream of urine. We sometimes see the pebble escape in this manner, as in several of my own cases, and those which my brother practitioners have collected, and a number have been seen at the mineral springs. It is on these facts that they have advised a method of practice which is said to be marvellous, but which does not seem to me to have been justly appreciated. Authors report, and I have myself seen, cases in which patients with gravel have passed pebbles of an enormous volume. This is, I think, a fact of observation sufficiently frequent to render useless new developements as to the possibility of their expulsion; I ought, however, to enter into some details relative to the bearing of the fact itself.

Up to the present time, when a patient with gravel expelled either naturally or in consequence of a medical treatment, a small calculus, or a large pebble, all rejoiced, and with reason, at the result, even without regarding the accidents and pain, often exquisite, which had preceded or accompanied this expulsion. I say they were right, because then the resting of the pebble left only the prospect of stone or of lithotomy; and the foreseeing this misfortune did not permit them to stop at the pain, no matter how severe, or at the consequences of the accidents, though even secondary. At the present day the question is different, and in order to demonstrate it, it will suffice to show what is seen when the expulsion of large pebbles is abandoned to the cares of nature, or excited by medicine, and when they are confided to the measures with which surgery at this moment is enriched.

I have cited in my third letter the case of M. Wettrel, of the Isle of Bourbon, who had all the symptoms of gravel. This patient had passed several pebbles when he came to consult me. One of these still existed in his bladder, where it gave rise at times to disorders. It at last became engaged in the urethra, and caused a difficulty in urinating, and even a retention of urine; when in consequence of repeated and prolonged efforts, and with inexpressible pain, it passed through the whole canal, and finally stuck in the fossa navicularis, whence it was extracted by cutting it out.

In the Parallel I have related the case of M. Deant, steward of the hospital of Sens, who had had for some months symptoms which led to the supposition that his bladder contained a large pebble,

which was discovered on sounding him. I proceeded immediately, and without informing the patient, to destroy the foreign body, which seemed to me too large to traverse the urethra without causing great pain, and an overdistention likely to produce serious consequences. This pebble that I had seized and held in the instrument was crushed by simple pressure; one portion came out in the instrument, and the rest was brought out with the urine. The operation did not last five minutes, and although the patient was strongly prejudiced, he suffered so little that he wept for joy when I told him that his stone was broken, and he saw several fragments of it, either in the instrument or in the first flow of urine. From this moment his cure was complete. I here place these two facts in contrast, because there is considerable analogy between their effects.

Both patients were young—very nervous and very irritable—both feared equally an operation. In one the calculus was driven by the bladder even to the fossa navicularis, but afterwards there were frightful and prolonged pains, great difficulty in urinating, and even a retention of urine, which reacted considerably on the economy, and after all it was necessary to extract it from the penis. In the other the pebble which was larger would perhaps not have been able to traverse the urethra, and even then would have caused very serious disorder, whilst a five minutes' treatment sufficed to remove the cause of all these accidents. In both cases the cure was sudden and complete after the escape of the foreign body; but there is this great difference in regard to the sensations, M. Wettrel suffered during several days the greatest difficulty in urinating, and afterwards the anguish from a retention of urine, whilst M. Deant had nothing of the kind, and during the five minutes of the operation he suffered so little that he could not believe that it was done. The pebble of M. Wettrel was so buried in the fossa navicularis that the most violent efforts of the bladder could not have dislodged it. Cases of this kind are not rare; they are the more easily understood, as there is here an anatomical disposition to explain the fact. I refer to the narrowness of the meatus urinarius. I have shown elsewhere that the simplest way, as well as the surest and least painful, was to unbridle the meatus: I use it with great success in all analogous cases, either for pebbles or for a fragment of a calculus. I have also shown that the dilatation and cauterisation employed by M. Segalas were essentially faulty. Experience has formally proved this; it is therefore a truth that I only here refer to, returning to it when on new cases.

The two cases that I have just cited, and which are taken from among several others, show that the prevailing opinions in regard to the expulsion of large pebbles ought to be totally changed since the discovery of lithotripsy. How can we, after the favourable results of the new method, persist in the old routine, or ought we now to see examples like the unhappy case cited by M. Chevalier, in which the patient had retention of urine, with frightful sufferings,

and to whom, after pushing the calculus into the bladder, they, during an entire month, afforded no further aid or treatment than the drinking each day a solution of two drachms of bicarbonate of soda. A very few remarks will be sufficient to show that a total change in the opinions and practice of each practitioner is now to be expected.

In order that a large pebble when contained in the bladder should become engaged in the urethra, many circumstances must be found united. First we must have the internal orifice of the urethra sufficiently dilated, consequently there must be no spasmodic contraction or considerable deviation consequent on the engorgement of a prostate, and the bladder must possess great expulsive power, and if the pebble is not spherical it must be presented in its most favourable position. Neither must the bas fond of the bladder be too much depressed, and its contractions must tend to bring the foreign body to the internal orifice of the urethra. But it is often necessary to wait a long time in order that all these conditions should be fulfilled; from this results the pain in the neck of the bladder, the frequent desire to urinate, and the difficulties and pains in satisfying it. In order to overcome this disposition, and to render the urine more abundant, and to increase the contractility of the bladder, it is indispensable to submit the patient to a sedative treatment, to introduce a large quantity of liquid into the economy, and to resort to the series of means indicated in the preceding chapters; but there are some patients whose stomachs would hardly bear from twelve to twenty-five glasses of water daily, no matter what might be its quality. Others are fatigued by the long continued baths, repeated enemata, purgatives and exercise. Experience moreover has shown that these different means have often been without result, and I have mentioned a long series of morbid phenomena, either from functional disturbance or organic lesions, which prevent the expulsion of pebbles. But, even when these are engaged in the urethra, other obstacles present themselves. We must recollect that the urethra has not the same dimensions throughout, and that at its membranous portions, at its bulb, and at the fossa navicularis, it presents a greater capacity than elsewhere, consequently the pebbles often remain there. Sometimes, indeed, the stoppage is only temporary, a second, third, or fourth column of urine driving on and forcing out the foreign body. But how much suffering remains for the patient during the hours, or even days, that either the pebbles remains motionless, or that the contractions of the bladder, forcing the liquid, shake and move it onwards. There is here a contest between the sides of the urethra which do not yield sufficiently, and the contractions of the bladder which increase in energy, and this contest causes severe suffering to the patient. I have seen three cases where the torment of the patient seemed to me to resemble those caused by a retention of urine, that is to say inexpressible. But, I ask, what is the operation—were it even incision—that can

compare with the pains and accidents determined by a spontaneous expulsion of a pebble?

The symptoms in these cases are of two kinds. The one is owing to the retention of urine, the others are the results of the action of the pebble on the sides of the urethra, and I have shown that these are sometimes so serious, that death may result from it if the foreign body remains there long. But in all these cases, no matter what may be the nature of the accidents, prudence and humanity make it our duty to relieve them as soon as possible. So long as they are left to nature, even when seconded by the best ordered medical treatment, the sufferings of the patient are prolonged, often without the expulsion taking place, so that at last we are obliged to resort to a surgical operation.

Before lithotripsy, the resources of surgery were uncertain and painful. They frequently brought on serious consequences, and nothing more was wanting to keep the surgeon in a state of hesitation, because prudence advised his not resorting to this as long as he could hope to attain his end by milder means. Lithotripsy has come to fill a great gap: the happy effects derived from it, make it the duty of the practitioner not to leave the expulsion of large pebbles to efforts of nature alone, and not to count too much on a medical treatment, even if the pebble is not engaged, or if when once engaged it does not quickly escape, as daily experience proves not only that delay may be fatal to the patient, but that artificial extraction is less painful and more easy. It is not, however, only in the fossa navicularis that pebbles stop: we find them also in other parts of the canal, as in the case of M. Wetrel and several others, where although extraction was difficult and painful, it was yet easier than had been supposed by some modern authors, who supported themselves only on theoretical combinations, or on some fruitless efforts by manœuvres executed in a manner far from perfect.

I have seen many cases in which the pebbles were stopped towards the middle of the spongy portion of the urethra, where they gave rise to accidents. I add the following cases to those already reported, they being remarkable on many accounts. In one, the greatest efforts and the most violent contractions of the bladder, were insufficient to drive out the foreign body. This was in a patient at the Necker hospital; he had previously had gravel, and several small grains had been expelled, I will not say without pain, but at least without serious symptoms, when he was taken in the middle of the night with difficulty of urinating, with fever, nervous movements, and inexpressible pain. He had felt a pebble engage itself in the urethra, and during more than ten hours, all the means that art could suggest in a like case, were employed to favour the effects of the vesical contractions, which tended to force out the foreign body. These means and the efforts of the bladder were useless: the pebble was stopped in the middle of the membranous portion of the urethra and did not advance; the bladder

was over distended, and the urine could hardly filter through between the inequalities of the pebble and the urethral parietes. No time was to be lost, the anguish of the patient required prompt measures. By means of a small pair of very thin forceps, I soon succeeded in seizing the pebble, which I found was friable, and instantly crushed. Scarcely was the instrument withdrawn, than the fragments escaped with the jet of urine, and all the symptoms ceased, without the reaction taking place which had been feared from the nervous temperament of the patient, and the violence and duration of his pains.

It may properly be said in objection to this, that the pebbles of M. Wettrel, of the preceding patient, and of many others that I have treated with a like success, were too voluminous, and that these cases ought not to be taken as examples. These pebbles were not out of proportion with the capacity of the urethra, and indeed they had already passed many of the narrowest points of the canal. I have also reported in this work, cases of pebbles expelled spontaneously, which were of greater size than those just referred to. I have shown why they did not progress, but it will not be useless to recall it, for it is an important point. When a pebble has remained for some hours in the canal, the sensibility and contractility of that spot are increased: the bladder becomes fatigued after strong and repeated contractions, the jet of urine is thrown with less force: over distention of the vesical parietes soon commences, the equilibrium between the expulsive force and the resistance is destroyed, and the pains and efforts, even though violent, remain without any result.

There are cases in which the symptoms are much less serious, and the expulsion of the urine, although painful and troublesome, goes on: gravel may thus remain for a long time in this portion of the canal.

M. le Baron Desportes, aged seventy-nine years, had suffered for some time in urinating. Having never had nephritic colics, nor passed gravel, he was far from thinking that a pebble could have stopped in his urethra. Different sedative applications produced no effect, and I was called in. The introduction of a small bougie showed me that there was a pebble in the canal, three inches and a half from the meatus urinarius. I also found that the urethral parietes were exceedingly irritable; I at once endeavoured to overcome this irritability by introducing, for six days, bougies of a greater and greater size. These bougies were however constantly stopped by the pebble, which made a print on the end of each of them. I at last tried to extract it, but found it to be much larger than I had anticipated. The small forceps that I usually employ were useless. By the aid of a crotchet, I succeeded in bringing it about one inch forwards; but as the patient suffered greatly I did not prolong my efforts, and had to congratulate myself on my prudence, as there was a slight exacerbation of fever in the course of the evening. The next day I again introduced the crotchet, and

drew on the pebble still a few lines; it was at last expelled after a long continued bath: it was oblong, rough, of a brown colour, and the size of a small almond. From this time all the symptoms ceased.

The parietes of the canal present a peculiarity which it is not rare to meet with after the sojourn of a pebble in the urethra, as the pebble digs out a kind of hollow, whilst the urethral parietes are tumefied, both before and behind it, so as to embed it. The efforts of nature are then almost powerless, all medical treatment is useless, and extraction is infinitely more difficult on account of the little padding before the pebble. The first indication is to dislodge the latter, and there is nothing more useful for this purpose than the crotchet; but the operation is more painful, and must be conducted with greater precautions. When the pebble is once displaced, it sometimes escapes as in the case of M. Desportes, and sometimes it has to be extracted in the manner that I have shown, and the application of which is daily seen.

When the pebble is stopped in the bulbous portion of the urethra, which rarely happens, or in the membranous portion which is more common, we force it back to the bladder, where the extraction is performed as I have shown in the *Parallele*, and in my third letter. There is sometimes pain and difficulty here, but these inconveniences are not to be compared with those which result from the means employed previous to our time, nor to those not less serious ones brought on by the sojourn of the pebble, when we employ only a medical treatment. It is the same thing if the pebble does not engage in the urethra.

This is so important a point in practice, that I think I ought still to add some remarks and new cases.

I have reported in my *Treatise on Lithotripsy*, the case of a patient of Lyons, M. Morfouillet, in whom the new method was employed, for the crushing and extraction of two pebbles, one vesical, the other urethral; this patient fully appreciated the difference that I here seek to show. The first pebble was taken from the spongy portion of the urethra, where it had been forced by the contractions of the bladder; but it had only come there after considerable efforts and violent pains during hours; a manœuvre of a few instants was sufficient to bring it out. The other and large pebble could not engage in the urethra: it was seized and broken in the bladder after a single sitting of five minutes, without any fatigue. This patient had undergone the different operations practised against vesical calculi; at the age of five years he had been cut: the operation was painful, the convalescence long and the cure incomplete. New pebbles formed at the age of thirty-three, and were at first mistaken. After a long state of suffering, without any special characters, the physicians attending only to the retention of urine, I was called in.

Among the cases of stone that I have operated on by lithotripsy, I have found more than fifty who had only very small calculi or

large pebbles. In all these cases a single sitting of not more than seven minutes, and sometimes much less, has sufficed to extract the pebble or to crush the little stone: a spontaneous cure has almost constantly followed, and the patients have hardly ever had any reaction from it; many even have not ceased from their usual occupations, or have resumed them on the next day. I have already given a great number of these cases in detail, and now offer a few more.

M. Faure, of Chatel Montagne, aged thirty-six years, after a few attacks of gravel, had suffered for more than three months from a large pebble which could not escape. The existence of this pebble was established, and in a single sitting which did not last more than two minutes, I succeeded in seizing and crushing it; a portion of the fragments came out in the instrument, and the remainder with the urine.

M. Robichon, an adult, had had the gravel for a long time. A small calculus existed in his bladder and deranged its functions; consequently the urethra became very irritable. The calculus was recognised, and after a short preparatory treatment, one operation of lithotripsy was sufficient to break it up. The patient was cured a few days afterwards.

M. de Lauzæ, a sexagenarian of Bordeaux, of a strong constitution and good habits, had had for several years slight rheumatic pains, but no other indisposition. About a year since, his urine brought away for two or three times some sand, to which he paid no attention; but six months afterwards, he commenced to have a painful sensation when urinating, and a stoppage in the stream as he termed it: this state continued and compelled him to seek medical aid. The first examination of his bladder seemed to show the existence of a foreign body, which was not found on a second search. In this state he was sent to me by Dr. Dutrouilh. After recovering from the fatigues of his journey, I sounded him and found his organs healthy, with the exception of a great irritability of the urethra and neck of the bladder. A small stone having been discovered, I proceeded immediately to the operation; the calculus was seized in an instant and crushed, a portion of the fragments were brought away in the instrument, and he passed the rest during the day. He had no accidents or acute pains; but having had the imprudence the next day to go to a public fête, he was attacked with fever and obliged to keep his room during four days. After this time, an examination of his bladder satisfied me that he had no more stone. Three minutes, therefore, were sufficient to destroy a calculus of seven lines in the direction in which it was seized, and of a size nearly equal to an almond, judging from the fragments when reunited.

M. d'Hauteville, a sexagenarian of strong constitution, but worn out by suffering, had been treated for a long time homœopathically, in the course of which treatment symptoms came on in the bladder, which led to the belief that he had stone. This opinion acquired

greater weight from the fact that a long continued treatment for the relief of the difficulties in urinating, a vesical catarrh, and pains in the neck of the bladder, had been without effect. At last an examination of his bladder, by a distinguished practitioner of Geneva, proved that he had a small stone. The patient came to Paris; great sensibility in the urethra and some accidents having resulted from the preceding examinations, decided me to try first the preparatory treatment of lithotripsy. The first two introductions of the soft bougie caused a slight shivering; the next two were without this effect. His general health improved promptly. I called in M. Biett, in order to explore the bladder and commence the operation immediately, if necessary. The sound showed a small stone, which was at once seized and destroyed by means of a small lithoclaste; the operation did not last five minutes, and he suffered but little; a portion of the fragments came away with the instrument, and the rest with the urine. The next day I saw him, and he had had no bad symptom, and continued his usual regimen. A repetition of the operation was decided on after the lapse of three days, but the most minute researches proved that the bladder was entirely free.

All these facts, which have gone on increasing since the discovery of lithotripsy, and of which my confreres have collected several as successful as those stated above, bring new proofs to support what I have said in regard to the facility and promptness of the cure of calculi, at their commencement, by lithotripsy. They show how erroneous are the opinions that have been advanced in regard to the pretended gravity of this operation, and the sensations that it has caused even in the most irritable patients. I am fully persuaded that if the patients with stone, and the physicians, were in a situation to judge by themselves of the results obtained, I should not have to combat the false doctrines which have induced the unhappy patients to take a false course, and have most frequently brought on the serious events that they have had to deplore.

Do you think, said M. d'Hauteville to me, that the use of the alkaline waters recommended to me, would have enabled me to pass my stone? I replied that the thing was possible, and that patients were indeed seen to pass calculi as large as his spontaneously; but I added, and he understood it very well, that this treatment would have been longer and more painful, to say nothing of the uncertainty of the result. The escape by the urethra of a body of six or seven lines in diameter would have exacted the greatest efforts on the part of the bladder, whilst at present he was able to travel without having any thing to fear from this organ; besides the waters when now taken in moderation, and to correct the vicious disposition of the kidney, could have no inconvenience, whilst in drinking them with the view of attacking or driving out the stone, it would have been necessary to introduce such large quantities into the economy, that we should have had to fear the derangement of health that it would have caused.

M. Leroy has said, in regard to the case of M. Longperrier, that a journey to Vichy and the drinking of a hundred glasses of water in six days, was worth more than an operation, no matter how simple and free from pain it might be. If this physician had not given so many opportunities of judging how varying and eccentric are his opinions, we should be surprised to see this proposition published by one who proclaims himself a lithotriptist, or at least we should suppose that he had never operated on these simple cases; but this is hardly probable, as they are very frequent, and the only ones in which we can hope to obtain a spontaneous expulsion of the calculi.

I am now about to review two of the cases published by M. le Docteur Petit, and which show how faulty is the practice to which it is wished to give the preference. This physician, whom we shall not suspect of exaggerating the pains caused by the spontaneous expulsion of pebbles under the effects of the waters of Vichy, reports a patient, M. Fray of Fournier, who after several attacks of nephritic colic, went to Vichy *to derive relief from the waters*, and at the end of the seventeenth day, after three hours of suffering, passed an angular pebble; another became engaged in the canal but the patient could not pass it till after nine hours of pain; a third was expelled without pain. This one was the result of grains closely united. Thus twelve hours suffering and a seventeen days treatment were necessary in order to pass three pebbles, whilst one operation of lithotripsy, of five minutes' duration, would have sufficed for their destruction. There is truly no comparison between the intensity of the sufferings; let us only recollect that the gentle expulsion of pebbles produces pain equal to that from retention of urine.

M. Petit reports another case, of M. Balivet, a patient with gout and gravel, who had passed many and very large pebbles during twelve years previous to his going to Vichy. Seven months previously, the patient *had perceived* another pebble fall into his bladder, *that he thought was of considerable size*; this pebble caused pain, hindered the excretion of urine, but did not escape. After using the waters five days it engaged in the urethra and progressed by means of great efforts even to the fossa navicularis, where it stopped. The patient suffered greatly for many hours and could not pass a single drop of urine. *The foreign body was pressed from behind forwards and then they could perceive its extremity at the meatus urinarius, which seemed to be extremely narrow compared with the size of the calculus. At last after some efforts the opening dilated, but not without a slight tearing, and the calculus jumped to a sufficiently great distance, followed by a large stream of urine.* This pebble was of the size and shape of a large bean. The patient had suffered from the morning until M. Petit saw him at two o'clock. It may be conceived how he suffered during this time; then how he suffered from the manœuvres resorted to in order to force the calculus *to tear* the meatus urinarius which is

known to be so resisting and so slightly extensible. How easy would it have been to have saved all this suffering, by the proceeding whose efficacy has been incontestably established. M. Petit would certainly not express himself with so much confidence if his numerous engagements had allowed him to keep up with the science of the day, for it is not difficult to see that he has only very incomplete and inexact notions of the calculary affection. The case of M. Balivet offers an example of conduct that we leave to others to qualify, and yet the sub-inspector of Vichy has the courage to propose it as a model. Let us hope that he will find no surgeon sufficiently unacquainted with the simplest precepts of his art to attempt to tear the meatus, by pressure exercised on the calculus, through the urethral parietes. We may also hope that M. Petit will profit by his stay in Paris, to learn what ought to be done in a like case, and that we shall not see him reproduce, in his future works, a practice which would carry us back to the dark ages.

There is yet a circumstance that the partisans of medicinal means have not regarded, when submitting patients to a prolonged treatment with a view of obtaining the expulsion of pebbles by the urethra. It is, that the sojourn of these bodies in the canal may bring on exceedingly serious symptoms. I have said in the *Parallel* when speaking of the stoppage of the fragments of a calculus, that the symptoms are alarming and claim prompt aid, whilst in other cases of an apparently similar kind the patient hardly perceives that he has a fragment in the urethra. The same is true of pebbles. I have reported a very large number of cases in which these bodies had remained for a long time in the canal, and had even caused alterations there of such intensity that the patients continued to suffer after their extraction or expulsion. I have reported among others the case of M. Daudet, of Nismes, who passed whilst traveling a pebble of the size I have stated, and which had remained a long time in the deep seated portion of the urethra. After the expulsion of this pebble he continued to suffer as he had done previously, although all the means advised in similar cases had been employed. If, instead of confining themselves to a prolonged medical treatment and to pretended solvents, they had at first examined the canal and proceeded to the extraction of the foreign body, the patient would have been freed from his acute sufferings and secured from the organic alterations which became a source of unhappiness to him.

The prolonged efforts that certain patients make, in order to expel pebbles which have stopped in the urethra, sometimes determine accidents of another kind. I have seen hernias, pulmonary or cerebral congestions, &c., come on after these, which required a special treatment, which have not always resulted satisfactorily either to the patient or practitioner.

There are, however, some exceptional cases, in which we had even recognised by means of the sound, the pebbles whose expulsion took place under the influence of a medical treatment, after

which the cure has been complete. Such, for example, is that of M. Barbette, who passed spontaneously some large pebbles, without either accident or excessive pain, and in whom a medical treatment which I prescribed for him, brought on a marked and lasting amelioration. The cures of patients treated by mineral waters, offer us many analogous facts. It is these fortunate cases which have given credit to a practice, the consequences of which, from the extension that they seek to give it, become each day fatal to a multitude of other cases of gravel. But we must ascribe many of these misfortunes either avowed or concealed as much to a neglect in deciding strictly on the case, as to the neglect of the examinations that I have so strongly recommended.

CHAPTER VII.

Of the value of the Medical Treatment of the Calculary Affections.

If the trouble had been taken to register the histories of a certain number of patients with stone, we should find that the greater part of these patients, before being attacked with stone, had had gravel, or that the symptoms of gravel had been manifested with violence, and at periods more or less remote, sometimes regular, sometimes not; and that these patients had experienced what is called nephritic colics, or that the symptoms were much less marked; that they had been vague, that they were confined to dull pains, spreading in different parts of the body, and even to a simple derangement of the functions of the bladder; or rather, that without any previous sensation, the patients had passed sometimes sand, and sometimes pebbles, in their urine: for the forms of this affection have no limits, and vary *ad infinitum*. It is the more necessary to insist on these points, as the greater number of authors who have written on gravel have enclosed them in too narrow and too regular a scale. During this first period, which lasts sometimes many years, both the practitioner and the patient ought to be observers, to follow the progress of the first symptoms step by step, and when the disease has taken a more decided character, to attack and combat it without ceasing, by the use of the remedies that I have reviewed, employing all the modifications, claimed not only by the state of the patient, but yet by the nature of the deposits, either when these take the form of sand or of pebbles, or when they constitute true stones, the quantity of these deposits, their volume, the place where they rest, the disorders that they bring on; in a word, the numerous peculiarities presented by practice, and the principal of which I have enumerated, being strictly observed, I here hasten to offer a remark tending to enable us to avoid the mistakes into which we daily fall, when we

have to decide on the curative means employed against this disease. The physician and surgeon, ought not, it seems to me, to be limited to their respective spheres; each must enter on the domain of the other. The surgeon generally only regards the operation, and counts on it alone to cure his patient; the physician has confidence only in his tisans, and keeps himself entirely to the action of the modifying means of the economy. These narrow views have too often the effect of overthrowing the hopes of both; and it is owing to our not having understood the true value of each treatment, employed both by surgery and medicine, that so many patients are the victims of the illusions that they cherish, and that the appreciation of the resources of art is delivered to the exaggerated enthusiasm of the one, and to the raillery of the other. If I am not deceived, we need not seek elsewhere the cause of the differences of opinion which make enemies of otherwise enlightened practitioners. The resources of medicine and surgery cannot be strictly appreciated, so long as they are not examined beyond their natural limits. But it would exceed the bounds of truth to pretend to cure a calculary affection by the extraction alone of a stone already formed and developed. Surgery has for its object the removal of the foreign body which causes the trouble in the economy, and which is in itself only the result of a morbid action, the theatre of which has been the urinary apparatus. The cure, without doubt, takes place from the sole fact of its extraction, since the cause of the disorders has disappeared for the moment. But the organic action under whose influence the calculus was first produced, still exists, and it belongs to medicine to correct whatever is vicious in the play of these organs, and to reduce the functions to their normal state. For this it has powerful modifying agents, the effects of which cannot be doubted by an impartial man. But to pretend, as has been done, that the action of these modifying substances is not restricted to the organs themselves, and that, with the aid of more or less adroit combinations, it would be possible to obtain from them results reserved entirely for surgery, is to abuse them in a singular way. He, who in order to appreciate the resources of medicine, would only regard the results said to have been obtained in following this last direction, would equally commit an error, since he would not judge of them by their worth, when extended beyond their true value. Indeed medical treatment may have for its object, the preventing of the formation of deposits in the urine, when the patient is only threatened with gravel, it may endeavour to arrest the development of the latter, to overcome the disorders excited in the economy, by the existence either of pebbles or of calculi, or to prevent the return of the disease after surgery has destroyed or removed the stone; and no one would doubt its efficacy, as far as this point. There is here a physiological action, as it may be termed, which belongs exclusively to medicine to perform; and which is accomplished by a modification of diet, by regulating the habits of life, by a war made on the morbid causes, or by alterative means

wisely combined : this is self-evident and incontestable. But beyond this action, medicine can do nothing, and the removal of urinary concretions, when they are accessible to the hand of man, does not belong to it, any more than does that of any other foreign body, introduced or developed in any region whatever of the organism. It then requires the assistance of surgery, to show its powers, as the surgeon has need of it, to complete the work of which he only performs the first act. Medical and surgical treatment, entirely distinct as to their bearing, but tending finally to the same end, yield each other mutual succour, and in a number of cases, the cure can only be obtained by their association, and by their successive or simultaneous application.

The different cases that I have reviewed prove in the most satisfactory manner the utility of the measures that I have recommended, and that ought to be employed against the gravel, either in order to prevent its formation or weaken its effects, or in order to facilitate its expulsion. Indeed there are some facts that I have cited which bear witness against the efficacy of these resources of our art, the disease having obstinately resisted, or the gravel having ceased spontaneously, if we may so term it, and all treatment has then been given up. But these are only exceptional cases, and the usefulness of medicine in them is too well established to require new proofs. Besides, if we examine attentively the facts on the opposite side, we soon discover certain defects in the mode of application of the curative means, to which it is rational to attribute the want of success. This I have found in several cases, where the medical treatment, such as it has been up to the present time, has not prevented the formation of stone. Having given a chapter to the special exposition of the mistakes in the present accredited theories and treatment, I here only offer a few new facts.

M. Sallé, of Chateauroux, aged forty-four years, of a good constitution, but nervous temperament, and employed in a fatiguing way, has had for six years, considerable disorder in his urinary apparatus, especially nephritic colics. Every month he passes, with pain, pebbles of uric acid, of which he has given me a boxful ; the greater part of them are round, very smooth, and of a tawney colour ; some, however, are granulated, and one of these last is very oblong, and slightly flattened, being eight lines long, four broad, and three thick. The expulsion of all these bodies had caused acute sufferings. This patient fearing, like nearly all those with stone, the performance of the operations likely to overcome, or even only to recognise, the disease with which he was attacked, submitted for a long time to every kind of treatment advised against stone and gravel. The symptoms nevertheless advanced, and some time afterwards, when he came to consult me, he had ceased to pass pebbles, or the urine at least brought away fewer ; the pain also was more tolerable, and the patient believed for a moment in the efficacy of solvents, which he took with the greatest confidence. But the symptoms of stone in the bladder soon came to destroy his

illusions ; they were rapidly developed, and he had the good sense to seek medical aid before they were too far advanced. Lithotripsy freed him from many calculi, which existed in his bladder, and which were of the same nature as the pebbles previously passed, and the expulsion of which would have been readily obtained, by a better directed treatment. His cure was prompt and complete. The operation, the preparatory treatment, and the medical means afterwards prescribed, brought the functions of his kidneys to their normal condition, and he ceased to make pebbles ; I have heard nothing of him since 1830.

The neuralgic state of the urethra and neck of the bladder, which existed in a high degree in this patient, was sufficient to paralyse the means likely to prevent the formation of gravel. We must also attribute to this circumstance the non expulsion of the pebbles which formed the calculi, which is proved by the disappearance of the disease under the means that were employed. In this case, as well as in almost all those of the same nature, the application of lithotripsy by destroying the neuralgic state of the urethra, and re-establishing the normal contractility of the bladder was sufficient to put an end to the production of gravel. If they had thought of overcoming these morbid states of the bladder and its excretory duct, the patient would not have had stone.

M. Mayè, of Lyons, aged fifty years, and of a weak and worn-out constitution, had had all the symptoms of gravel, since 1821 : he had passed much sand, and pebbles of uric acid of various sizes, one of which was extracted from the urethra by M. Gensoul. During many years he successively employed all the means advised against gravel ; many times he thought that he derived benefit from them, but his symptoms soon reappeared. At last he was attacked with stone, for which he came to Paris in 1833, to be operated on by lithotripsy. The conditions were very unfavourable, both in regard to his urinary organs, which had suffered greatly, as well as his general health, which had been rudely attacked by his local disease, and the means so long employed to overcome it. The precautions that I am accustomed to take in these kind of cases, had full success, and the patient was cured. I had occasion to see him again in 1836 ; from an excess of caution he desired to be again sounded ; his bladder, however, contained no stone, though he had pain from time to time, and a frequent desire to urinate. These were the results of a neuralgic state, and a highly marked moral influence : there was also a lesion of his prostate, which contributed to keep up the irritation of the neck of the bladder, and the difficulty in urinating.

In this patient as in the preceding one, the stone was developed notwithstanding the best combined treatment which was exactly followed, nothing either in diet, diuretic drinks, alkalies or mineral waters having been neglected, only they had not taken into account the diseased state of the neck of the bladder, and this rendered all the rest useless. It was sufficient to remove this, in order to cause

the vicious renal secretion and the formation of gravel to cease; the pain at the neck of the bladder and the frequent desire to urinate was dependent on the lesion of the prostate which had resisted the treatment.

But the medical treatment whose utility cannot be doubted, whether its object be to modify the action of the organs charged with the secretion and the expulsion of the urine, or to favour the ejection of pebbles, or to weaken the effects of the foreign bodies on the economy, this treatment such as it has been up to this time has also its inconveniences, and we can hardly think how largely it has contributed to the fatal termination of the disease. This proposition is supported by the numerous facts that I have reported, and it will suffice to offer here a few remarks.

Daily experience proves the efficacy of the measures that I have advised. Thus every time that a pebble too large to traverse the urethra exists in the bladder, we must resort to an operation, and with the greater reason as the prolonged contact of the calculus fatigues, irritates, attacks, and destroys our organs. But there is here a peculiarity which I ought to mark, as many errors result from it. The patient in general only appreciates the effects of stone from the pain that it produces, and it is ordinarily only when he has been conquered by suffering, that he decides on undergoing a surgical operation, to which he has always a greater or less aversion. But all the means employed by medicine tend to blunt and conceal the pain, to render it more supportable, to sustain the courage of the patient, and to fortify his resignation by the hope of ulterior relief or even a cure, which is unhesitatingly promised him. It is in consequence of these two orders of causes and under their influence, that cases of gravel become calculi, that stones acquire a great development, and that their presence brings on the destruction of the organs, or at least such deep-seated lesions that death necessarily follows, a death which is afterwards charged on the operation, and which in the majority of cases is only the result of the employment of the internal remedies. In this light, the medical treatment instead of rendering great services to patients, becomes immensely injurious to them, but it is not to the treatment alone that we must charge it; it is to the false application made of it either from the indications not having been well examined, or from their wishing to exceed the natural limits of the resources of medicine, which is only too frequent. If we seek to collect the motives which have determined the patients to place themselves in the desperate conditions, examples of which are daily seen, we find that they will all answer; 1st. That the pains were for a long time quite endurable, that they were only momentary, that they easily overcame them, that they even prevented their return by a simple medical treatment. 2d. That this irregularity in the progress of their symptoms led them to hope that it was only the gravel and not stone, since the pain yielded to rest, to baths, enemata, and abundant drinks, results which seemed to them impossible to obtain

in cases of the existence of stone, because this having an uninterrupted action could not produce temporary effects. 3d. That at a later period the fear of an operation prevented their being sounded, and that they had determined to take solvents, sedatives, &c. ; that they had been to the springs, and that the comfort derived from the employment of these means had cherished in them the hope of escaping surgery. Lastly, the history of all terminates by the avowal, that they have been deceived, and with the heavy maledictions that they lance at those who have advised them, the hesitation or negligence of whom have condemned them to years of acute anguish, in order to bring them at last to despair. Such are undoubtedly the sad results of this palliative treatment, which only masks the pain ; it encourages its support, and allows time for the increase of the stone, the prolonged sojourn of which in the economy begets a frightful series of disorders. When examining the dissolution of the stone, I shall refer to the inconveniences and dangers of this medical treatment which I only here indicate, especially when employed in the chimerical hope of obtaining by its aid the solution or breaking down of vesical calculi strictly speaking.

THIRD PART.

CRITICAL EXAMINATION

OF SOME OF THE SPECIAL MEANS WHICH HAVE BEEN PROPOSED FOR

THE TREATMENT OF GRAVEL.

1st. After having shown the means which have most commonly succeeded with me, I should only have fulfilled a portion of my task if I passed over in silence certain others whose employment has also been proposed. The greater part of these latter were invented or reproduced by a member of the academy, who ranks among the first of our physiologists. It is from this physician that they have borrowed them, who since have extolled them with certain modifications, the greater portion of which are of no value; many even are unfortunate, and wanting weight when separated from the authority of him who by his numerous experiments gave them a value.

I will first present them such as they have been indicated by our physiologist. In his opinion, gravel is only the consequence of a diet in which nitrogen enters in a too great proportion. The formation of pebbles is also for him a simple chemical operation, comparable to those executed in our laboratories; this is his theory. To change the diet and give another direction to the affinities, is his practice. These indications are easily fulfilled at the desk, but it is not the same thing at the bedside of the patient, where experience comes to show that it is not sufficient to arrange phrases in a masterlike manner, nor to interpret more or less ably some experiments on animals, in order to seize the combinations of nature in all their generality. These indications, as well as analogous ones that theoreticians and the public find to be so simple and seductive, are far from satisfying the practitioner. The mistakes that he soon meets with show him in a short time that they are vague. Unfortunately there are always patients who become the victims of these false speculations.

I have proved in the treatise on calculary diseases, that the

theory of our physiologist in regard to the causes and formation of gravel, is more pleasing to the mind than satisfactory to reason, that it rests upon incomplete experiments, upon facts which are too few in number or badly interpreted, and is in opposition with other very numerous ones and those rich in detail. Thus the experiments on animals tending to prove the effect of diet in the production of the gravel of uric acid end principally in this, that the constraint imposed on the natural desires of the animals places them in a diseased condition, which is so serious that the greater part die of it. To draw from like experiments conclusions applicable to a man who enjoys full health is to go beyond what is permitted by analogy even of the most extended kind; for by changing entirely the diet of a carnivorous animal and submitting it to diet that produces death, we must necessarily affect the functions of the kidneys as well as the other organs, and as the urine of the animal is diseased from this, it no longer contains the elements that would be found there when it was in health, and we can draw no conclusions applicable to man when in the ordinary conditions of social life. In experimenting in the same manner on him, we should compromise his existence; indeed some patients who have had the weakness to lend themselves to like attempts have seen their health disappear in a sufficiently threatening manner to oblige them to stop it.

There is one important fact which ought to be sufficient to cool the zeal of experimenters; it is that in a man in full health, a moral affection, excessive fatigue, temporary functional derangement of other organs, the influence of the atmosphere, a simple change in the hours of his meals, a diet to which his stomach is not accustomed, or that creates a repugnance to it, an attack of fever, an accident, in a word every sudden perturbation of the economy, often suffices to change the secretion of the kidneys, to bring on an excess of uric acid and determine the formation of gravel or at least of red sand. Every observer may prove the reality of this fact which has drawn the attention of a certain number of our modern writers, as well as of those in Italy, Germany, and especially in England. It is to be regretted that the authors of the chemical theory, have not taken it into the account, for they would not then have laid down the principle that a necessary relation exists between the diet and the presence of uric acid in the urine, in other words that there is not uric acid in the urine of animals except so long as they are fed on flesh and other azotic articles.

Another not less important fact which arises against this theory, is that the urine of certain carnivorous animals does not contain uric acid, that on the contrary this acid is met with in great abundance in that of other animals whose diet is not azotic, and that in man himself as I have positively demonstrated, the most azotic diet has not the influence that is ascribed to it in the formation of gravel and stone.

From all the evidence, precisely the contrary of what they wished

to establish is proved. Attention has not however, been paid to this striking contrast, and they are contented to group together every thing which may tend to support the opinion that they had previously formed. It has not been recollected that it was not only an affair of theory, but also of the method of treatment, which if the doctrine had a false basis, would of itself become injurious in place of being useful.

But let us take one by one the principal arguments used by them, and submit them to discussion.

One is founded on the changes seen in the urine in persons habitually sober, the day after a slightly too copious repast. The colouring of this liquid, and the deposits that it forms, or the matter that it holds in suspension, and which give it a cloudy appearance, have been considered as due to an excess of uric acid. Even when this shall be true in all respects, what relation will it have to the part that they wish to be played by a too azotic regimen? It is only an affair of the influence of a laborious digestion, whatever be the nature of the food, and I just recollect that every day other circumstances, which equally derange the stomach, bring on a similar appearance in the urine. Besides, facts are offered in crowds to oppose the assertion, that *uric acid, which constantly forms pebbles and calculi in those having gravel, is not an accidental or diseased production of the animal economy, but one of the essential elements of the urine in man in perfect health.* This last proposition is only true for uric acid in small quantities, but it is false in regard to this same acid in a sufficient excess to produce gravel, for there commences the diseased state, and without stopping at the cases in which cystine predominating almost constantly excludes this acid, in persons otherwise in good health, the observation shows that the production of uric acid in sufficient abundance to give rise to gravel or to calculi, is essentially connected with a functional trouble of the kidneys, and results from a morbid influence.

If it is not a rare thing to see gravel and nephritic colics among gastronomes, and those who eat largely of meat, it is yet common for those given to the pleasures of the table to eat too much, and for the permanent superexcitement under which they live to expose them naturally to disorders of their functions, as well in the kidneys as in the other organs. A short recapitulation of the consequences of excesses at the table will suffice to show that gravel is perhaps one of the least, and yet it is on cases where this is manifested under like circumstances that the modern theory rests.

It will not be necessary to greatly multiply our remarks in order to be convinced that the lovers of good cheer are not those in whom gravel is the most frequently seen. Numerous facts, which I have reported in my treatise, establish this truth in a positive manner. But there is even more, for contrary facts, that have been cast aside, yield it a not less powerful support.

The opinion that calculary disease does not exist in warm climates has predominated for a long time in a general way, and the

fact admitted as true has been invoked also in favour of the theory that I oppose, because the inhabitants of warm climates generally live on vegetables. But not only is stone rare in the latitudes near the equator, but yet what is a remarkable fact, gravel there takes on a severity that it has not elsewhere, and nephritic colics are there common from infancy to old age. Besides, in warm climates, as with us, inexplicable differences relative to the frequency of gravel and stone are seen, which is common in some sections and rare in others. It is constant, as has been observed in England, and as daily experience proves, for the diminution of the urine to indicate a strong irritation, or even inflammation, of the kidneys, whilst a simple superexcitement of these organs produces in general only an increase of their secretion. But numerous variations are seen in this respect. It is also worthy of remark that a high degree of irritability in other organs may be accompanied with a true diuresis. Thus many of the diseases of the nervous system, and certain moral affections, bring on a flow of urine which is sometimes very abundant. Still oftener is there an increase or diminution of this liquid without our suspecting the cause. I have been led to make some observations on the influence that the calculary affections and the different diseases of the bladder exercise on the action of the kidneys. Thus I have shown that ordinarily a slight irritation of the neck of the bladder is accompanied with a copious secretion of urine, whilst it is diminished or even suspended during a certain lapse of time, when the vesical irritation becomes acute, and lasts for a long time. These changes in the quantity of the urine are generally connected with such a multitude of circumstances that we cannot be too careful in drawing from them practical consequences.

Diminution of animal heat in old age has been presented as being likely to favour the developement of uric acid and the formation of gravel. But in the first place they lay down a fact which is contrary to experience, and to what has been established by statistical tables: for gravel is much more common in the adult than in the old man, and all the experiments imaginable cannot prove what does not exist. Leaving out the slight differences remarked in different localities in regard to the proportional differences of calculary affections, it is demonstrated that, generally speaking, stone is more common in childhood and old age than in the adult, but that the latter is more exposed to gravel. All the accounts arranged in England, Italy, Germany and France place this beyond a doubt. On what then does the contrary opinion, which serves as the basis of the new doctrine, rest. No one offers any authorities, but content themselves with saying that the dinner is the most important act of the day, especially to old men, and that they are especially afflicted with gravel, because they cannot resolve to diminish the quantity and nutritious qualities of the meats served at their table. But at the present day we are not contented with assertions; we require also proofs of them.

Let us now review the means proposed to overcome gravel

according to the theory that we have just examined. Four indications have been established.

1st. *To diminish the quantity of uric acid formed by the kidneys.*—Starting with the principle that the existence of uric acid in the urine is connected with the usage of azotic, animal or vegetable substances for diet, the partisans of the new theory are naturally led to proscribe these articles, and to replace them by others. In proof of the efficacy of this measure, they cite the cases of some gastronomes, who ate largely of meat, and enjoyed better health on becoming more sober and using a less exciting regimen; who at the same time have ceased to pass pebbles, have become more active, have recovered a feeling of good health, of lightness, and a freedom of spirits that they had not previously known. These are certainly very just remarks, and some which will not be contradicted, especially when applied, as I have said, to persons eating five or six times as much as is necessary to nourish them properly. But they will also agree that they have no other bearing than to show the inconveniences resulting from excesses of the table, and the advantages of temperance. There are some cases which offer a peculiarity that had previously been observed in the experiments on animals, and that they had then attributed to a diet containing little or no azote; it is that the urine becomes very abundant, and out of proportion with the drinks taken. But here there is nothing which differs from daily observation. Practitioners find at each instant occasions to see the greatest variations in the quantity of the urine, without being able to attach it to any particular cause. Is it not also known that in many cases of small quantities of urine, the surplus of drinks escapes by the cutaneous and pulmonary exhalation, as well as by the kidneys? Lastly, we have seen that the increased renal secretion cannot be considered as a consequence of a non azotic diet, since it is owing to such varied causes. Besides, they seem tacitly to avow this in establishing the second indication, which is

2d. *To increase the quantity of the urine.*—The means that they propose are very simple, and contain nothing new, consisting entirely in the drinking largely, choosing aqueous and diuretic drinks, and at the same time abstaining from spirituous liquors. But we often meet with patients with gravel whose stomachs cannot support copious drinks, and it is also at the moment when we feel the greatest necessity for them that we are deprived of this resource; we have indeed seen that during nephritic colics, vomiting is frequent, and that the stomach cannot be filled with water even when there is no nausea. Fortunately the practitioner has other resources than to order five or six pints either of decoction of dog grass (*chiendent*, *triticum repens*. U. S.) or cherry stems, or the waters of Spa, Luxeil, Contrexeville, or Bussang, to be taken daily. If the mind, from being preoccupied with a chemical theory, had not lost sight of other circumstances, than an azotic diet, as alone likely to influence the urinary secretion, they would not have been

confined within the narrow circle of means, by the aid of which they can without doubt satisfy the theorician and patient, especially when they are careful to arrange them methodically, and to attach a special virtue to each of them, but one which does not satisfy the wants of practice.

3d. *To saturate the uric acid.*—The feebleness of sugar and chiendent in curing gravel, has led our modern experimenters to bring in chemistry, in order, as they say, to combine the uric acid with alkaline or earthy bases, so as to form salts more soluble than itself. Such was the starting point of all that has been imagined, at first only to prevent the formation of gravel, but soon after in order to dissolve the calculi themselves. But we here see a brightness of intellect rather than the result of direct observation. It is not a rare thing to cure one disease by the formation of another. I have cited in the treatise many facts tending to prove, that in overcoming one morbid disposition of the urinary apparatus, they had given stone to patients who had it not previously, and I shall revert to this point. We do not find it necessary to go far into practice in order to find analogous facts which prove the sad results of a too experimental practice of medicine, but the thing the most difficult to conceive, is that they wish to support themselves on isolated events, the explanation of which escapes us, and on some experiments liable to a thousand different interpretations, in order to establish a law of affinity and of combination to which they would afterwards pretend to submit the actions of the animal economy by making, as it were, a removal of those vital laws which alone govern the fulfilment of our functions. A like pretension would bring on the abuse that the physicians of the sixth century made of chemistry. A knowledge of chemistry is certainly a great assistance in the art of curing, especially in regard to calculary diseases, where it often serves as a guide to important questions, enabling us to avoid the rocks, and furnishing the means of fulfilling certain indications. But without contending in the least against the immense services that chemistry renders every day, we must not submit to it all the phenomena of life, the progress, results, and products of which we are forced to admit that it cannot explain. They have yet, however, wished to go farther. We know that many substances give to the urine a peculiar colour and odour; we also know that different alkaline salts modify its nature so as to render alkaline the acid that it habitually contains. Ancient and modern facts prove this in the most positive manner. It is an important point from which practice without doubt will draw many advantages, and which might even have led to better results if they had not fallen into exaggeration. I shall here content myself with remarking, that instead of examining the fact in all its bearings, of appreciating even its natural limitation, and taking into account the unchangeable influence of life, they have thought that the alkaline carbonates passed from the stomach into the urinary passages, that when there they were decomposed from the effect of

a chemical reaction, the uric acid taking up the excess of the base and forming urates, the precipitation of which they prevented by taking care to keep up an excess of alkali in the urine. They have thus thought to act in the kidney as in a matrass, and to vary the results according to the will of the operator. They have successively tried the pure alkalies, carbonates and bicarbonates in fixed doses. In a theoretic light nothing has been wanting; experiments on animals, facts drawn from the practice of the ancients, facts borrowed from that of the moderns, all have been arranged to dissipate the doubts that a similar pretension ought to excite. Step by step, they even came not only to wish to prevent the formation of a pebble, but in a measure to destroy the calculi already produced. I shall again refer to this latter subject; at present we are inquiring into the treatment of gravel.

The theory was in the highest degree seductive. How could we help resorting to a treatment which was so simple, so easy, so inoffensive, in order to free ourselves of a serious disorder, and prevent the return of it? Alkaline substances have been therefore tried in every form and in every dose. Some patients have been benefited, others have suffered from it, and some have felt neither one nor the other. We have thus seen absolutely the same phenomena reproduced, by each of the substances employed under the title of a remedy. Besides, the question is not yet resolved, even from the avowal of the most enthusiastic, and lastly, physiologists are far from explaining the true manner in which the alkalies act in this case. But one point cannot be contested, it is that the treatment of gravel has become the prey of empiricism. Practitioners do not agree any better than the physiologists; some wish for the potash or soda pure; others give the preference to the carbonates, among which some extol the carbonates of potash and soda; others the carbonates of magnesia or lime; for all these means have found warm and exclusive partisans; each one has seen his reputation established on facts, and yet all have ended by falling into discredit, notwithstanding the periodical efforts made to keep them in repute.

4th. *To favour the expulsion of sand and calculi.*—Here every thing is very easy. They only prescribe diuretic drinks in larger or smaller quantities, adding that this precaution has sufficed in many cases; that even certain cases of gravel have been able, without serious inconvenience to continue their succulent diet, and enjoy all the pleasures of the table. Thus it is not only in heaven that there is reconciliation. Rebellious cures, say they, are constantly met with, and they speak of the authentic examples of patients whose urethras were completely obstructed by the accumulation only of very fine pebbles. I admit that I should have been flattered by knowing the details of these cases. Besides they do not propose any special means to favour the escape of the pebbles, excepting only when they are engaged in the orifice of the urethra, or in an excavation in the bladder. Those who advise these manœuvres, have certainly never had occasion to put them in prac-

tice, otherwise they would be more careful in recommending them. I will say as much of the methodic pressure that they prescribe to be practised on the course of the urethra in order to drive out the pebbles which may be stopped there. All this surgery carries us back many centuries. The selection of instruments also is not more happy; for the brise-coque of M. Heurteloup, that they propose, is so faulty that no one has used it, not even the inventor himself, and the kind of larding pin praised by M. Amussat, the worst of all known means, has not been adopted by any practitioner. As to Hunter's forceps, which are said to have been used by this celebrated English surgeon to extract a large number of little calculi, every one knows that it was not to this instrument, but to another invented by Sir Astley Cooper, that he resorted in the case to which allusion is made.

2d. Among those who have shown themselves the most earnest in the propagation of the opinions that I have just examined, in regard to the cause and treatment of gravel, M. Segalas is peculiarly remarkable. In different articles addressed to the Academies, and in a recent work, this physician has reproduced nearly all even to the most ordinary facts without taking the trouble to examine them. Indeed, in the commencement of his work, he exclaims, "observe those with gravel, they are for the most part, replete, inactive, and rarely take bodily exercise." But whoever has seen three patients, knows very well that this assertion is incorrect, and if M. Segalas had taken the trouble to arrange his recollections, he would have found that in three cases of gravel two at least were not in the condition that he assigns to them.

I should have much to object to in the publications of my confrere, both as to doctrines and as to the means that he employs to sustain them. But his doctrine is only a slight reflection of that which I have just criticised, and his means are almost strangers to science. It is painful to me to have to mark the acts of M. Segalas, the effects of which he cannot certainly have calculated, and which have already drawn on him remarks far from flattering. If I am correctly informed, he shows now a disposition to re-enter the ways of science, and to recover the dignity which belongs to a surgeon. In taking up lithotripsy, he wishes henceforward to attach his name to the operation by serious labour, which serves art at the same time that it elevates the artist, instead of wandering about in little combinations of what is vulgarly called *savoir-faire*. He is a member of several medical societies; and this title, under which more than one error has been patronised in a certain incompetent world, will place I hope bounds to the acts of charlatanism. Already critical friends in giving an account of his work, instead of a strict analysis, have so expressed themselves as to let it be believed that the author has done well, and have shown him by this what he ought to do. This is a delicate manner of giving counsel to our friends and certainly M. Segalas will profit by it. If my hope

should be deceived, notwithstanding the relations of good professional feeling which have always existed between this gentleman and myself, and notwithstanding all the repugnance that I feel at bringing into light the acts which debase the men of our profession, I should not hesitate an instant to render public the numerous facts that I possess, and which prove positively that truth, science, and humanity have not been respected as they ought to have been, either in the communications to the academies and periodicals, or in his special works.

I have a duty which silences every other consideration : it is to cause lithotripsy to triumph, and to remove from it every thing that can injure its entire developement. M. Segalas owes to this method all that he is at present, and it is therefore a powerful reason why he should not discredit it. Such, however, would be the certain result of an extra scientific course, and of a series of miserly combinations that I will not here enter into. My confrere has allowed himself to be drawn into this false way more than once, and he ought strongly to regret it when seeing erroneous opinions and vicious practices introduced under his name. I offer a recent example of it.

I have said that M. Segalas has done every thing to give a scientific character to a work essentially destined for the public, and that this book might thus mislead the inexperienced practitioner into whose hands it might fall, from the simple reason that it would never occur to any one that the work was written with any other view than to show the science as it is. I have just this moment received one of the daily journals, the editor of which has pointed out the dangers that I have just spoken of, in criticising the book, it being precisely the principal errors contained in it, that are referred to. Thus in the indications of the causes of gravel we see those whose real value I have shown as defective, and M. Segalas himself will be so much the less flattered by having contributed to propagate this false doctrine, as it will suffice for him to weigh the respective value of the proofs brought forward both for and against, or even to preserve his own observations, in order to appreciate its want of foundation.

M. Segalas calls himself the inventor of a special instrument for lithotripsy and the extraction of pebbles. All who are at present informed of this question know that there is no instrument peculiar to him, that the modifications which he has made in what is called the fly wheel (*volant*) are useless, especially since it has been well established that the fly itself, although applicable in certain cases, was incomplete when compared with other means possessed by art at present. But those who will read his work without excepting those who give an account of it, do not know all these peculiarities, and propagate without wishing it assertions leading to the belief of what is not so. They do not confine themselves to this ; in the analysis that I have just referred to, it is said that the author

has not met with a refractory case during the five years that he has used this instrument. A similar interpretation will without doubt enable my confrere to feel how greatly his ideas have been misunderstood, and how much he has contributed without wishing it to propagate the most serious errors. They have also referred to the high reputation that this instrument will enjoy both in France and abroad. M. Segalas, however, is, I think, the only one who employs the fly, because it has, I repeat, the disadvantage of prolonging the operation without any advantage. As to the European reputation of which the journalist speaks, I do not know to what he refers unless it be the mixture of the eulogies sent by post from foreign countries to Paris.

Charlatanism in medicine is generally confined to the sale of secret remedies, to giving the greatest attractions to the drugs to which are ascribed a particular action, and the nature and sale of which are elsewhere submitted to the inspection of authority, so that a portion of the danger is avoided and it rests with the good sense of the public to avoid the others. But quackery has wished to enter also into surgery, and in our times an invasion is permitted, against which we cannot too strongly fortify our minds, for it is not by flowing words and *savoir faire* that they give to a surgical operation the nicety that it exacts: and when this precision is wanting the life of the unhappy patient is compromised. In a like subject which is submitted to fixed laws there is only one course to be pursued: in practice it is to do better than others if possible; in theory to expose the actual state of the science, by rendering to each one whatever belongs to him and giving to each the rank that he merits. A writer who like M. Segalas does not always reproduce without altering what has been done before him, who only tells that which can turn to his personal advantage, who gives importance to matters in which they might vainly seek for value, renders a very poor service to the human race, and the sincere friends of science and humanity ought to make it a duty to show him his errors.

3d. A second edition of a work has lately appeared, which, from the vastness of the subject treated of, and the high post filled by the author, cannot fail to exercise a certain influence. I cannot, then, omit here to offer some remarks in regard to it, reserving a deeper discussion of many inexact assertions in it for another work. I refer to the *Surgery of M. le Professeur Velpeau (Medicine Operatoire)*, but only of that portion which relates to calculi. Every practitioner who will read this long chapter will regret, as I do, that our learned confrere has forgotten that he was writing a dogmatic treatise, in which neither his prejudices nor his personal sentiments ought to appear. Both of these unfortunately there hold a large space, and they have so blinded the author, as to prevent his seeing the littleness to which for the moment he has descended. I confine myself to the annunciation of this fact; for as

this injustice strikes me principally, my remarks might have the semblance of recriminations, and I wish to leave every advantage of this kind to him.

I have already noted a grave omission in his surgery, concerning one of the most embarrassing points in surgery—the case of a pebble or calculus stopped behind a stricture in the urethra. M. Velpeau passes over this circumstance as if it was the simplest thing possible, and in the cases most frequently met with, those in which the canal is not contracted, he advises the proceedings which are least certain: thus, for example, he advises the extraction of calculi from the spongy portion of the urethra with the fillet or loop (anse) of Marini, or with the dressing forceps.

It is also, he says, when pebbles or calculi are stopped in the membranous portion of the urethra that there is the greatest difficulty in extracting them without resorting to an incision. Here (I ask his pardon) his assertion is not confirmed by daily experience, for pebbles, little calculi, or fragments of stone, are daily drawn and without great difficulty from this portion of the canal. Anatomy fully explains this fact, the structure of the membranous portion of the urethra allowing it to yield without difficulty to the manœuvres necessary not only to seize the calculus, but even when necessary to crush them. It will be understood that I do not refer to large stones, nor to certain exceptionable facts, the general practice of which the author endeavours to establish.

In the table of the rational signs of stone given by M. Velpeau, he confines himself to the assertion of a thousand other writers—both ancient and modern. But experience proves that these signs are not met with at the bed-side of the patient, as I long since remarked. I have proved, in calling the attention of practitioners to the veritable signs of vesical calculi, that the authors who preceded us were mistaken on this point. M. Velpeau might very well have declined resting on my assertion; but the examination of the cases offered in his clinique would promptly have convinced him that the signs that he enumerates are nearly all created by the imagination, that they are purely conventional, and connected with the various theories with which the pathology of calculi is overloaded. The question is so important that it certainly merits that they should have stopped at it, for it is the appreciation of the true symptoms of the disease that lead to the employment of the exploring means, likely to convince the surgeon. I have also shown that this question has acquired a new importance in our time, since the choice of the curative means depends on the opportunities of vesical examination.

M. Velpeau has treated with singular levity all that relates to sounding of the bladder. Instead of endeavouring to show the advantages possessed by the new resources of art at the present time, he enters into a serious discussion on the weight of sounds and the metal of which they ought to be made; he speaks of them

also as if there had never been more than one kind, with one and the same curve and identical dispositions. Neither would we recognise the practitioner in his appreciation of some of the insignificant means likely, it is said, to render the examination of the bladder more easy and more sure. I shall note, among others, the method of auscultation and the injections of air into the bladder instead of water, in order that we may the better judge of the contact of the sound with the stone. The care with which he discusses these trifles, and the silence that he keeps on many of the precautions which are incontestably useful, prove that he has not studied this important subject sufficiently. According to him, we ought to introduce the finger into the anus *in order to raise the bas fond of the bladder*; he must have fingers of a remarkable length, and have chosen his cases, for if the patient is not exhausted, and if, as frequently happens in cases of stone, the prostate is enlarged, his finger could not reach the bas fond of the bladder.

Thus all that relates to the means of recognising stone, and especially gravel, of appreciating the size of the stone, its form, situation, &c., leaves us much to wish for in a work written by the clinical professor of surgery, and practitioners who take this for their guide will be exposed to the commission of sad errors.

The same thing is true of the organic disposition that is often seen in those with gravel and in those with stone, and which exercises so great an influence both on the diagnosis of the disease and on the decision of the part to be taken by the practitioner.

The author has followed the same system in regard to the curative means. These means are chosen and appreciated without discernment, useless things are praised without bounds, and those truly useful are only indicated. Perhaps M. Velpeau will say, that having taken up the entire subject of operative surgery, he could not enter fully into all its parts, and that therefore we ought not to be surprised at the gaps or even errors which disfigure his book. But how are we to explain his decided predilection for the most adventurous of therapeutic means, and those in regard to which experience is yet silent, if she has not entirely opposed them? Why has he, whom we certainly cannot accuse of ignorance, instead of supporting himself with the most decided authorities, attached himself to those which have the least weight? I communicated to the Academy of Sciences the result of some researches on the foreign bodies which serve as the nucleus of stone; extracts of this work were published in the journals. I have reproduced it, complete in details, and consequently more useful to practitioners, in my Treatise on Calculi; but M. Velpeau, who says that I have collected one hundred and sixty-six cases of stone developed on these foreign bodies, gives as his authority the *Gazette Medicale*, where there is only a short summary of my labours. The same is true in regard to several other points. We might say that our confrere feared to make known the sources of any value.

It is, however, chiefly when it is a question of the appreciation of the curative means employed against stone that M. Velpeau shows his prejudices. He does not regard either the lessons furnished by experience, nor the wise warnings that he has received from his confreres, and from the Academy itself. His part is taken, and if we may judge of the future by the past, we may foresee that there will be nothing more difficult than for him to renounce the system of false interpretations and assertions that are, at least, hazarded.

As long as the knowledge of lithotripsy was but little extended, it was not surprising that some persons, after the example of our academies, should be singular enough to think that all patients who consulted a surgeon practising the new method should be considered as cases of stone, and admit that all those with stone had been treated by him. It is with like elements, and by means of interpretations some of which are more inexact than others, that they have given credit to the errors with which this branch of surgery is filled. It is on the errors heaped up in his surgery that he has established his precepts. Already in 1835, in order to give the appearance of foundation to his attacks against lithotripsy, he not only affected to confound the soundings with the operation, strictly speaking, but yet reported as dead after the operation patients who had not been operated on, some of whom even had no stone, and in order that no doubt might exist as to the truth of the facts alleged, he declared to the Academy at the meeting of the 5th of May, *that he had been to consult the documents which I had addressed to the institute.* Unfortunately for him, these documents had been returned to me some time before, and have not since gone out of my cabinet. I shall not refer to the efforts then made by M. Velpeau in order to cause the Academy to adopt his opinions; they repulsed them. This question has been fully treated of in the Parallel, but I may here mention that neither the vote of the Academy, nor the explanations which have been made, nor the new facts that have been since collected, and which refuted the opinions of M. Velpeau, have been able to do any thing against the pertinacity of this professor.

Our confrere prefers the cutting instrument, for the urethra and for the bladder, both for pebbles and for calculi. Without doubt he is free to prefer lithotomy to lithotripsy, and to apply it to those with calculi that he can convince as to the preference and benefits of this operation. His convictions are his own, and ought to be respected. But that which we have a right to expect of him is, that when he endeavours to throw them into the minds of his hearers, he shall not pervert the truth, nor play with the fate of patients. Wise, practising, and professing, he goes even to deny both his science and his practice, so much is he blinded by prejudices that I cannot qualify. He ought to be heard in his cliniques in order to judge of the means that he employs to support his

system. Persons are not respected, and the attacks against them are proportioned to the influence that they exercise on lithotripsy. His anger falls chiefly on me, and his passionate criticisms are addressed to my practice. I console myself by seeing that this anger and criticism rests without effect both as to my personal position, and that which interests me much more acutely still, the general progress of lithotripsy. Indeed, this method is daily becoming a serious subject of study among the distinguished practitioners of every country, and the results obtained contrast singularly with those which flow from the theory, and especially from the practice, of the surgeon of La Charité.

MEMOIR
ON THE
CALCULI OF CYSTINE.

In 1805, Wollaston showed the existence in a vesical calculus of a peculiar substance, that he designated under the name of cystic oxide, and which afterwards received the name of cystine. The works on this subject, both on the part of the English chemists, as well as on those of many national and foreign savans, would without doubt have left nothing to be desired, if they had been able to procure the matter itself in sufficient quantities, and know the circumstances under which it was developed. But these two conditions having failed up to the present day, there are some gaps which cause us to desire some new investigations. In order to facilitate these researches, I have given the details of many of the cases which I have seen. I shall begin with some general remarks, the object of which is to show the differences which exist between the results of these new observations and the consequences deduced from the ancient ones.

We can hardly doubt that the concretions of cystine are sometimes formed in the bladder, since Prout has seen urine which precipitated a considerable quantity of this substance, an observation since repeated by M. Strohmeyer and myself. But it is also produced in the kidneys; for Marcet, Brande, Prout, M. M. Strohmeyer, Flaubert, Neill, Magendie, and Segalas, have met with patients who passed cystine in the form of pebbles. Marcet even describes two cases where they found many pebbles of cystine in the kidneys, some of which were moulded in the dilated infundibula; and M. Neill cites the case of a woman of fifty years, who passed thirteen by a fistulous opening, situated between the umbilicus and the pubis. Several of my patients have expelled the same kind of pebbles by the urethra. In these different cases, the symptoms shown on the part of the secretory organs of the urine, do not permit a doubt of these pebbles being formed in the kidneys. From this time the term of cystine could no longer exist, than that of cystic oxide, whose place it had so recently taken, since it reposed on a physiological error, as the latter had done on a chemical one. I leave to others the care of substituting one more suitable; and it is without attaching any importance to it, that I propose the name of *scordosmine*, alluding to one of the most marked proper-

ties of cystine. That of *nephritic*, which has been created by M. Venables, it seems to me ought to be rejected, because it may possibly be discovered one day, that cystine like urea, exists in the blood.

Marcet has showed us that all the calculi that he has seen, were extremely pure and free from any other ingredients. This peculiarity has since been admitted as a distinctive character. Nevertheless, it is not general. Prout speaks of a man who, five years after having undergone the operation of lithotomy, for a stone of two ounces, passed with considerable pain a calculus of pure cystine, which came from the left kidney; his urine, which was abundant, and of a greenish yellow, produced immediately after it was passed a pellicle and copious sediment, both of which were ammoniaco magnesian phosphates: it contained very little urea, and hardly a trace of uric acid, an observation since repeated by MM. Strohmeyer and Venables. The next day, the urine of this same patient furnished a like deposit of the same nature, but the proportions of which were changed, the phosphate being much less abundant than the cystine. This may then at least be mingled with the phosphatic salts, and indeed one of the calculi examined by Wollaston was thus covered with a layer of phosphate of lime. The same disposition was seen in a patient on whom I operated, and in whose calculus we found cystine associated in the centre with phosphate of chalk. In another patient also that I operated on by lithotripsy, the stone which was composed of cystine and calcareous phosphate, was covered with a horny pellicle, which enveloped a layer of pure cystine, arranged in little drops of the thickness of a half line.

It is then very positive that after the association already observed several times, either in the urine or in the calculi themselves, that the phosphatic diathesis may accompany cystine. But the coexistence of the uric diathesis, although much rarer, cannot be doubted, as has been done, for many subjects in whom we have found stones of cystine, have also had those of uric acid either before or afterwards. Thus in the infant, from whose bladder they had taken the first calculus analysed by Wollaston, there was a relapse, and this time the concretion was principally formed of uric acid. M. Yelloly cites another child of four years of age, in whom they found a stone of cystine with a nucleus of uric acid; a new calculus was developed in this patient one year afterwards, which was formed also of a nucleus of uric acid, with a cortical portion of a fusible phosphate. In a case reported by Henry, a calculus of uric acid had a little mass of cystine for its base. In that described by Prout, spoken of above, the patient had been cut for a stone of oxalate of lime. One of my patients had a vesical calculus of cystine, and a preputial one of a phosphatic nature. Marcet has found calculi of cystine in the kidneys, and stones of phosphate of lime in the prostate. In the stone analysed by M. Lassaigue, a small quantity of phosphate and oxalate of lime was associated with cystine.

These facts lead us therefore, to establish 1st. That cystine is the product of a renal secretion. 2d. That it can exist for a long time in the urine in variable quantities, in a continuous manner, or with interruptions. 3d. That it can alternate, with the other principles of the urine, and join itself with them in the formation of calculi, or in the liquid state, but that urea and uric acid, are the substances with which it is most rarely joined.

The consequences deduced from the observations first collected, ought therefore, to be modified. We also know how greatly the constituents of urine vary, and most frequently from inappreciable causes. But not only are the analyses of this liquid few in number, and wanting in all the precision requisite, but yet, were they free from all reproach in this respect, they would not have the value which they have thought to give them. Cystine may very readily not exist in the urine of a patient who passes pebbles, or has a calculus of this nature, because it would have disappeared after the formation of the concretion. It is possible that this, like every other principle, predominates for the moment, afterwards diminishes, and then disappears entirely, to reappear at a later moment, and that the urine in these different phases produces calculi of various compositions, without an analysis of the liquid, made at such or such a moment, being able to throw any light on the question.

I have seen nothing peculiar in the urine of the four patients that I have treated; indeed the analysis was only once made at the moment of the operation, and it did not prove the existence of cystine in this fluid. In two patients whose cases I shall report, the microscopic examination showed crystals of cystine.

As to the other physical characters of their urine, as the colour, odour and nature of the depositions, nothing has been seen which was not observable in other cases of stone. But we know how numerous are the variations that the urine presents in calculary diseases, and which is specially dependant on the degree of irritation of the urinary organs, the quantity and nature of the food, and drink, kind of life, &c. &c. It is therefore contrary to the laws of strict observation, to relate in regard to the calculi of cystine, and as so many of their peculiarities, phenomena which are equally seen in all the other kinds of stone.

Besides, even when the urine contains cystine in large quantities, its physical characters do not vary more from this fact, than when uric acid or any other principle predominates. The difference only becomes manifest at the moment when these principles, being in excess, become condensed, and pass to the solid state: as long as they are held in solution, the liquid containing them does not offer any characters appreciable by the naked eye.

The volume of the stones in three of my patients, and especially the absolute identity of composition in two of these cases, prove that this state of the urinary secretion is maintained uniformly for

a long time, if not without interruption, at least without any one principle having sufficient force to prevail, or to give an alternating character to the calculus. These cases are not the only ones in which we have thus noted a long continuity in the predominance of cystine, for those who have preceded me have already made the same remark, among others, M. Venables. But in order that the deductions should be exact, we must know that the same thing does not exist in other diatheses. But we see every day calculi of oxalic, uric, or even phosphatic acids, acquiring a great size, consequently remaining a long time in the bladder, which do not present any alternate layers; which proves that the urine during a long period, preserves the same characters.

Observation teaches, and the cases cited leave no doubt of the fact, that cystine may exist in the urine during whole years without the general health being altered in the least, and also without the formation of stone. Like cases are undoubtedly much more common than is thought, and now that attention is called to it, we shall not probably be long without examples increasing. Besides nothing occurs here which differs from what is seen in every case where a solidifiable principle of the urine predominates. When the quantity of cystine increases, and the urine is not sufficiently copious to keep it in solution, crystals of it are formed, which collect together and are afterwards expelled with the urine. Two of my patients have passed considerable masses and of a remarkable purity.

The history of the calculi of cystine presents a striking peculiarity: it is that we meet these bodies in a small number of families. The patients spoken of by Marcet were brothers. The case seen by Prout had a twin brother who also suffered from stone, and there was some reason to think that the stone was of the same nature in these two individuals. I have learned that one of our confreres, M. Lenoir, had operated on two children of a family at Meaux, who had calculi of cystine. Of the four patients that I have treated two were brothers. These facts are not undoubtedly sufficient to establish any law whatever, which others might not tend to overturn, but we ought not the less to regard them, for it would seem sufficiently singular that in twenty-two cases of calculi of cystine, there were ten which were presented in four families by twos, and by threes, and that in at least three cases the patients were brothers. Besides, among the twelve isolated cases, nine are precisely those of which we have no history in regard to the persons who had the concretions.

Are the calculi of cystine really as rare as the small number of complete observations which we have been able to collect, might lead us to believe? I doubt it. It is only thirty years, since chance caused the discovery of this substance, to which observers have as yet hardly given their attention. Nothing also proves that there is not more than one specimen in many cabinets which has not undergone a special examination. Besides how many calculi are

each year lost either by surgeons who make no collections, or by patients who are unwilling to give up what has been extracted from them. I am persuaded that by searching for cystine we should find it much more common than it has as yet appeared to be up to this time, and that the same thing would be shown in it as was seen in the urate of ammonia, which was also for a long time considered as a rare ingredient in urinary concretions, although it is very common.

Nothing is easier than to recognise cystine when it is pure, or at least such as it is offered to us by the most beautiful calculi which contain it. It is a confused agglomeration of little crystalline masses, which are brilliant, translucent, and of a light yellow colour. At the moment when the stone escapes from the bladder, we can see these little globules adhering to each other, and leaving between them irregular intervals. If we split the calculus with a hammer or wedge, we can see with the naked eye, and especially by means of the lens, the granulated texture, which is different from that of the other kinds of granulated stones—it is more accidental; it is this which is shown in the designs that I have given in the treatise on calculi. Seen by the lens the surfaces appear as if covered with a thin and shining kind of cement. Lastly, when they are sawn through, the action of the instrument gives the piece an ashy yellow tint, and we do not find concentric layers, but only divergent striæ which start from the centre, diverging to the circumference. The density increases as we approach nearer to the centre, where the texture becomes inappreciable; for we only see a compact mass which is more yellow than the other points. This remark has been already made by Marcet.

The same thing holds good in the calculi of cystine as in the greater part of those of the other kinds: their composition is more uniform, and their characters more regular in proportion as they are smaller. The pebbles passed by two of my patients are those which have most struck me as to their light yellow colour, their shining aspect and transparency. The examination by the lens shows the grains irregularly stuck together; but this irregularity has its proper characters, which are also those of the crystals formed by their agglomeration. In the more voluminous calculi the grains which last adhere to them do not offer that clearness and nicety of form which the lens shows in the crystals bathed by the urine, and which is preserved in certain pebbles by their agglomeration round the central mass. The irregular crystals leave between them spaces which have persisted for a long time, as we find them of considerable size at the time of expulsion of the pebble, which would seem to indicate that the cystine was not deposited on this nucleus in a fluid state. This also is seen in the structure of the calculi, which is rough and irregular, at least in a state of purity; in stones not very large I have seen that the grains of the last layer had angles more rounded than those in the pebble.

When cystine is associated with other substances, especially the

earthy salts, the characters that I have just indicated do not exist any longer, or are modified according to the nature of the combination and the proportion of the ingredients. I have stated the peculiarities met with in the two cases that I have seen. It is especially here that the physical characters may leave us in doubt, and that we are obliged to seek other means.

There is one which is very simple, consisting in throwing a little of the substance on burning charcoal; cystine thus treated exhales white vapours of a remarkably fetid odour, to which Wollaston found no analogy, but which has been compared to that of garlic or phosphorus; this odour is very penetrating, and of so marked a nature that we cannot forget it when once we have smelt it. When the cystine is united to other matters, this character is not of the same value but has various shades of difference. I have seen the most experienced observers who never suspected cystine, so much was the odour changed by the mixture of other substances; but it is sufficient to heat some atoms of it in the flame of a spirit lamp on a piece of platina, in order to see the part of the metal on which the fragment rests blackened in a ray of several lines, which shows the presence of sulphur, which can be afterwards proved by chemical means.

Like all granulated calculi, those of pure cystine are developed by successive additions to the original mass of grains already formed either in the kidneys or ureters, or in the bladder, and which would be expelled with the urine, except for the attraction which the stone exercises on them. I have only seen one case where with this species of calculus passed pebbles. This also has been often seen in cases where a totally different diathesis prevails. Indeed the observations relative to the calculi of cystine are yet too small in number to enable us to establish any law on this point. Judging from the small number of complete cases that we possess, the increase of the new grains takes place in a sufficiently uniform manner; for notwithstanding their rough surfaces, the calculi in question have generally a spherical or ovoidal shape. In this respect they resemble the stones of uric acid, and differ from those of the oxalate of lime, which sometimes take singular configurations.

As to the calculi in which cystine was associated with other substances, it has been impossible to determine their form, since in the two cases that I have seen they were destroyed by lithotripsy.

It would be very important to determine the causes under which cystine appears in the urine. But hardly any have been noted even in regard to the urinary concretions which are better known. We know for example that a slight irritation of the kidneys favours the formation of uric acid, and the development of the stones composed of this acid, and that an inflammation of greater or less extent in the urinary apparatus produces a superabundance of the principles which constitute the phosphates. As to cystine and oxalic acid we absolutely know nothing in regard to the causes which

produce them, and all that we can say on this point is reduced to conjecture.

The history of the calculi of cystine however, offers some peculiarities which it is important to note. I have already shown that the greater number of patients who had these calculi, had had gravel for a long period before being attacked with true stone; many even have only had a gravel which has cruelly tormented them. In this respect then the stones of which I speak, resemble those of uric acid, and differ from those of the oxalates.

All the patients whose history is known, have belonged either to infancy or adult age; none are known of in old men. Out of twenty-two cases, there were two women. A calculus has been spoken of as coming from a dog, and the elementary analysis of it has been published by M. Lassaigne; but this analysis differs so much from that which Prout has given of the human cystine, that we cannot admit the identity of the substances on which these two chemists operated, and we doubt if cystine is to be found in animals.

In regard to their social position, the patients belonged to all classes. Of the four that I have had, two were working men, and two favoured with the gifts of fortune traveled for their pleasure, but were strict observers of the precepts of hygiene.

In regarding the local state of the organs and the general health, we do not see in any account that we possess remarks which are not met with also among the other kinds of calculi. The same is true of the effects produced by the foreign body. The patients that I have operated on have not suffered more than those with ordinary calculi. Neither is there any thing more than is daily seen in the gravel of uric acid and its compounds, in the nephritic pains, the violence and duration of which have been spoken of by some observers.

The organic lesions offer also nothing special. The cysts of the kidney, the tumefaction and calculi of the prostate, the induration of the gland, the different degrees of vesical catarrh, and the disorders of the other functions that they have observed in some patients who had calculi of cystine, are also frequently met with in the other kinds of stone.

The calculi of cystine, as observed up to a late period, were small, which might lead us to believe that these kinds of concretions are not capable of acquiring a great volume, a circumstance that has been even stated as belonging peculiarly to them. Experience has proved that this is not so. In two of the cases that I have seen, each stone was of the size of a small hen's egg; one of them having been destroyed by lithotripsy was judged of as to its volume by the measure furnished by the instrument and the quantity of the fragments passed by the patient. In the other case where I performed lithotomy, the stone was oblong and slightly flattened, and was two inches wide by eighteen lines thick, and twenty-nine lines long. I have given in Plate III. of the Treatise

on Calculi, three figures of this stone, which is the largest known, and which weighed three ounces and two drams ; I have deposited one quarter of it in the Dupuytren Museum.

These calculi, like the greater part of the granulated stones, are not hard ; they break in the bladder by moderate pressure, and yield very easily to the methods of lithotripsy. The largest of this kind that I have destroyed by means of a straight instrument, was broken after two perforations by means of the lithotriteur excentrique, from which we obtained an excavation nine lines in diameter. The second of a like hardness but a little smaller, was broken after a single perforation by the same instrument. The third, which was yet more tender, did not require the previous perforation in order to crush it.

It remains for me, in order to complete the history of the calculi of cystine, to make known the treatment which they require. But on this point all is yet pure speculation : the cases collected are too few and generally too incomplete to furnish the elements of a rational practice, and the therapeutics of the different forms of the calculary disease prove without a reply that theoretical inductions are often at fault. The practitioner ought then to fear to allow himself to be led away by conjectures which may carry him into a false route.

One circumstance is more striking than all the others, and should not be forgotten ; it is that the calculi of cystine have a great analogy with those of uric acid and oxalate of lime, in their formation and the peculiarity of their developement. They are specially formed in the kidneys, and without being accompanied by any constant organic lesion, or without even the health being deranged for a long time. At least these consequences are shown by the most complete cases that we possess.

It is therefore to the kidneys that we should direct the efforts which tend to prevent the formation of cystine, by modifying the normal mode of vitality under whose empire this substance is produced. As has been said in regard to the diathesis of uric acid, we must employ all that can remove the causes of the trouble which has appeared in the functions of the secretory organs of the urine, whether these causes act directly on the kidneys or attack the urethra and bladder, which then becomes the starting point of the disorders. The means of recognising these causes, of attacking and of destroying them, are exactly those which I have indicated when treating of yellow, red, and black gravel : I can only therefore refer here to what I have there said.

The predominance of cystine in the urine, without the excitement of symptoms, or morbid phenomena is a more common event than might be thought. Many facts that I am about to relate prove that perfect health may coincide during a very long time with this diathesis. There are then no rational indications except when disorders in one or more of the functions of the urinary apparatus are presented.

The first symptoms are shown in the kidneys, whether there be sand or gravel in the urine or whether there is no formation of these foreign bodies, and that all the phenomena are confined to lumbar pains, which are often vague and irregular, but sometimes have characters which resemble, more or less, the nephritic colics. As far as this, we should confine ourselves to an antiphlogistic treatment, to emollient topical applications, to long continued and repeated baths, to slightly diuretic drinks, to laxatives given by the mouth or rectum, to a mild diet, &c. It may become necessary to resort to local bleeding or even a general one. We will otherwise fulfil any other indication which may offer: it is especially important to watch over the digestive functions, which most frequently are deranged in cases of disorders of the kidney.

It is proper to restrict ourselves to these means as long as the cystine does not sufficiently predominate, to solidify and agglomerate so as to form large pebbles, and not to torment the patient by empirical treatment, which would be useless if not injurious. Indeed experience has already proved that health can accompany a cystic diathesis as well as a uric one, which we frequently see lasting from infancy even to an advanced old age.

The expulsion with the urine, of pebbles of cystine, offers, as in the other kinds of gravel, two circumstances which ought to fix the attention of the practitioner: first, a greater predominance of the abnormal substance, then the simultaneous existence in the urine of the elements likely to favour the agglomeration of the molecules of which it is composed. This is the commencement of a morbid state that must be combated actively. The most rational treatment is that which I have indicated against the red gravel. But here it is especially proper to act strongly on the region of the kidneys; the frequent application of cups and topical means, first calming then derivative: at the same time long continued and repeated baths, very copious drinks, purgatives in small doses, but often repeated, &c. &c. Such are the means most generally proper to employ.

Sometimes special indications are presented. For example, opiate enemata succeed very well in some cases of excessive pain. The application also of the derivative irritating methods of treatment here demand some modifications. When we are compelled to act promptly and with energy, we resort to powerful purgatives, and to a tartar emetic plaster applied on the seat of pain in the renal region. The local action of heat may also become advantageous. If it is right to act more gently we give mild purgatives in small doses, and prefer counter-irritating frictions or issues on the lumbar region.

When the inflammatory period is passed, the moment arrives to resort to a method which may combat the cystic diathesis. But we here see that we have only the inspirations of theory. We have seen that many patients, especially the one spoken of by Brande, have taken soda water, magnesia, and the different preparations of

the alkalies, without deriving any benefit from them. Two of my patients, the Messrs. Planta, have not felt any influence on the renal secretion from the waters of Contrexeville; after as before the use of these waters, they continued to pass cystine in a greater or less quantity. However the alkalies are still recommended, though the small number of cases cited, and in which they have been resorted to, tend to prove that these substances are without any marked action. We shall see in the following note of M. Pelouse, what are the chemical means that theory would indicate to be applied to them; if experience should prove that the alkalies really act in the interior of our organs, we ought to try them, using them with circumspection, and proceeding so that the organs themselves may not suffer from them.

The association of other substances to cystine gives us no more rational indications. Here as in the other kinds of calculi, the presence of the phosphates announces a morbid state of these organs, especially in the bladder. These cases enter into the category of the gray gravel which I have treated of. The same means are here applicable, with the modifications commanded either by idiosyncrasies or special complications.

CASES.

1st. Cotillard, aged twenty-five years, of a feeble and poor constitution, had suffered in urinating during seven or eight years, and had also some very acute pains in the renal region. He had passed on several occasions pebbles, one of which stopped in the fossa navicularis whence it was extracted in 1831, by means of an incision. The pains in the kidneys continued, and in 1835 he showed the symptoms of stone in the bladder, which was proved to exist by the sound. At his entrance into the Necker Hospital, on the 27th of June, in the following year, he was so exhausted and feeble that we feared for a long time the success of the operation. He, however, supported it very well. The stone was of the size of a little nut, and moderately hard. Four very short sittings were sufficient to crush it. One of the fragments stopped in the membranous portion of the urethra, whence it was necessary to extract it. At the end of a month the cure was complete.

It was when the patient gave me the fragments of his stone, that I suspected the existence of cystine from their yellow and almost micacious aspect. The odour that they made when thrown on burning charcoal left me no doubt of it, and the analysis supported this. The cystine, however, was associated with a calcareous salt in the centre of the stone, and above this kind of nucleus, was found a

layer of a dark colour, horny appearance, covered with another layer of pure cystine.

The account given by the patient as to the pebbles that he had passed, but which he had not kept, was not sufficiently exact to enable us to say positively what had been their nature. But the composition of the stone destroyed by lithotripsy showed that different diatheses had succeeded each other. In this respect, as also in regard to the morbid phenomena in the kidney, this case resembles many others, the details of which have been published.

2d. Sigure, poultry merchant, aged twenty-three years, had passed pebbles for three years without ever having suffered in the renal region. We could obtain no account of these pebbles, of which he had passed many on different occasions. For a year he has had pains at the end of the penis when walking and after urinating; the surgeons of the hospital at Orleans recognised a stone, and wished to cut him, but at the decisive moment they could not introduce the catheter, and the operation was given up after long and painful attempts. Sigure entered the Necker Hospital the 23d of March, 1836; I proved on sounding him the existence of a stone in the bladder, which seemed to me a large one. I also satisfied myself that he had a considerable separation of the hypertrophied prostate, producing an excavation at the end of the membranous portion of the urethra between this gland and the rectum.

The employment of lithotripsy however, offered no difficulty. The first sitting was short and but slightly painful: the instrument brought away fragments of cystine, which were immediately recognised, and he soon after expelled a large quantity. Eight other sittings, also very short, were necessary to free the bladder entirely. In the interval several fragments stopped behind a stricture which existed at three inches from the meatus urinarius or more deeply; some were forced into the bladder, others crushed and extracted. Notwithstanding these painful manœuvres, which were rendered necessary by the rigidity of the canal and the want of elasticity in its parietes, his general health did not suffer, and he went out completely cured the 22d of May.

This case differs from the preceding and analogous ones in the renal pains; but they resemble each other in the composition of the stones, although this contained one proportion more of cystine. As to the disposition of the prostate and urethral parietes which existed in this patient, I have cited different other examples of it, in which I have made known the proceedings proper to remove the obstacles that they cause. It was these morbid states, and especially the induration of the parietes of the urethra, which prolonged the duration of the treatment and rendered the expulsion of the fragments difficult: they would have brought on serious disorders of the general health as consequences of the operation if I had not proceeded with the greatest caution.

3d and 4th. M. de Planta, aged thirty-nine years, and of a fine constitution, had suffered from the pains of stone for nearly three years. Fourteen years before, when traveling in Italy in 1816, in a badly closed carriage, he took cold, and the same evening experienced the first attacks of nephritic colic, which yielded to blood-letting and demulcents. From this period and at least once a year, he had nephritic colics, followed by the expulsion of pebbles, of which he passed a boxful, and which were of pure cystine. In the intervals he enjoyed good health, continued his travels and took all kinds of exercise without feeling any inconvenience. But for three years (the symptoms of the formation of a stone dated from this time,) traveling, and particularly exercise on horseback, became very painful to him, and he urinated blood. He also passed from time to time pebbles which were so irregular as to induce us to think that they were detached from a considerable mass, and were fragments of stone rather than pebbles strictly speaking. But in comparing them with those which he had passed several years after the operation, when the bladder contained no foreign body, we found no difference between them. At last his symptoms ceased, and by means of an arrangement which he made in his carriage he was enabled to continue his travels which he did until 1823. At this time the violence and obstinacy of his pain forced him to stop. He was then at Munich, where he consulted M. Walther. A remarkable fact here, was, that his brother who was two years his senior, suffered from the same disease; they were sounded the same day by the same surgeon, who assured both that they had stone. Both brothers were unwilling to submit to lithotomy, and they came on to France to try lithotripsy. I was not less surprised than M. Walther had been, to see these two patients almost of the same age, of equally good constitutions, and placed in identical circumstances in their relations to life, since they never left each other, simultaneously attacked with the same disease. My astonishment was yet increased when I learned that both stones were large, that they resembled each other in their composition, and that they were of the rarest kind of cystine.

The progress of the disease had not been the same in both cases. In the elder brother the symptoms were less chronic, and had pursued a less regular course. After a cold, he felt some pain in the left side, which continued with variable intensity. He only passed a single pebble which was not analysed, but which resembled as he told me those which his brother passed. The expulsion of this body was accompanied and followed by an acute irritation of the neck of the bladder, which persisted notwithstanding all the means employed to overcome it. From time to time this irritation, malaise and pain which resulted from it, were so acute as to render his accustomed journeys very painful. Nevertheless he did not stop: this circumstance however, prevented his fixing positively the period at which the stone had formed: for he had not recognised any marked differences between the first symptoms and those which he

felt some time before being sounded. The nature of his sensations appeared to be the same, the only difference consisting in the force and duration of his pains. Thus in regard to the symptoms, the history of the disease of the elder M. de Planta, presented much that was vague, and its progress and irregularity which contrasts with the other cases, and even with that of his brother, although the history of the latter also differs from those collected in England. I ought also to add that the two brothers supported their suffering with a remarkable stoicism, and took no account of them as long as they were slight. The state of the organs was not the same in both. The bladder of the elder, was more horny, and contracted with greater force on the stone; the inflammation was then advanced; the functions were disordered, and there was a febrile tendency continually; the urethra alone was in its normal condition. For these reasons the patient would not perhaps have borne the numerous sittings which would have been requisite for the destruction of a large calculus. I therefore proposed to him the high operation for stone, to which he consented after a fruitless attempt with lithotripsy. The operation was perfectly successful. I have given a description of the stone. The operation presented nothing remarkable; no serious symptom came on, the convalescence progressed regularly, and at the end of a month the cure was complete, with the exception of the previous inflammation of the bladder, which persisted many weeks. The urine contained much mucosity, and its passage caused acute burnings in the urethra. More than once since, especially under the influence of cold and moisture, he has had a temporary return of this vesical irritation: since, he has passed no more pebbles.

In his brother the state of the organs was more favourable to the application of lithotripsy; the urethra alone exacted a preparatory treatment from a slight stricture which he had; the gland was very hard and voluminous, and the external orifice of the urethra was contracted by a strong bridle which it was necessary to cut: but the induration of the gland which was increased by a mass of calcareous matter under the prepuce, produced a considerable stiffness in this part of the canal, so that the passage of instruments was always more painful than it is naturally, and the fragments of stone pushed on by the contractions of the bladder stopped in the fossa navicularis, when it was necessary to remove them sometimes after breaking them. The cure was accomplished after eight sittings of lithotripsy, each of which produced a considerable quantity of powder and fragments, the whole of which formed a mass similar to the calculus of the elder brother. Before the operation I had been unable to decide which of the two stones was the most voluminous.

The induration of the gland continued during a certain period. I had warned the patient of it, for experience had taught me that this pathological state, which is often met with in those with stone, does not cease entirely till after several months of the treatment that

I have made known. It is important to inform the patient of this, for there results from it an increased sensibility under whose influence the passage of urine produces sometimes sensations analogous to those of stone.

Some months afterwards, during a journey, M. de Planta passed but without any previous colic and without pain, a pebble of the same nature, at least in appearance, as the stone and pebbles which had preceded it: from time to time afterwards the urine brought away analogous concretions, sometimes with pains which lasted many days, so that he thought that he had a new calculus. I however satisfied myself that his fears were groundless. Since this period he has passed pebbles still of the same nature, but without any true nephritic colics. The two brothers have resumed their annual trips and went to Carlsbad, but these waters have not produced any appreciable change in the functions of the kidneys, for in 1838, MM. de Planta, having returned to Paris, gave me an opportunity of examining their urine, which yet preserves the same physical characters, that is to say a stronger odour with a darker colour, and forms on cooling an abundant but light mucous deposit which contains crystals of cystine. In other respects their health is perfect, and it has not been materially deranged during the five years which have elapsed since the operation.

Towards the end of May, 1839, in consequence of a slight exposure to cold, the younger brother had a new attack of colic, and a short time afterwards passed a large pebble of pure cystine, of which I have given a description. Some months previously, M. Mandl had examined the urine of this patient with the microscope, as well also as that of his brother, and found crystals of cystine in both. The cystic diathesis therefore persisted here in an uninterrupted manner. The elder brother had in the spring of the same year a slight irritation of the neck of the bladder, with frequent desire to urinate, and pain in satisfying it; the urine contained mucus and was thick. The examination of the bladder has convinced me that there is no stone. A simple medical treatment, some copious drinks, rest and a mild diet, were sufficient to remove these symptoms, and bring the urine to its normal state.

The brothers being pleased with Carlsbad some years since, have returned there, as much for their amusement, as for the cause of the disease. Independently of the remarks that I have already offered, important considerations are attached to these two facts, which are the most extraordinary that are on the register of science. At first they furnished us an example of two of the largest calculi of cystine that I have yet seen; afterwards they are remarkable from the identity and homogeneousness of the composition of these bodies, as well as from the arrangement of their molecules, and the physical characters that I have described. Although their development was rapid, considerable time was requisite for them to acquire such great dimensions. Yet during all this period the same principle has prevailed in the urine in great abundance, and

in an exclusive manner. The examination made of this liquid five or six years after the operation, proves that cystine there existed constantly, but that it was not always in sufficient quantity to form a new stone. It only produced some pebbles in one of the brothers.

In regard to the effects of cystine on the general health, these facts are as much the more interesting, as we now know the chemical composition of this substance, and that it is removed entirely from the immediate principles secreted by the kidneys in their ordinary state. Cystine indeed contains twenty-five per cent of sulphur. What are the conditions under which a like anomalous combination can be developed? We know not. What I have seen shows that it is consistent with good health, for the Messrs. de Planta are both very robust. Nor is it in their regimen or in their habits, which are conformable to the laws of hygiene and the usages of high society, nor in their constitution, which offers nothing extraordinary, that we can seek the cause of a like peculiarity which is so singular, and has persisted during a number of years in so marked a manner. It is not the less worthy of remark that these phenomena are presented at the same time in two members of the same family, who have never been separated, and who passed their lives in traveling for their amusement. They have successively inhabited different parts of Europe; neither climate, regimen nor the special influences of each country, appear to have influenced the nature of their urine. I must add, that they go each year to visit the mineral springs of the greatest reputation, and to which travellers from all countries resort. Many times they have used these waters, differing in their nature, none of which have modified in the least the singular state of their renal secretion.

From the examination made by M. Mandl, of the sediment in their urine, the crystals of cystine contained in this sediment were hexagonal, much flattened, the greater number isolated, sometimes in masses; some of these hexagons had three sides lengthened and the three other shortened. By heating them they lost their regular shape and became globular; many rays then started from the centre towards the periphery. By dissolving the cystine taken from a calculus in a solution of caustic potash, and precipitating it by acetic acid, we obtain the same beautiful microscopical crystals that the sediment offered. M. Mandl advises the employment of a cold in preference to a boiling solution, which only gives very small and imperfect crystals.

NOTE ON CYSTINE.

BY J. PELOUSE.

Cystine possesses physical and chemical properties which do not allow us to confound it with any other substance. It is white, insipid, inodorous, insoluble in water and in alcohol, soluble on the contrary in alkalies, and in hydrochloric, sulphuric, and nitric acids. When submitted to the action of heat, it affords a large quantity of ammoniacal products, and a residuum of spongy charcoal. Among the gases which come from this decomposition, there is one which is elsewhere badly known, which has the property of inflaming spontaneously with almost as much facility as phosphuretted hydrogen. A characteristic property of cystine consists in the garlicky, fetid, persistent, and altogether peculiar odour that it yields when even a very small quantity is thrown on burning charcoal.

Dr. Prout gives the following as the composition of cystine.

Carbon,	29.88
Azote,	11.85
Hydrogen,	5.12
Oxygen,	53.15
	<hr/>
	100.00

Messrs. Baudrimont and Malaguti have made a very beautiful work on this substance, and have there discovered an element whose presence had escaped all the chemists who were previously occupied with the same subject.

This element is sulphur, which makes one fourth of the weight of cystine.

We know that in the ordinary methods of elementary analysis of organic substances, oxygen is given for the difference. Dr. Prout, so well known for his accuracy, after having determined the carbon, azote, and hydrogen of cystine, considered oxygen as forming the complement of the weight of the substance on which he

operated. It was thus that he arrived at the formula. C. 6; Az. 2; H. 12; O. 8. the expression of which we have given above in centimes; MM. Baudrimont and Malaguti have proved, that instead of eight atoms of oxygen, there were only four, plus two atoms of sulphur, that in other terms cystine presented the following composition.

Carbon,	30.34
Azote,	11.70
Hydrogen,	4.95
Sulphur,	26.58
Oxygen,	26.43

Prout had thus dosed largely the three first elements, but he had taken for oxygen alone that which was sulphur and oxygen. As the atomic weight of sulphur,—201.165, it is sensibly double the atomic weight of oxygen—100, we easily conceive that Prout had found the simple formula C. 6—Az. 2—H. 12—O. 8, and that he ought to have substituted in the one part C. 4—S. 2 to O. 8—without changing the rest of the formula—that is to say C. 6—H. 12—Az. 2.

This example shows more than all others the serious inconvenience of giving the difference of bodies in general to oxygen in particular.

The preceding composition of cystine has been verified in the laboratory, and under the eyes of M. Liebig, by M. Thurlow, and we may regard it as definitive.

That which follows is literally extracted from the memoir of MM. Baudrimont and Malaguti.

Of the compounds in which cystine enters as base.—In order to determine the capacity of saturation of cystine, we have only used volatile acids, the excess of which could be made to disappear by evaporation.

Pure and dried cystine does not absorb the slightest trace of chlorohydric gas; we have employed the acid dissolved in water.

Concentrated chlorohydric acid forms with cystine a large amalgam (magma) which has the aspect of mucilage. This residuum is soluble in water, and can give a precipitate with concentrated chlorohydric acid. The solution made with the smallest possible quantity of the acid, and evaporated in a vacuum, gives very clean crystals, which appear to come from prisms with rhomboidal bases.

0.199 of dried cystine at + 120°, dissolved in chlorohydric acid, dried again at + 120°, has given to M. Pelouse, 0.258 of chlorohydrate of cystine; 0.121 of cystine treated in the same way, has given us 0.157 of the chlorohydrate. These results calculated in hundredths give

	Pelouse.	Ourselves.	Mean.
Cystine,	77.13	77.07	77.10
Chlorohydric acid,	22.87	22.93	22.90

In order to be fully persuaded that the chlorohydrate of cystine

did not contain water, 0.302 of this salt, dried at 120° , has been treated with a solution of potash until the liquor was evaporated to dryness, and the organic matter was entirely decomposed; the residuum treated successively by nitric acid and nitrate of silver, gave 0.274 of chloride of silver, corresponding to 23.01 of chlorohydric acid for 100 of the chlorohydrate of cystine. This number is very near that indicated by the theory; it shows almost positively that the chlorohydrate of cystine is anhydrous. If we seek the chemical molecular weight of cystine starting from the composition of the chlorohydrate of cystine we find 1532.41: this weight is very nearly that of 1513.41, which is the double of the sum of the weight of each of the elements entering into the composition of cystine. In adopting the last weight, we find

Cystine,	76.88
Chlorohydric acid,	23.12
	100.00

The chlorohydrate of cystine is decomposed by water, which leaves one part of cystine and retains the rest in solution, 0.132 of the chlorohydrate of cystine, has given by water 0.052 of cystine, which corresponds to the half of the cystine contained in this salt, for 0.132 of the chlorohydrate contains 0.101 of cystine, of which 0.052 is nearly the half.

Nitric acid diluted with water easily dissolves cystine: the solution placed in an air chamber (etuve), the temperature of which does not exceed $+ 60^{\circ}$, is decomposed, giving (rutilantes) vapours, and leaving a brown, bitter residuum, soluble in water. The solution evaporated in a vacuum gives on the contrary, a nitrate in silky filaments of a beautiful pearly white.

By following this proceeding

1° 0 gr. 1265 of cystine have given 0 gr. 2020 of the nitrate, and
 2° 0 gr. 165 of cystine have given 0 gr. 263.

These results give	}	Cystine, . .	62.62	62.74	62.68
in hundredths,	}	Nitric acid, .	37.38	37.26	37.32

We have determined the quantity of nitrogen contained in the nitrate of cystine in order to be very sure that the salt is anhydrous; 0 gr. 210 of the nitrate of cystine dried in a vacuum, gave 31cc of azote at the temperature of 16° and at a pressure of 750 millimetres, weighing 0.0365; this weight corresponds to 17.40 of nitrogen for 100 of the salt, the calculus showed 17.09.

In seeking the quantity of cystine which is found united to a chemical molecule of nitric acid, we find 1137.05, which is very nearly 1135.05 or once and a half the sum of the weights of the elements constituting cystine, and three fourths of the weight obtained. By saturating with chlorohydric acid, and starting from this fact in order to calculate the composition of the nitrate of cystine and to have it in hundredths, we find

Cystine,	62.63
Nitric acid,	37.37

Numbers which are the same as those given by the first experiment.

Sulphuric acid diluted with water easily dissolves cystine, and forms with it a transparent mass which resembles gum arabic. This mass when exposed to the air, attracts the moisture and resolves itself into a viscous liquor. We have not tried to determine the composition of the sulphate of cystine because we are not sure of having it neutral.

OF THE ACTION OF BASES ON CYSTINES.

Ammonia.—Dry cystine does not absorb the smallest portion of ammoniacal gas; it on the contrary dissolves with great facility in liquid ammonia. Its solution, when left to spontaneous evaporation, gives crystals of cystine which are as much more voluminous as the evaporation has been slow. We have satisfied ourselves several times by weighing the products, that the weight of cystine is the same before the solution and after the evaporation.

The cystine thus obtained does not sensibly give ammonia when treated by alkalies at the temperature of the atmosphere, and is certainly nothing else than cystine, since it has been comparatively analysed with that which comes directly from the calculi. This cystine is in hexagonal pieces as recognised by Wollaston.¹

By pouring oxalic acid diluted with water into the ammoniacal solution of cystine until it begins to be troubled, we obtain in a very short time a white pearly precipitate of pure cystine.

It is by this method, and the spontaneous evaporation of the ammoniacal solution, that we have procured the cystine which has served to make our experiments.

Solutions of lime, of strontia, and of baryta, the bases of which are not precipitated by ammonia, do not trouble the ammoniacal solution of cystine. The nitrate of silver gives peculiar precipitates that will be referred to at the end of this memoir.

An ammoniacal solution of cystine, preserved in a well corked bottle, becomes brown in a few days. The ammoniacal odour is found greatly diminished, and if we pour on it tartaric acid in solution, a gas is disengaged of a sulphuretted hydrogenic odour, a reddish gray precipitate of impure cystine is formed, and the liquor remains of a brown colour.

The dried precipitate still gives the odour of cystine when we attempt to burn it, but the garlicky odour is much more faint and is greatly masked by that given out by the animal matter burnt under like circumstances. This is not astonishing; for the formation of sulphydric gas shows that the cystine has lost a portion of

¹ We have, therefore, by the employment of ammonia, an excellent means of purifying cystine.

sulphur, and we cannot doubt that the garlicky odour given off is owing to the presence of this body.

Potash.—Cystine placed in contact with a weak solution of caustic potash and boiled, gives out ammonia, which is disengaged very slowly and in small quantities. If we saturate it exactly with weak nitric acid, sulphydric acid gas is disengaged on cooling, and a substance analogous or like that which we obtain by ammonia, is deposited slowly and with an entirely different aspect from the cystine, which is found so well characterised from the facility with which it crystallises when it has not been changed.

Cystine when submitted to the action of a concentrated solution of caustic potash, at boiling heat, gives ammonia and becomes brown rapidly. The liquor is not discoloured by the acids, which produce a precipitate of a like appearance to that which has previously been spoken of.

Baryta.—When we boil cystine with the water of baryta, ammonia is slowly disengaged, a sulphate of barium and a peculiar salt is formed, which remain in solution, and a grayish deposite takes place which is formed of the carbonate of baryta and a small quantity of organic matter. If we filter the liquor when no more ammonia is given off, and if we pass through it a stream of carbonic acid with the view of separating the free baryta that it may contain, sulphydric acid gas is disengaged, and at the same time we obtain a deposit of the carbonate of baryta. The liquor when boiled in order to drive off the sulphydric and carbonic acids that it may contain, and then filtered, is yellow and neutral; when evaporated, it gives a residuum of a shining yellow mass which has a strong garlicky odour. This new compound is soluble in water. Its solution produces no effect on vegetable colours. If we add thereto a quantity of sulphuric acid insufficient to precipitate the baryta that it contains, it reddens the tincture of heleanthus (tournesol) which is a certain indication that it contains a salt whose acid has been rendered free. This salt of baryta, warmed in a tube closed at one of its extremities, and furnished at the open end with two bands of paper, one coloured by saffron (curcuma), the other soaked in acetate of lead, gives certain indications of the presence of sulphur and of nitrogen, by this last paper which is easily blackened, and by the first which takes a well marked red tint. The same barytic salt treated by nitric acid or burnt with the nitrate of potash, gives sulphate of baryta, which is readily recognised. The action of baryta upon cystine, may without doubt, enlighten us on the general action of alkalies, but we have not thought it necessary to push our researches farther, although we still possess a few grains of cystine, because we have feared to destroy them fruitlessly. The attempts that we have made, lead us to hope that some bodies foreign to cystine will give us reagents which will re-enter on those that it offers. This has been another reason for our preserving carefully what remains of this substance

in order to be able to establish useful comparisons which would be impossible without this precaution.

Of the compounds in which cystine acts as an acid.—When we leave an ammoniacal solution of cystine exposed to the air, until it begins to form crystals, or rather when we add to it weak nitric acid in order to bring it to the same point, when we filter it rapidly, and when we pour on it a solution of nitrate of silver, a white precipitate is formed, which soon becomes yellow, and which even blacks by the light of the sun. Thinking that this precipitate was a compound of cystine and the oxide of silver, we prepared it several times, and have burned it several times in order to determine the quantity of silver that it contained. We have only obtained results far removed from each other, as may be seen in the following table.

	Weight of the cystate of silver.	Silver.	Oxide of silver per 100 of cystine.	Proportionate weight of cystine.
I.	0.157	0.0880	60.196	959
II.	0.0915	0.0465	56.048	1138
III.	0.286	0.1650	61.883	894
IV.	0.420	0.2490	63.673	828

When we burn the cystate of silver we observe a remarkable peculiarity; it deflagrates at 125° spreading a thick smoke, which has the odour of cystine; when we take the trouble to levigate the residuum and to submit it to a much lower temperature, it is completely burnt and leaves only metallic silver. If we omit this last precaution the combustion is completely stopped, as if there was nothing more to burn. The gray and spongy matter gives *vapeurs rutilantes* when treated with nitric acid, and leaves a black residuum, which, when washed and dried and then again submitted to a high temperature, burns with a beautiful blue flame, giving out the odour of sulphurous acid and leaving a residuum of silver. Whatever be the nature of this last black product, which on trial we have found to be composed of sulphur, carbon, and silver, it is remarkable that it should have resisted so high a temperature and the action of nitric acid.

If we pour a solution of nitrate of silver into an ammoniacal solution of cystine before it commences to form crystals, the liquor remains limpid, becomes yellow, brown, or black, and throws down a copious precipitate of this last colour. This precipitate, when separated by filtering and then dried is soluble in ammonia. If we add nitric acid to this solution, a blackish brown flocculent precipitate is formed. This precipitate partially disappears by an excess of acid, what remains without being dissolved, has presented all the characters of ulmina (ulmine).—0 gr. 114 of the black cystate of silver have given by combustion 0 gr. 076 of silver, a result which is insignificant.

It is probable that two cystates of silver exist, and that whatever may have been the precautions that we have taken to separate them, we have never been able to obtain one without the other.¹

CONCLUSION.

It results from this essay, that cystine contains a very considerable quantity of sulphur which had not as yet been observed. The presence of sulphur in a vesical calculus is a fact without example up to the present time, and which merits the attention of physiologists and physicians, either to study its formation or to prevent it.

Cystine forms with chlorohydric and nitric acids, well defined compounds, which seem to lead us to regard them as an alkaloid of animal origin. These compounds, although well defined, cannot, according to our ideas, permit us to draw directly the molecular weight.

Chlorohydric acid gives C. 4.5—Az. 1.8—H. 12—O. 4—S. 2—1513.41. Nitric acid gives, C. 4.5—Az. 1.8—H. 9—O. 3—S. 1.5—1135.05.

If the chlorohydrate is a neutral salt, the nitrate becomes a nitrate one and one third, or rather a nitrate three fourths, *basique*: if we take the nitrate as a salt, and we should be right in doing so, from analogy, for there only exists other than neutral nitrates, the hydrochlorate becomes one and one third *basique*, or one and three fourths chlorohydrate. But the chemical molecular weight only represents this as one arbitrary molecule, the use of which ought to be as convenient and general as possible, and the weight of the elements of the formula gives directly by analysis C. 3—Az.—H. 6—O. 2—S—706, which effacing all the irregularities which have just been shown, it is evident that it is the one ought to be adopted.

The nitrate is then *sesqui basique*, and the chlorohydrate *bibasique*: this is the more probable as this salt is decomposed by water, in losing the half of the cystine that it contains.

We end in remarking that it is curious that after having obtained clearly defined compounds, in order to determine the molecular weight of cystine, we have been obliged to resort to reasoning in

¹ The cystate No. 1, has been prepared by pouring nitrate of silver into an ammoniacal solution of cystine, which began to throw down crystals. The cystate No. 2, has been prepared by pouring the cystate of ammonia into the nitrate of silver. The cystates 3 and 4, have been prepared by pouring nitrate of silver into the cystate of ammonia, brought to the point of precipitation by the addition of weak nitric acid.

order to adopt one which is foreign to the experiments, but which however, places all the facts in harmony.

Cystine, containing sulphur in its composition, there is reason to think that we ought to exclude from the diet of persons attacked with cystic calculi, all the articles of food which contain sulphur. Such are especially eggs, and albuminous matters in general, beans, mustard, cabbage, &c.

The solubility of cystine in oxalic acid, permits us equally to hope for a useful result from the use of very weak oxalic acid and the vegetables containing it, as the sorrel.

Injections into the bladder of water very slightly ammoniacal, or a feeble solution of bicarbonate of ammonia, would perhaps be useful. But we can only form conjectures relative to this question, which are more or less vague and hazardous.

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