An essay on an improved method of cutting for urinary calculi; or, the posterior operation of lithotomy / by W.W. Sleigh.

AN ESSAY

ON AN

IMPROVED METHOD OF CUTTING

FOR

URINARY CALCULI;

OR,

THE POSTERIOR OPERATION

OF

Lithotomy.

By W. W. SLEIGH,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS,

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SIMPLICITAS SCIENTIÆ ANIMA EST.

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TO

JAMES DURIE, Esq. M.D.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS IN LONDON,
MEMBER OF THE HUNTERIAN SOCIETY, &c. &c.

London, November 21, 1823.

Dear Sir,

I embrace this opportunity of testifying how sensibly I feel the many acts of kindness and friendship you have conferred on me.

I trust, therefore, you will permit me to inscribe to you this little Treatise on Lithotomy, as a trifling tribute of gratitude from,

Dear Sir,

Very sincerely,

Your most obliged and faithful Friend,

23, *Chapel Street,*
Grosvenor Square.

W. W. SLEIGH.

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PREFACE.

It is the Author's wish, that this little Work should be viewed in the light of a proposal; inasmuch as he does not consider that the sentiments of one person (although in the present instance he has the approbation of some experienced professional men,) nor, in fact, any thing short of a number of successful cases, sufficient to establish a new operation. But to delay in giving publicity to his ideas, however erroneous they may hereafter prove to be; would, he conceives (particularly as hints on the subject have already been made in the public papers), appear like designed secresy. Therefore, although to some his present conduct may appear presumptuous and precipitate, yet, regardless of any motive which may be attributed to him, while he is persuaded, as far as his own judgment warrants him, of the correctness of his sentiments; he submits them, with all due deference and respect, for the consideration of the profession.

The Author having conducted an Anatomical Theatre for some time in Canada (where he resided these last four years), afforded him an opportunity of minutely examining the relative si-

tuation of the pelvic viscera, and repeatedly performing, in a variety of methods, the operation in question. The difficulty of obtaining modern publications in the above country, will, it is hoped, account for his non-acquaintance with improvements which may have lately occurred.

It was not till the month of June last, that he heard from a friend, that lithotomy through the rectum had been recently attempted in Europe. The gentleman alluded to had just received the last edition of Mr. Cooper's Surgical Dictionary, and wrote to him the following note, viz.:—

"*Montreal, June* 16, 1823.

"*Dear Sir,*

"*I hasten to send you an interesting report on a subject which has occupied much of your time and thoughts*—lithotomy through the rectum. *It appears from a recent statement, that altogether fifteen patients have been operated upon in this way; and that only one case terminated fatally; ten being completely cured, and four more, with the exception of trivial urinary fistulæ. See Journ. Complem. du Dict. des Sciences. Med. Tom.* 10. *p.* 180, 8*vo. Paris,* 1821.

"*I am, your humble servant,*

"W. D. SELBY, M.D."

"*To Dr. Sleigh.*"

Upon referring to the article alluded to in the note, the Author found that no hint was made of the operation through the intestinum rectum having been performed without dividing the sphincter ani muscle, and prostate gland, which alone constitutes an essential difference between it, and the method proposed in this work; for in the first place, the division of the sphincter ani muscle (as practised in these cases) must vastly augment the sufferings of the patient, and contribute towards a tedious recovery: secondly, the division of the prostate gland can scarcely be accomplished without wounding one of the excretory ducts of the testicles and vesiculæ seminales; and, lastly, the passing of the urine through the wound, which could not be obviated in this method of operating, must, as in the lateral one, prevent the wound healing by the first intention (which, when practicable, is an important desideratum in almost all wounds), and increase the hazard of callous edges, and a urinary fistula. Now, in the method proposed by the Author, the sphincter ani muscle is not touched—nothing is divided but mere membranes, which, in a healthy condition, may be said to be *almost* insensible; the vasa deferentia can alone be wounded, through the ignorance or awkwardness of the operator: and, lastly, there will be the same pro-

bability of the wound healing by the first intention (as the urine is not permitted to pass through it), as a simple incision in any other part of the body.

But these late cases corroborate in a most unquestionable manner many of the arguments adopted by him in the following sheets: nay, in his humble opinion, put beyond all dispute the superiority of his plan. The perfect safety with which the urinary bladder and intestinum rectum may be divided *together* can no longer be questioned. The danger of extravasation of urine in the cellular substance is equally unfounded; and, finally, that a calculus may be extracted from the bladder, through the rectum, with impunity; nay, with much less risk of danger than by the lateral operation, is now established; and that, notwithstanding the sphincter ani muscle and prostate gland be divided.

INTRODUCTION.

NOTWITHSTANDING the primary object of this Treatise is to describe an entirely new method of operating for urinary calculi, yet to enter abruptly into the subject without preliminary remark, would, to the student, although not to the practitioner, render it somewhat uninteresting, and less easily intelligible.

The nature and structure of parts to be the seat of a proposed operation—their office in the animal economy—their connection to the system at large—the relative vitality with which they are endowed—and the proportionate dependence upon them, for the due performance of the more important or minor functions of the machine, constitute a necessary subject of investigation, previous to its adoption or rejection.

To undermine old prejudices—to overturn systems or dogmas—and to eradicate from the mind false impressions, is no easy task. And all this, though every day's experience exhibits to our view some false opinion, or groundless dread, aban-

doned, and acknowledged to be such; till then, cherished and defended even by enlightened men.

The annals of surgery, from the earliest dates to our own times, present a vast variety of such occurrences. Hippocrates himself states, that he considered wounds of membranous parts, *mortal:* the father of physic, as he is called, must have, according to this statement, entertained either very limited ideas of the extent of membranes in the body, by not applying the term to the same structure of parts that we now do; or wounds in his time must have been attended with consequences which seldom now occur.

The difficulty of establishing what one would suppose the simplest and most obvious fact, namely, that recently divided parts are the best possible application to each other; or that the lighter and less irritating the dressing be, which is applied to wounds, the better; sufficiently illustrate the innate attachment which exists in the breasts of all men, to pristine systems or peculiarities. Even in the days of Mr. Pott, it was generally believed that when a portion of the scalp was torn from the cranium, the bones should exfoliate; and they were determined not to be disappointed in their expectations, for they actually

effected that, with their irritating applications, as spirits of turpentine, &c., which would not otherwise have happened in nine cases out of ten. And as that celebrated surgeon observes, "exfoliation is full as often the effect of art as the intention of nature, and produced by a method of dressing, calculated to accomplish such end, *under a supposition of its being necessary.*" The opening of an artery was so much dreaded by our predecessors, that when arteriotomy in the temple was first proposed, they pronounced it "*murderous, and on this reasoning it was absolutely forsaken for many years.*" Many other instances, if it were necessary, may now be adduced; we shall therefore proceed to those considerations, which are more immediately connected with our subject.

It is almost superfluous to observe, that the peculiar process by which nature repairs injuries done to the system, or unites the divided surfaces of a solution of continuity, is obedient to certain laws wonderfully adapted to various structures, and admirably calculated to accomplish her views. It would be well for surgeons always to recollect that a wound is healed not by the effect of art, but by this process; that they are only to *assist* her in her operations, and to obviate those difficulties which often impede her in her salutary exertions;

by guarding against the introduction of foreign matter, or the needless and officious interference of man. The circumstances by which this process is influenced, so as in various instances to exhibit a diversity of phenomena, are, the nature of the injury sustained; the structure of the parts wounded; and the condition of the constitution. Nature appears to have adopted for the above purpose a similar plan in the vegetable and animal kingdoms, in fact in all animated matter. The re-union of simply divided parts is that which she acomplishes with the greatest facility, least need of foreign assistance, and in the shortest space of time. To perform this, the cut extremities of the vessels recede, and their mouths contract; red blood soon ceases to flow; coagulable lymph is exuded; the vessels which had receded become in a few hours elongated; new ones are generated, and these inosculate with those of the opposite side: thus re-union of parts takes place, which is termed the adhesive process of inflammation, or union by the first intention. As to wounds of other descriptions, and the manner in which they are healed, being unconnected with our subject, cannot be noticed here: they are called punctured, lacerated, contused, &c.

Wounds do not heal equally well in all parts

of the body; this arises from the following circumstances: in the parts being situated at a distance from the centre of the circulation; or in a depending situation, which retards the return of the blood; or, lastly, their possessing in a minor degree the principles of life, or of reparation. It is an established fact, that in proportion as parts are endowed with a poor circulation do they suffer considerably from accidents, and badly endure the process of inflammation; such are tendinous, ligamentous, and bony structures. Other parts of the body, provided they be none of those upon which life directly depends, as the heart, lungs, brain, &c., generally bear inflammation well, and heal by the first intention, unless a peculiar condition, or deranged state of the constitution should interfere. It is also observable, that certain membranes always first commence the adhesive process of inflammation; and when the nature and use of those parts is considered, its propriety will be obvious. These are serous membranes, they line the cavities of the body, and, by reflection, form the external coat of the viscera; such as the pleura, peritoneum, &c.: when any of these is wounded, an extravasation of the contents of the viscus injured, would, without this provision, unavoidably occur; but shortly after the accident inflammation commences, coa-

gulable lymph is exuded, and the surfaces are united, by the process before related, to each other, and frequently to the surrounding parts: thus the injury is limited; but if the inflammation runs high, it is to be subdued by those means which are termed antiphlogistic. The membrane forming the internal tunic of canals, as that of the intestinal canal, &c., is subject to that process which is termed the ulcerative; were they, as the others, upon every slight attack, to put on the adhesive process, the consequence would generally be fatal; and were serous membranes liable to the ulcerative process, the effect would be equally dangerous.

The peritoneum is the most extensive membrane in the body, lining not only the internal surface of the parietes of the largest cavity in the animal machine (the abdomen), but forming the external coat of the whole of the intestinal canal, together with the stomach, liver, &c.; it also forms several ligaments to bind down, or rather keep *in situ*, the abdominal viscera; and besides these, forms also processes or prolongations. Thus the whole of the important viscera of this cavity are, independently of other means, intimately connected with each other, through the medium of this membrane.

It is from the great extent of the peritoneum, that inflammation of it has so often increased to such a degree as to extinguish the vital spark. And the frequently fatal termination of accidents occurring to those parts has occasioned such a dread of wounding this membrane, that it exists even at the present day.

Let us now inquire, is there any thing peculiar in the structure of the peritoneum that predisposes it to an excessive or dangerous degree of inflammation? It is a serous membrane, so strongly resembling the pleura, that no distinctive marks have yet been noticed. The latter, as well as the former, has been punctured and wounded repeatedly, with the greatest impunity. Mr. John Bell, noticing the delicacy of the peritoneum, and its liability to excessive inflammation, remarks, "that wounds of the small sword, and the stab of the stiletto, as well as the cæsarian operation, lithotomy, or the bursting of the gravid uterus, induce inflammation of the peritoneum and death." In this gentleman's opinion, the sole cause of the extensive inflammation is the wound of the peritoneum, nothing else in his mind (if it be fair to judge from *his writings*), appears to contribute towards it; as he says, "the most minute wound of it is sufficient to account for all the symptoms

and evil consequences. This membrane, it is evident, cannot be wounded without injury to other parts. If it be a puncture made within the liniæ semilunares (which space is about eight inches broad in the adult, and extends from the ensiform cartilage to the os pubis, in the anterior part of the abdomen; of which it constitutes by far the greatest part), which, it must be allowed, is a part as liable to be punctured as any other; there must be wounded, four tendinous expansions, which form the sheath of the recti muscles; the tendon of the external oblique, and that of the transversalis, with the double layer of the internal oblique. I would presume to ask this gentleman, does a puncture of those parts contribute nothing towards the violence of the inflammation? Are not punctures of tendinous parts, in all other situations, considered as the most dangerous description of wounds? And what is to obviate this danger from wounds of the tendinous expansions, situated in the anterior part of the abdomen? Further, there are very few, if any, stabs penetrating the cavity of the abdomen, that do not wound one or more convolutions of the intestinal canal, together with the great omentum, &c., will they contribute nothing towards the fatal catastrophe? Has not the incision in the uterus, for the cæsarian operation, a similar tendency? Or

the bursting of the uterus? Has the extensive incision of the irritable neck of the bladder and prostate gland, when divided in the lateral operation for the stone, nothing in it to produce peritonitis? Or is the previous condition of the constitution to be entirely overlooked and disregarded? Will not this latter circumstance alone produce in the system the most violent and formidable effects, from the slightest causes? It is not surprising that men, when once they overshoot the object at which they have been aiming, should dispute, and involve themselves in a labyrinth of erroneous discussion. Thus much argument has been expended in the inquiry, *what is the direct cause*, that wounds of the peritoneum are so frequently fatal? Many celebrated men (amongst whom Alexander Monro, senior, was conspicuous) contended that the cause of all the subsequent evil was the access of air to the cavity of the abdomen; and to obviate this fatal inconvenience, Dr. Aitken recommended to operate on the abdomen, only under the cover of a warm bath, in order to exclude the air. Mr. John Bell proved the absurdity of this doctrine, but did not elucidate the subject any further, nor attempt to attribute the morbid extent of the inflammation to any other than the generally supposed cause, *the simple solution of continuity*. One more passage from this

author deserves quotation; he proceeds—"But the admission of air, as a stimulus, when compared with the *great incisions* of lithotomy, of hernia, of hydrocele, of the cæsarian section, of the trepan, is no more than the drop of a bucket to the waters of the ocean. And it is just as poor logic to say, that, after such desperate operations, these cavities are inflamed by the admission of air, as it would be to say (as Monro did), that when a man is run through the pericardium with a red hot poker, that the heart and pericardium are inflamed by the admission of the air." P. 347. This is all true; and the applicability of the argument, to prove that air was not the cause, to my subject is extremely striking; and I would thus aver, that a simple nick of the peritoneum, abstractedly considered, is as much the cause of violent inflammation as the air is, in the case where the pericardium is run through with a red hot poker. It is well authenticated, that persons have had swords passed completely through their bodies without material or fatal consequences; while others, from a puncture of the abdominal parietes (which did not entirely penetrate), have had violent sympathetic fever, &c.

It is a fact universally acknowledged, that the effects of every injury done to the system are in-

fluenced by the state of the constitution; yet, strange to relate, authors frequently argue as to the cause of certain symptoms, and appear to take no notice whatever of this important truth. Some constitutions will endure, with comparative impunity, the most violent accidents; while causes, to all appearance exceedingly trifling, will produce in others the most formidable symptoms, and not unfrequently prove fatal. This phenomenon cannot proceed from an original or congenital idiosyncrasy; for a person will receive, at one period of his life, severe violence, and the constitution will scarcely appear even to sympathize with the local affection; although the same individual, at another time, shall have the most dangerous symptoms from a mere scratch. Very slight punctures produce violent inflammation, and not unfrequently tetanus: the same, or a similar description of wounds of the scalp, cause in some persons, erysipelatous inflammation and delirium; and a prick of a needle in the finger extensive inflammation of the superior extremity. On the contrary, all parts of the body, with the exception of a few, as the heart, cerebellum, &c., have been punctured, cut, and lacerated, without any fatal consequences. Musket balls have passed through the body in almost every direction, through the abdomen, thorax, and pelvis; their several

viscera, as the lungs, intestines, bladder, &c., have been wounded; and the individuals have endured but comparative inconvenience. Wounds of very few parts of the system can, therefore, strictly speaking, be termed inevitably mortal; and the fatality of the wounds of the remaining parts must depend upon something else than their structure; upon something which is different in different persons, and varies at times in the same individual.

Now the *structure*, or *nature*, of the constituent parts of the body, as that of bone, membrane, muscular, and tendinous fibre, do not at any period of life vary (although their composition undergoes a change), hence we must look for something which is liable, at uncertain periods, to alteration. This cannot be any one particular part of the body, independent of the system at large; it is well known that a perpetual waste and reparation is in incessant progress; that the hardest substance becomes fluid or aeriform, and substances, the most fluid and aeriform, become solid; while an equilibrium is maintained between the circulating fluids, the various actions of the machine proceed healthily.

The constitution, or temperament of the sys-

tem, depends, I conceive, upon those sources, from which, or through the medium of which, the body is supplied with its nutritious principles. The organs which perform the process of digestion, are peculiarly exposed to accidental impediments, by which this important process is retarded or completely suspended; and these, holding a most prominent rank in the animal economy, when interrupted in their functions, derange the whole machine, and produce, what is termed, an unhealthy condition of the system. Even the more remote parts of the body, sooner or later, sympathize; they being imperfectly supplied with chyle, are rendered incompetent to do their duty; the glandular system is particularly affected; the secretions are more or less suppressed, or morbid fluids are produced; and then, these reacting on those parts which first were deranged, the machine is thrown into a complete disordered condition. When this state of the system occurs, and I by no means think it uncommon, nature is no longer able to perform her various functions; in fact she loses her authority (if I may be allowed the expression), over the machine: and when she attempts, on the occurrence of accidents, in this state, to restore the injured or mutilated part, in vain calls in the other parts of the animal to her assistance,

as the skin, kidneys, &c.; in vain she endeavours, by these means, to restrain the inflammation, (which was excited for the purpose of reparation) and to keep it within due limits; which not curbed, extends beyond her design, and she, unable to rally, sinks in the contest. This state of the system is, in my opinion, the principal cause of many accidents, trivial in themselves, producing formidable consequences; but particularly so, when to this is united a rigid fibre. It is almost unnecessary to remark, that those most exposed to such accidents, as wounds, &c., are persons engaged in a campaign, and whose constitutions, from the irregularity in their mode of living, must, if not actually the same, at least bear a strong similarity to that described above; and the great number who survive under such circumstances, must be a matter of astonishment to the reflecting mind; but much must be attributed to the bold use of the lancet, now so judiciously prevalent in military surgery.

Attributing the immediate cause of death, or the fatality of wounds of the peritoneum, solely to the peculiar structure or nature of that membrane, is a prejudice of ancient origin, and current acceptation. It is hoped we shall be excused for calling a *prejudice* that which is entertained

by the most celebrated men of the day; for I do contend, that if its nature be examined, and the several instances where it, or some of its prolongations, has been divided extensively with impunity, maturely considered, death may be attributed to some other circumstance (although there are numerous cases where wounds of the abdomen, and consequently of this membrane, have proved fatal) than the peculiar structure or function of the peritoneum. Finally, I would call the peculiar state of the constitution, at the time of the accident, the predisposing cause of the violent symptoms—the stab or wound the remote or exciting cause—and the parts injured, the immediate cause.

Having made these preliminary observations, which I conceived a necessary introduction to a method liable to be impugned; I shall now (for the student's advantage) give a general but brief view of Lithotomy; its history; and the principal methods and improvements, which have been devised to facilitate it. There are but few operations in surgery, if any, which have attracted more attention than that under consideration. The improvements which have been made, from its first introduction, are numerous; and the variety of instruments are still more. All appear to have

had a similar object in view, that of penetrating the bladder, where it is without the sphere of the peritoneal tunic. There are but two places where this has been hitherto attempted, above the os pubis and beneath its arch, or through the perineum. A vast variety of methods have been invented to cut through these parts, but particularly the latter. It was first performed more than two thousand years ago, by Ammonius at Alexandria; he, having emptied the rectum, introduced two of his fingers into the gut, grasped the stone, and at the same time pressed it forward against the neck of the bladder, so as to make it protrude in the perineum; a lunated incision was made with a scalpel, down to the neck of the bladder, on the stone, which was then, by the fingers in ano, thrust out of the viscus, through the wound. This method was termed *cutting on the gripe;* and was also practised by Meges, at Rome, in the reign of Augustus.

I shall now transcribe from Celsus a full account of the subject as it stood in his time, that the reader may form some idea of the view the ancients took of the operation, and the minutiæ of the manner it was then performed. He writes thus,—"Cum vesicæ vero, calculique facta mentio sit, locus ipse exigere videtur, ut subjiciam, que

curatio calculosis, cum aliter succurri non potest, adhibeatur. Ad quam festinare, cum præceps sit, nullo modo convenit. Ac neque omni tempore, neque in omni ætate, neque in omni vitio id experiendum est: sed solo vere; in eo corpore, quod jam novem annos, nondum quatuordecim excessit; et si tantum mali subest, ut neque medicamentis vinci possit, neque etiam trahi posse videatur, quo minus interposito aliquo spatio interimat. Non quo non interdum etiam temeraria medicina proficiat; sed quo sæpius utique in hoc fallat, in quo plura et genera et tempora periculi sunt. Quæ simul cum ipsa curatione proponam. Igitur, ubi ultima experiri statutum est, ante aliquot diebus victu corpus præparandum est: ut modicos, ut salubres cibos ut minime glutinosos assumat, ut aquam bibat. Ambulandi vero inter hæc exercitatione utatur, quo magis calculus ad vesicæ cervicem descendat. Quod an inciderit, digitis quoque, sicut in curatione docebo, demisis cognoscitur. Ubi ejus rei fides est; pridie is puer in jejunio continendus est; et tum loco calido curatio adhibenda, quæ hoc modo ordinatur. Homo prævalens et peritus in sedili alto considit, supinumque eum et aversum, super genua sua coxis ejus collocatis, comprehendit; reductisque ejus cruribus, ipsum quoque jubet, manibus ad suos poplites datis, eos,

quam maxime possit, attrahere; simulque ipse sic eos continet. Quod si robustius corpus ejus est, qui curatur, duobus, sedilibus junctis, duo valentes insidunt; quorum et sedilia et interiora crura inter se deligantur, ne diduci possint: tum is super duorum genua eodem modo collocatur; atque alter, prout consedit, sinistrum crus ejus, alter dextrum, simulque ipse poplites suos attrahit, sive autem unus, sive duo continent, super humeros ejus suis pectoribus incumbunt. Ex quibus evenit, ut inter ilia sinus super pubem sine ullis rugis sit extentus, et in angustum compulsa vesica, facilius calculus capi possit. Præter hæc, etiamnum a lateribus duo valentes objiciuntur, qui circumstantes, labare vel unum vel duos, qui puerum continent, non sinunt. Medicus deinde, diligenter unguibus circumcisis, atque sinistra manu, duos ejus digitos, indicem et medium, lenitur prius unum; deinde alterum in anum ejus demittit; dextræque digitos superimum abdomen leniter imponit; ne, si utrinque digiti circa calculum vehementer concurrerint, vesicam lædant. Neque vero festinanter in hac re, ut in plerisque agendum est; sed ita, utquam maxime id tuto fiat: nam læsa vesica nervorum distentiones cum periculo mortis excitat. Ac primum circa cervicem quæritur calculus: ubi repertus, minore negotio expellitur. Et ideo dixi, ne curandum

quidem, nisi cum hoc indiciis suis cognitum est. Si vero aut ibi non fuit, aut recessit retro, digiti ad ultimam vesicam dantur; paulatimque dextra quoque manus ejus ultra translata subsequitur. Atque ubi repertus est calculus; qui necesse est in manus incidat; eo curiosius deducitur, quo minor læviorque est; ne effugiat, id est, ne sæpius agitanda vesica sit. Ergo ultra calculum dextra semper manus ejus opponitur; sinistræ digiti deorsum eum compellunt, donec ad cervicem pervenitur. In quam, si oblongus est, sic compellendus est, ut pronus exeat; si planus sic, ut transversus sit; si quadratus, ut duobus angulis sedeat; si altera parte plenior, sic ut prius ea, qua tenuior sit, evadat. In rotundo nihil interesse, ex ipsa figura patet; nisi, si lævior altera parte est, ut ea antecedat. Cum jam eo venit, incidi super vesicæ cervicem juxta anum cutis plaga lunata usque ad cervicem vesicæ debet, cornibus ad coxas spectantibus paulum: deinde ea parte, qua resima plaga est, etiamnum sub cute altera transversa plaga facienda est, qua cervix aperiatur; donec urinæ iter pateat, sic, ut plaga paulo major, quam calculus sit. Nam, qui metu fistulæ (quam illo loco χορυάδα Græci vocant) parum patefaciunt, cum majore periculo eodem revolvuntur: quia calculus iter, cum vi promitur, facit, nisi accipit: idque etiam perni-

ciosius est, si figura quoque calculi, vel aspritudo aliquid eo contulit. Ex quo et sanguinis profusio, et distentio nervorum fieri potest: quæ si quis evasit, multo tamen patentiorem fistulam habiturus est rupta cervice, quam habuisset, incisa. Cum vero ea patefacta est, in conspectum calculus venit: in cujus colore nullum discrimen est. Ipse, si exiguus est, digitis ab altera parte propelli, ab altera protrahi potest: si major, injiciendus a superiore ei parte uncus est, ejus rei causa factus. Is est ad extremum tenuis, in semicirculi speciem retusæ latitudinis; ab exteriore parte lævis, qua corpori jungitur; ab interiore asper, qua calculum attingit. Isque longior potius esse debet: nam brevis extrahendi vim non habit. Ubi injectus est, in utrumque latus inclinandus est, ut appareat, an calculus teneatur; quia, si apprehensus est, ille simul inclinatur. Idque eo nomine opus est, ne, cum adduci uncus cæperit, calculus intus effugiat, hic in oram vulneris incidat, eamque convulneret. In qua re, quod periculum esset, jam supra posui. Ubi satis teneri calculum patet, eodem pæne momento triplex motus adhibendus est: in utrumque latus; deinde extra, sic tamen, ut leniter id fiat, paulumque primo calculus attrahatur; quo facto, attollendus uncus extremus est, uti intus magis maneat, faciliusque illum producat. Quod si quando a supe-

riore parte calculus parum commode comprehendetur, a latere erit apprehendendus. Hæc est simplicissima curatio. Sed varietas rerum quasdam etiamnum animadversiones desiderat. Sunt enim quidam non asperi tantummodo, sed spinosi quoque calculi, qui per se quidam delapsi in cervicem, sine ullo periculo eximuntur: in vesica vero, non tuto vel hi conquiruntur vel attrahuntur; quoniam, ubi illam convulnerarunt, ex distentione nervorum mortem maturant; multoque magis, si spina aliqua vesicæ inheret, eamque, cum duceratur, duplicavit. Colligitur autem eo, quod difficilius urina redditur, in cervice calculum esse; eo, quod cruenta destillat, illum esse spinosum. Maximeque id sub digitis quoque experiundum est, neque adhibenda manus, nisi id constitit. Ac tum quoque lenitur intus digiti objiciendi, ne violenter promovendo convulnerent: tum incidendum. Multi hic quoque scalpello usi sunt. Meges (quoniam is infirmior est, potestque in aliqua prominentia incidere, incisoque super illam corpore; qua cavum subest, non secare, sed relinquere, quod iterum incidi necesse sit) ferramentum fecit rectum, in summa parte labrosum, in ima semicirculatum acutumque. Id receptum inter duos digitos, indicem ac medium, super pollice imposito sic deprimebat, ut simul cum carne, si quid ex calculo prominebat, incideret: quo consequebatur, ut

semel, quantum satis esset, aperiret. Quocumque autem modo cervix patefacta est, leniter extrahi, quod asperum est, debet: nulla, propter festinationem, vi admota. At calculus arenosus, et ante manifestus est; quoniam urina quoque redditur arenosa: et in ipsa-curatione: quoniam inter subjectos digitos neque æque leniter renititur, et insuper dilabitur. Item molles calculos, et ex pluribus minutisque, sed inter se parum adstrictis, compositos indicat urina, trahens quasdam quasi squamulas. Hos omnes, leniter permutatis subinde digitorum vicibus, sic oportet adducere, ne vesicam lædant, neve intus aliquæ dissipatæ reliquiæ maneant, quæ postmodum curationi difficultatem faciant. Quidquid autem ex his in conspectum venit, vel digitis, vel unco eximendum est. At si plures calculi sunt, singuli protrahi debent; sic tamen, ut, si quis exiguus supererit, potius relinquatur: siquidem in vesica difficulter invenitur, inventusque celeriter effugit. Ita longa inquisitione vesica læditur, excitatque inflammationes mortiferas; adeo ut quidam non secti, cumdiu frustraque perdigitos vesica esset agitata, decesserint. Quibus accedit etiam, quod exiguus calculus ad plagam urina postea promovetur, et excidit. Si quando autem is major non videtur, nisi rupta cervice, extrahi posse, findendus est: cujus repertor Ammonius, ob id λιθοτομος

cognominatus est. Id hoc modo fit. Uncus injicitur calculo, sic, ut facile eum concussum quoque teneat, ne is retro revolvatur; tum ferramentum adhibetur crassitudinis modicæ, prima parte tenui, sed retusa, quod admotum calculo, et ex altera parte ictum, eum findit; magna cura habita, ne aut ad ipsam vesicam ferramentum perveniat, aut calculi fractura ne quid incidat." Lib. 7.

Many objections have been made, and are justly entertained against this cutting on the *gripe*. The celebrated Fabricius Hildanus endeavoured to obviate some of them, by cutting on a staff, introduced into the bladder, instead of directly on the stone; his method was termed the Apparatus Minor. The Marian method came next into vogue, it was invented about the year 1500 by Johannes de Romanis; this operation (which was also termed the Apparatus Major) consisted in dividing the perineum with a razor on one side of the raphe, down to the staff in the urethra just at its bulb; then, cutting no farther, lacerated, by way of dilating, the neck of the bladder, and prostate gland, by means of two iron conductors, one called the female, the other the male. Although many improvements have been made in this mode of operating, and although it was practised by some eminent men, as Paré, Le

Dran, Le Cat, Mery, Morand, Mareschal, Raw, &c. &c., for upwards of two hundred years, yet it was at last most deservedly abandoned, and superseded by two methods, now to be described.

The first of these was what is termed the high operation, being performed above the pubes, through the abdominal muscles; and was first attempted by Pierre Franco, about the year 1540, in the following manner: the bladder being distended with fluid, and the muscles of the abdomen relaxed, an incision, about four inches long, was made between the recti and pyramidal muscles, down to the bladder; after this the cut in the bladder was enlarged by means of a bent knife; then the finger directed the forceps to the stone, and it was extracted. The thickened and contracted state in which a bladder containing a calculus generally is; the difficulty of extracting the fragments; the danger of the urine becoming extravasated into the cellular substance, surrounding the incision, and the pain commonly occasioned by the distention of the bladder, forms a catalogue of insuperable objections to this method of lithotomy. The next plan was devised and practised by Frere Jacques, and is termed the lateral operation, in consequence of the neck of the bladder and prostate gland being laterally

divided. It is this which, after various improvements, continues in celebrity to the present day. When he first attempted it in Paris, about the year 1697, he was extremely ignorant of the anatomy of the parts, and also very careless about all subsequent treatment of his patients; he used to draw out the stone with considerable roughness; and many fell victims to his awkwardness. He used a large round staff without a groove, and when introduced into the bladder, he depressed the handle of the instrument, so as to make the portion of the viscus, which he wished to divide, approach the perineum. He then pushed a sharp knife towards the body of the bladder, within an inch and a half of the perineum, and close to the tuberosity of the ischium; which portion he cut and enlarged sufficiently in a direction from the anus, up towards the neck of the bladder; this method was adopted by Mareschall, in Paris; Raw, in Holland; and by Bamber and Cheselden, in England. It is related by Albinus, that Raw used to open the bladder between the neck and ureter, which he conceived to be a considerable amendment to Frere Jacques's plan; but the urine, not having a free outlet, became extravasated in the perineum, which obliged this gentleman to return to the original method. Cheselden adopted three different methods (about the year

1700) of getting into the bladder; the first was a complete imitation of Raw's; which, for the same reason, he was obliged to discontinue; he then invented a second plan, which he thus describes:—"I first make as long an incision as I well can, beginning near the place where the old operation ends, and cutting down between the musculus accelerator urinæ, and erector penis, and by the side of the intestinum rectum; I then feel for the staff, and cut upon it the length of the prostate gland, straight on to the bladder, holding down the gut all the while with one or two fingers of my left hand." The extraction of the stone differs but little in any of these improvements, a steel forceps being the principal instrument used for that purpose. The third method this celebrated operator adopted differed from the last, principally in substituting a gorget instead of a knife, to cut the neck of the bladder and prostate: after making his external incision through the muscles and skin of the perineum, beginning it near the margin of the scrotum, on the left side of the raphe, he felt for the groove of the staff in the urethra; and after having cut into it, he fixed the beak of the gorget in the groove, and then thrust it into the bladder. The staff was withdrawn, and the forceps then introduced along the concavity of the gorget, and the

stone extracted. An instrument was invented some time ago by Frere Cosme, called *bistourie cachee,* or *lithotome;* it consists of a knife in a sheath, which starts out at will, after the usual incision through the perineum; this is introduced along the staff into the bladder, it is then turned sideways, and being drawn out cuts the prostate and neck of the bladder. This contrivance is still used by many of the European continental surgeons, and has lately been revived in the Westminster Hospital.

Another complicated method was invented by M. Foubert, at Paris; the bladder being distended, and pressure applied to it through the abdomen, so as to make that part of it lying between the neck and the ureter prominent, and the rectum being drawn towards the right thigh by the operator's fore finger, introduced into it for that purpose, a trocar was then pushed on the left side of the perineum, about an inch above the anus, parallel to the rectum, so as to enter the bladder on one side of its neck; a slender knife was then introduced along a groove in the canula; he then cut upwards towards the pubes, about an inch and a half, and enlarged the external wound, by moving the handle more than the knife; a blunt gorget was then passed to

guide the forceps. Various other improvements have been made in this lateral operation of lithotomy, particularly by Sir Charles Blicke, Sir James Earle, Le Cat, Charles Bell, Deaze, Blizard, &c. &c. &c. I shall now describe in full, the present modes of performing the lateral operation, both with the gorget and knife, and shall take the liberty of doing so in the words of Mr. Charles Bell, from his work on Operative Surgery. "The patient is seated on the edge of a strong table, a pillow is under him; then laying him down on the table, the shoulders and head are supported; the staff, with a groove upon the lower convex part, is now introduced, and then the feet and hands are tied together, by putting a noose of tape over the wrist, making the patient grasp the sole of his foot, and then tying the ligature around the hand and foot. The breech now presented over the table, the surgeon seats himself at a convenient height; and taking the handle of the staff, presses it a little towards the right groin, so that the convexity of the staff is felt in the perineum. The staff is now given to the assistant, who holds it firm in the position in which he received it, having the thumb of the left hand over the head of the staff, there is one thing more, particularly to be attended to, viz. that by the assistant's carelessness the point of it be not brought

out of the bladder; be sure, then, that by elevating the handle of the instrument, you can push it smoothly onward in the bladder. If you went to cut while the point of the staff rested on the neck of the bladder, instead of being fairly within the bladder, when you were about to thrust the gorget forward, it would pass, not into the bladder, but betwixt the bladder and rectum." "We are directed to begin our incision on the prominence of the staff, and cutting through the skin and integuments, to carry it down between the verge of the anus, and the ischium, or somewhat below the ischium."—But "I let it remain in its unconstrained position; then making it to be held firm, cut down to it, making an incision towards the fore part of the prostate gland, not as if searching for the staff."

"Our object in the first instance, is to lay the perineum open to a sufficient extent for the extraction of the stone, and to unbridle the muscles and fascia which support the perineum. The surgeon feels the prominence of the ischium, observes the raphe and prominence of the staff; he strikes the knife into the space betwixt the crus penis of the left side, and the bulb of the urethra. From this, with a deep steady incision, it is carried down directly betwixt the anus and tuberosity of the

ischium, and the incision terminates opposite the lowest part of the margin of the anus." "One or two successive strokes of the knife deepen the wound, and the surgeon must be careful that he carries the knife from the side of the staff, down by the side of the rectum, and that he cuts through the transversalis perinei muscle, and the ligamentous connections of the urethra in the perineum." "In cutting through the muscles of the perineum, the operator must carry the finger of the left hand into the lower part of the wound, and press down the rectum, else it may be wounded." (When the rectum is cut, it generally heals; but *sometimes* the wound degenerates into a fistula. Though it is *easily* cured, it is a fistula in ano.) He must continue his incision until he feels the prostate gland, and that there is no stricture on the wound below, from the crossing of the flesh. If the staff has been kept hitherto nearly in the middle, it must now be inclined with the handle to the right groin, so that the convexity of the instrument, may appear bulging in the wound of the perineum. And now the surgeon inserting the knife cuts freely, and decidedly into the groove of the staff. He keeps the nail of the fore finger of the left hand in the groove of the staff, until he takes the gorget from the pocket of his apron, or the ready hand of the

assistant, and fixes the beak into it. Directed by the finger of the left hand, the blunt point of the beak of the gorget is introduced into the groove of the staff, it is moved backwards and forwards, and made to grate upon the rough groove.

Now the surgeon, rising from his seat, and secure of being in the groove of the staff, carries the gorget onward, recollecting the curve of the staff, and that he has to carry the gorget in the axis of the pelvis, not directly onward. He moves slowly at first, until he sees the urine trickling over his instrument, when he carries it more resolutely onward, lest the urine escape altogether from the bladder. The gush of urine announces the completion of this incision." " When the forceps are introduced, the surgeon should not immediately begin with both hands to separate the handle of the instrument, and to dive and chuck for the stone, but endeavour to feel for it with the forceps closed, and ascertain its exact position before he attempted to seize it." " Oiled lint is put into the wound, the thighs are bound slightly together with a soft tape, and the patient is carried to bed. Under him the clothes are placed as for a woman after child-bed. An opiate is usually given. The urine is for the first fortnight passed through the wound; often on

the second and third day it is passed by the urethra. This is merely owing to the tumefaction of the rising inflammation, and of course temporary. Towards the end of a fortnight the urine should pass by the urethra; and in a perfectly successful operation the parts should be healed in three weeks. The dressing is very simple; all our care being to dress mildly, and to see that no lodgment of urine or matter be allowed by the side of the rectum." The best operators of the present day prefer the knife to the gorget, and rely more upon their knowledge of the anatomy of the parts, than on the peculiar construction of their instruments."

URINARY CALCULI owe their formation to depositions from the urine, or morbid changes in its secretion; and the investigation of their chemical constitution and properties is therefore connected with its history. It is one of much importance, from its relation to the discovery of the means by which their formation may be prevented, or by which they may be removed. These concretions are not uniform, they differ in physical qualities, and still more in their chemical nature. The following substances enter into their composition: uric acid, urate of ammonia, phosphate of lime, phosphate of ammonia, and magnesia; oxa-

late of lime, silex, and animal matter; these being more or less pure or mixed, and being often diversified by mechanical structure, so as to render it difficult to reduce these concretions to well defined species. Dr. Wollaston has reduced them to four species: first that composed chiefly of uric acid; second, what has been named the fusible calculus, composed chiefly of phosphate of ammonia and magnesia; third, the mulberry calculus, as it has been named, consisting of oxalate and phosphate of lime; and fourth, the bone-earth calculus, formed almost entirely of phosphate of lime. Uric acid calculus is the most common. These calculi are of a brown or yellowish colour, smooth, displaying internally a fibrous or radiated structure, and often in fine layers of different shades, rather soft and brittle.

Calculus of phosphate of magnesia and ammonia, the fusible calculus of Wollaston.—Phosphate of magnesia and ammonia seldom form an entire calculus. It is either, if pure, discharged under the appearance of a white sand, composed of minute crystals, or it is intermixed with other ingredients, particularly uric acid, and phosphate of lime, and often forms alternate layers of these, or covers a nucleus of uric acid. It is distinguished by its softness and smoothness, and its

white colour, its lamellated texture, and its giving a fine powder of brilliant whiteness. Before the flame of the blow-pipe it melts into a white enamel, is charred when placed on burning fuel, and emits an ammoniacal smell; or raising the heat, it melts. It dissolves very sparingly in boiling water; the acids, even those that are weak, dissolve it easily, leaving any animal matter mixed with it undissolved. The fixed alkalis disengage its ammonia, combine with its acid, and precipitate the magnesia.

Calculus of phosphate of lime. This sometimes composes the entire substance of a concretion; more frequently it is mixed either with uric acid, or with phosphate of magnesia and ammonia, or disposed with them in layers. When pure, or little intermixed, the concretion is of a pale brown colour, and so smooth as to appear polished; its texture is laminated. It dissolves slowly, but entirely in muriatic or nitric acid diluted, and it is little affected by alkaline solutions.

Calculus of the oxalate of lime. This has been long known by the name of mulberry calculus, from its colour and its rough pointed surface. Dr. Wollaston shewed that it consisted chiefly of oxalate of lime, with animal matter. It is of a

dark brownish or purplish colour externally, often grey within; its surface is usually uneven, often covered with protuberances: it is the hardest and heaviest of the urinary calculi. It is also less affected than any of them by the usual re-agents. The alkaline solutions do not affect it, and the stronger acids, the nitric and muriatic, dissolve it only with great difficulty. The solutions of the alkaline carbonates decompose it, precipitating carbonate of lime. It is also decomposed by heat, leaving, when urged by a strong fire, pure lime, amounting to about one-third of its weight.

A calculus has been described by Wollaston, composed of a substance which he has named Cystic Oxide. Its structure is confusedly crystalized, its colour yellowish, with a degree of lustre and semi-transparency. It is dissolved both by acids and alkalis, by lime water and the alkaline carbonates; and its compounds with acids may be made to crystalize.

In all these calculi, besides the saline matter of which they chiefly consist, there is present a portion of animal matter, which appears to give them colour and induration. See Murray's Elements of Chemistry. See also an Essay on the subject, by A. Marcet, M.D.

An important question now naturally suggests itself, namely, what are the circumstances which predispose the constitution to the formation of urinary calculi? This is by no means well understood, and a vast variety of opinions exist concerning it. Some have considered that *hard water*, that is, water impregnated with the sulphate and carbonate of lime, renders persons liable to this affection. Dr. Henry dissents entirely from this opinion. It is well known that there is a wonderful sympathy between the skin and kidneys; and that whatever contributes to retard the perspiration or secretion of the former, more or less determines to the latter; the secretion of which is loaded with a superabundant quantity of excrementitious matter, to be carried out of the system. Thus, those who lead an inactive or sedentary life frequently labour under nephritic complaints. It is also remarkable, that calculous affections attack persons at that period of life when there is most osseous matter in circulation; that is in youth, when chiefly osteogeny is in progress, and in advanced life when much bony matter is deposited. Those inhabiting cold damp climates are particularly subject to the gravel, while the inhabitants of warm climates are scarcely ever affected with it. Men are more subject to it than women; which

is owing to the peculiar structure of the urethra in the latter allowing the calculus to be passed previous to its becoming considerable; or the quantity of osseous matter being diverted towards their breasts, &c., for the supply of their offspring, may contribute in preventing it. A foreign body getting accidentally into the bladder, has been known to form the nucleus of a calculus.

AN ESSAY, &c.

CHAP. I.

The necessity of a Preparatory Regimen.

A REGIMEN preparatory to this operation, I consider a very important precaution, and which should not be omitted upon any consideration. It is a principle in Surgery, that when there is an opportunity, the constitution should be attended to, previous to any *capital* operation. My sentiments on this subject are perhaps somewhat extended beyond that of the generality of practitioners; which it is probable arises from my having witnessed some dangerous effects after trifling operations, that evidently were connected with a deranged state of the chylo-poietic viscera, and which in all probability would have been obviated, had the least attention been given to those parts. When there is no need of an immediate operation; or where it is not an un-

expected one, I hold it the inexcusable duty of every man, to pay some little attention to the constitution previous to undertaking an operation: it can be no possible detriment to the individual, and although it may be adopted frequently without any necessity, yet by so doing, effects very unpleasant will often be prevented. Although a person may appear extremely healthy, yet his system may be in such a condition, as not to bear with impunity almost the slightest scratch. I have seen a young woman, to all appearance in the most perfect health, thrown into the most deplorable condition, in consequence of simply cutting a small sarcomatous tumour the size of a pea, from the lobe of her ear; in three or four days after the operation (which was performed by a celebrated surgeon) a violent erysipelatous inflammation seized her scalp, face, neck and shoulders; the tumefaction of her face was truly appalling, her eyelids were swoln to a dreadful degree, and notwithstanding the strictest antiphlogistic regimen, which was had recourse to on the first symptoms, several abscesses formed over her face, &c., accompanied with considerable delirium. I do not in the preceding remarks so much allude to the necessity of previous blood-letting, (although in many instances it will be highly proper) as to the

absolute necessity of paying attention to the abdominal viscera. Nothing can tend more to hurt the feelings of a surgeon, after having adroitly performed an operation, and almost confident of a happy result, than to have all his expectations in a moment blasted, by some violent attack of inflammation, by which either the cure is frustrated, or the individual loses his life. People who are inadequate to form a just opinion in such cases, are apt to blame the operator for the unsuccessful termination of the case, not considering the peculiarity of the patient's constitution. Therefore we ought, not only in duty to our fellow creatures, but also from regard to our own characters, to pay attention in every instance to the state of the system previous to making use of our knives.

When the individual on whom we purpose operating is *young* and *plethoric*, a little blood may be judiciously detracted; if this has not been done previous to the operation, and provided that our patient does not lose much blood during it, some taken immediately afterwards will be very advisable ; thus we may anticipate an inflammatory attack. But it should not be forgotten that nature has to heal the divided surface, (if possible by the first intention) and that to accomplish this, a certain degree of inflammation must be

permitted; so that were the constitution to be much reduced, our grand object, that of the wound healing by the first intention, may be thwarted; and the process of suppuration inevitably take place. Independently of the reasons I have before adduced for attending to the state of the bowels previous to attempting any serious operation on the animal machine, I conceive it to be an indispensable duty previous to undertaking the posterior operation of lithotomy. If there be any one operation in surgery, which requires more than another, attention to be paid to the constitution, it is this posterior operation of lithotomy. Let it be clearly understood, that I consider the success of this operation, ultimately, to depend upon the regard given to the condition of the bowels; and to the strict observance of the rules I lay down in this chapter. In this operation the bowels are not merely to be cleared with the same intent as in all other operations, that of lowering the plethoric state of the individual; but there is a double object to be accomplished here, for the operation itself is on a part of this canal. The first object then is to evacuate thoroughly the bowels of all feculent matter, and any superabundance of bile that may be in the system. This is to be accomplished by administering cathartics for some days previous to

the operation, which is to be regulated by the necessity for them, and this alone can be ascertained by carefully inspecting what is passed. The medicines which I would recommend in particular, are submur, hydrag, and comp. ext. of colocynth: united together in the form of a pill. The day preceding the operation I would recommend a dose of castor oil. The second object is, after the bowels are perfectly clear, to slacken the peristaltic motion of these viscera, or to cause (if I may be allowed the expression) a constipated condition; this must only be attempted the morning of the day for operating. It will be accomplished by administering two or three small doses of opium in pills; thus the action of the bowels will be lulled, and a temporary repose produced; which can have no possible bad effect, as this latter plan is not to be adopted till the bowels have been perfectly cleared. During the above time the patient should abstain from almost all solid food, particularly animal matter: I need scarcely add the necessity of his refraining from spirituous liquors, &c.

CHAP. II.

The Posterior Operation described.

EVERY person acquainted with the anatomy of the pelvic viscera may, from what has been already observed on this subject, form a tolerable correct idea of the part of the bladder I purpose dividing in this operation; but lest any might not be fully aware of this place, or may mistake my intention, I shall briefly mention its boundaries, &c.; premising by way of remark, that the parts cut are mere membranes, the coats of the urinary bladder and intestinum rectum, in almost actual contact with each other, and when united, not exceeding the eighth of an inch in thickness. No skin (the actual seat of feeling), no tendinous fibres, no bundles of muscular fibres (except a few transverse ones between the coats of the intestine), no part of that most irritable, and consequently most exquisitely sensible membrane that forms the urethra; I say, none of these structures or parts (all of which are wounded in the lateral operation) are touched in my method.

This part of the bladder is its inferior posterior

surface, which is destitute of a peritoneal tunic, and is only separated from the intestinum rectum by cellular substance; its shape is triangular, the base of which is placed backwards and upwards, and its apex forwards and downwards; its length is from one to two, or two and a half inches. It is bounded laterally by the vasa deferentia and vesiculæ seminales, superiorly by the cul-de-sac of the peritoneum, and inferiorly by the prostate gland, and union of the seminal tubes.

The instruments I have invented for this operation are only two (with a trifling alteration in the lithotomy forceps); one for dilating the sphincter ani muscle, the other for making the incision into the bladder. The former I term the speculum ani, or dilating forceps; it is divided into its blades and handles, which go off from each other at a right angle. The blades are convex, and smooth externally, and are gradually reduced in breadth towards their extremities, so that when closed they occupy but a very small space, and thus may be introduced into the anus with the greatest facility, and without producing any uneasiness to the individual. A screw transfixes one of the handles (its right one), and rests upon the internal surface of the other; by the turning of which the blades are slowly, steadily, and gradually separated, and full command is

obtained over the sphincter ani, which becomes dilated in proportion as we turn the screw, and consequently to any admissible extent we may desire.

The staff may be of the ordinary description, its size and curve are to be regulated according to circumstances, as the age of our patient, &c. The scalpel is seven inches in length, its blade is one inch and a quarter only, which is concealed in an open sheath, that is attached to the root of the blade by a steel spring; by which means the edge of the knife is entirely and firmly covered, until pressure be made with it on some *soft substance*, as if in the act of cutting; when the sheath retiring back in proportion to the force used, the blade becomes naked, and the incision being effected, the sheath *instantaneously* recovers it, in consequence of its spring. A few different sized lithotomy forceps must be at hand for the purpose of extracting the stone, should it not be thrust out on the incision being made.

The state of the constitution having been regulated according to the directions mentioned in another part of this work (see page 42), and an enema administered, the patient is put in the same situation as for the lateral operation. The speculum ani (having lain in a little warm water for some time previously, and then rubbed with a little

sweet oil,) should be gradually introduced into the rectum; the screw should then be slowly and steadily turned, by means of which its blades are separated, and the power of the sphincter ani muscle overcome. The anus thus opened to a sufficient extent * (transversely), the index finger of the left hand should be placed on the posterior edge of the prostate gland, which is the anterior boundary of the part of the bladder to be divided. The scalpel is then to be introduced, and by measuring the knife with the index finger, the length of our incision can be regulated with accuracy, according to our wishes. The staff having been previously introduced into the bladder, will be felt pressing the coats of the viscus against the intestinum rectum. This will be an infallible criterion by which we can judge of the situation for our incision, and of the nature of the substance interposed between the staff and our finger. We can then divide the parts either directly on the staff, or by its side. Upon the incision being made the urine will gush out, and in all probability the stone will be forced out in the same moment. Should the calculus not escape with the urine, the common forceps is to be introduced through the rectum into the bladder,

* We may safely dilate it from two to three inches in an adult.

and the stone extracted according to the principles given for the lateral operation.

The bladder can be washed out by means of a syringe, with a little tepid water. After this, a gum elastic catheter is to be introduced into the bladder through the urethra, and kept in till the adhesive process of inflammation commences, so as to unite the divided surfaces. The patient is to be given an anodyne, composed of about thirty or forty drops of the tincture of opium. He is then to be put to bed, and to be kept lying on his abdomen, till the time above mentioned for removing the catheter. The object I have in view for this last direction must be obvious, namely, to prevent the urine escaping through the incision * into the intestine, which would ne-

* It may be observed, "although the urine be prevented getting into the intestinum rectum by this position, yet it exposes the patient to an evil of equal moment, and what must retard the healing of the incision, just as much as the passing of the urine, namely the fæces escaping from the intestine into the bladder. To answer this plausible objection, I must refer my reader to the arguments adopted by me in answer to the third and fourth objections; and also I desire him to remark, I take it for granted, that the state of the bowels is attended to, according to the directions given in page 42, by which means, the bowels will be so tranquil that a thousand to one, if any fæces will reach the intestinum rectum, before the parts will be, if not healed, at the very least, so swollen, as to obliterate the incision, and to effectually guard against the possibility of this accident occurring.

cessarily retard the union of the parts. By observing the above plan, another grand object is accomplished, that of preventing the urine insinuating itself into the cellular substance. In the natural position of the body, that is lying on the back, the wounded part of the bladder would be the most depending part; consequently, when the body is prone, the part alluded to is placed in the very reverse position; the urine dribbling from the ureters will accumulate in the fundus of the bladder, and pass off by the natural channel through the catheter.

I have now come to that stage of my operation, when, what has just been advised, although it may be considered the most simple part, is, in my opinion, one of the most essential steps towards ensuring a speedy cure. For, in the first place, the more simple a process is, provided it accomplishes the desired object, the more truly valuable is it. Secondly, upon the success of this proposal depends the immediate healing of the wound, consequently removes every chance of a fistula. I am aware it may be said, "theory is very good, but practice is the only thing to be relied on:" true, but deductions may be drawn from theoretical reasoning, founded upon common and acknowledged laws, so correct and substantial that men's minds may be as thoroughly per-

suaded of the correctness of the theoretical deductions, as if they had actually proved them by practice. It does not require my actually taking hold of the ink bottle, which now stands before me on the table, and turning it upside down, to prove to me that if I do it, the fluid or ink which, by certain laws that I am acquainted with, remains quiet at the lowermost part of this vessel, will immediately leave that part which is now the bottom of the bottle, and rush towards its mouth or neck, although this part of it is now the highest: and further, if its mouth be not stopped or obstructed, that the ink will spill upon the cloth that covers the table. I say, I am as fully persuaded that all these effects would occur were I to displace the bottle, as if I had actually put the thing into practice. I am convinced of this by theory, because the theory is founded upon certain and unchangeable laws of nature. What I want to accomplish now after the stone is extracted, is to prevent the urine passing through the wound, which by experience is well known to prevent the parts divided in the operation of lithotomy healing by the first intention; nay, keeps the wound open for weeks at least, and not unfrequently for months. The patient after the lateral operation is placed on his back, and the urine accumulates in the *posterior infe-*

rior part of the bladder, until it reaches the margin of the wound, and then dribbles over it. This posterior inferior portion of the viscus is the most depending part, and what is divided in the posterior operation; so that if the patient be placed on his back after my operation, all the urine will directly escape into the rectum, as it does when the bladder is punctured here. But on the contrary, if I can reverse the bladder, or turn it upside down, the urine will of course accumulate in the direct opposite part of this viscus, which will be found to be its fundus. This fluid then gradually increasing from the fundus upwards (taking for granted the bladder is turned upside down), would at length rise to the margin of the wound, as it does in the lateral operation, and then pass through it; but the natural canal, the urethra, commences between the fundus and this part of the bladder; so that when it arrives here it must pass off, and can never, in this position of parts, while the urethra is free, reach the divided part of the bladder. Hence then I consider, that by placing the individual, immediately after the operation, on his face, and keeping him so for four and twenty hours, that this most desirable object will be accomplished, and the wound healed by the first intention.

I have mentioned that a gum elastic catheter

should be introduced, and kept in the bladder for some time; but I consider it very questionable whether this will be always necessary; indeed I am inclined to view it as an unnecessary precaution. It is well known that the parietes of the bladder are always in contact with the fluid it contains; that, in fact, they are completely passive in the dilatation of this organ, and are separated from each other by the gradual accumulation of the urine. Let the quantity of this fluid be ever so trifling, it will lie on the surface of that part of this viscus, which is its most depending part; and this last circumstance will depend upon the position of the individual: if, therefore, this place be its fundus, the urethra will, as was observed before, be between the wound and the surface upon which the urine accumulates; and the urethra, kept open by the catheter; will always afford a direct outlet for this fluid, and prevent it reaching the divided surfaces. But query, Would the urine flow through the urethra without the use of the catheter? Must not the sphincter vesicæ be overcome by this means?

During a few days the patient is to be merely supported by light diet, as sago, barley water, gruel, &c., and at the end of three days a small dose of castor oil should be administered and

repeated every six hours, till the bowels are moved.

If any symptoms of peritonitis should supervene (which I verily believe will occur very seldom after this method of operating) the antiphlogistic regimen is to be put in practice, with boldness and perseverance, particularly blood-letting and the warm bath.

I consider that the patient should be perfectly well in the course of six days at the very farthest; when I say well, I mean at liberty to go out, and return to his former mode of living: in fact from the moment after the operation I see no cause for any great uneasiness, but it is our duty to guard against *possible* (although not probable) occurrences. There may be many other things to be attended to, after this operation, but as they cannot differ from those of the lateral one, I presume it is unnecessary to occupy any more time in detailing them.

CHAP. III.

Difficulties and Objections to the Posterior Operation, considered.

As many no doubt will entertain sentiments inimical to this operation, I shall endeavour to sum up all the objections that occur to me at present, under six heads, viz.

The first, is the difficulty of reaching through the anus, the seat of the operation, and overcoming the perpetual contracted state of its muscular fibres. The second, the danger of wounding the peritoneum. The third, the probability of an extravasation of urine. The fourth, the danger of the incision not healing kindly, in consequence of the passage of the urine through the wound; and a fistulous communication being established between these viscera, by the urine sometimes passing through the rectum, and at other times the fæces through the urethra. The fifth, the risk of a troublesome hemorrhage, not merely from the arteries, but also from the hemorrhoidal veins, which are in some instances very much distended.

The difficulty of extracting a calculus through the anus, if of a considerable size, may be considered as a sixth objection.

For the purpose of obviating the first difficulty, I invented an instrument, which I described before, for gradually opening the sphincter muscle of the anus, and operating by means of a screw, the fibres are slowly dilated, and perfect command of the action of the instrument is obtained. It is a well established fact that muscular fibres, which rupture, if attempted to be stretched suddenly, will, on the contrary, suffer incredible dilatation and extension, provided the process be conducted slowly and steadily. For instance, in the reduction of dislocations, if the extension be made by jerks, the object, if accomplished at all, will be with considerable difficulty, and not altogether free of the danger of some of the fibres being lacerated. The dilatation of the meatus urinarius in the female, which, in its natural condition, does not exceed *in caliber* a common quill, has spontaneously dilated, so as to transmit an enormous calculus; this proves how much the actual condition of fibres may be overcome by gradual means. The sphincter ani muscle itself has, as will appear in the sequel, admitted a concretion the size of the fist, to be extracted with impunity. The vast dilatation of the

os uteri in parturition, furnishes another striking proof of this doctrine. By reflecting upon these circumstances, I was convinced of the possibility of dilating with impunity the sphincter ani muscle.

I have succeeded in dilating the anus *with the speculum ani* in many cases, producing at the same time but little uneasiness to my patient. This last fact may appear somewhat strange, but I declare I always asked the individual, while I was turning the screw, if I was hurting him; and he always answered in the negative*.

The second objection which may be advanced is the risk of wounding the peritoneum; as the triangular space situated between the cul-de-sac of this membrane, and the union of the seminal tubes, is by no means considerable; even stated by a modern French surgeon of so limited an extent, that he considered the operation of tapping the bladder, through the rectum, extremely hazardous, as endangering this membrane. But I presume that any one acquainted with the anatomy of this part, from actual demonstration, must consider this gentleman's apprehension extremely groundless, and his opinion far from being correct.

* This I have done in the presence of several gentlemen, particularly Drs. George and William Selby, of Canada.

It should be remembered, that, in examining the pelvic viscera, for the purpose of obtaining an exact knowledge of their relative situations, and the proportionate size of the several parts of each viscus, and the whole contents of the pelvis, that the accuracy and correctness of our investigation will depend upon putting them into a similar condition to that which they are in, in the living body, or would be *at the period of operating*. There is scarcely a viscus, the relative situation of which is not considerably altered after death; nor a hollow or cylindrical one, the size and shape of which does not differ considerably from what it was in the living body. Therefore, were we to describe the size or relative situation of these parts as they appear in the subject, it would give an inaccuracy of conception highly erroneous, and likely to be productive of the most serious consequences.

How considerably do most of the abdominal and thoracic viscera change their situation after death. Thus the size and shape of the intestinum rectum, and urinary bladder, when empty, differ vastly from what they are when entirely or moderately distended; and it is presumed scarcely necessary further to remark, that the size of the different parts of these viscera, and the situation they hold to each other, is proportionably altered. When

we examine the size and relative situation of this triangular space between the vasa deferentia in the subject, we find the parts collapsed, the cul-de-sac of the peritoneum hangs down to within a very inconsiderable distance of the prostate gland; so much so, that to look at them in the dissecting room, it would appear almost an impossibility even to tap the bladder through the intestinum rectum, without wounding the peritoneum. It is the French author above alluded to, having viewed the parts in this condition, that can alone account to me for his strange observations on their anatomy.

Let the bladder be only moderately distended, and the difference is considerable; then the distance from the union of the seminal tubes, and the cul-de-sac of the peritoneum will generally be found to be about two inches *; and the base of the triangle about an inch and a half; but these distances may be increased nearly double, without the rupture of a single fibre. The only part of any of these viscera which is immoveable, is that portion of the urethra, or neck of the bladder, that is surrounded by the prostate gland, and which is firmly tied to the arch of the pubis

* The vesiculæ seminales are three fingers-breadth in length; and the peritoneum does not reach them. See Bell's Anatomy, Vol. 3, page 392.

by a strong fasciculus of fibres, termed the ligamentum triangulare urethræ. In this operation, then, the prostate gland which is, as to its situation the only one of these parts somewhat unchangeable, and which can be distinctly felt by the finger in ano, should be made the grand guide to the place for our incision; the seminal tubes are contiguous, directly at the posterior extremity of this gland, so that by placing the index finger of the left hand upon the posterior edge of it, we are sure to cover the union of these excretory ducts, and by keeping it there, we not only effectually guard them from being wounded; but we can with accuracy calculate the size of our proposed incision, so as to regulate it according to circumstances. The axis of the pelvis should be carefully attended to, it is a line drawn from the umbilicus to the os coccygis; the incision through the rectum and bladder should correspond to this.

Were these parts of a similar structure, with that of the neck of the bladder, where it is surrounded by the prostate gland, I would freely acknowledge that the operation of lithotomy here, would be almost impracticable without wounding the peritoneum, or vasa deferentia. But this is far from being the case, a small portion of cellular substance, situated between two extremely loose membranes, is the

simple anatomy of the part. It will be recollected that in the directions for performing the lateral operation, provided a free incision be made of the parts of the perineum, and the neck of the bladder, there will be no necessity for extending the incision into the lateral part of the viscus; and this for a very obvious reason, that the structure of the coats of the bladder is of such a nature as to admit, with the greatest impunity, safety, and without any laceration of fibres, of considerable dilatation. From the nature of the parts, which are the seat of the posterior operation, I conceive that a calculus of the ordinary size may be extracted with ease, through an aperture but little larger than that made by the trocar. It is impossible to say what the exact distance is from the reflection of the peritoneum to the juncture of the vasa deferentia; as this differs in various persons according to their age and size: but I have generally found it, in a moderately distended bladder, and in an adult subject, from an inch and a half to two inches. Let us then suppose a stone of six inches in circumference, a size that does not frequently occur; it may be extracted, in consequence of the nature of the seat of the operation, with the greatest ease, and if not roughly performed, without the laceration of a single fibre, through an incision little better than an inch in

length. And I do believe that an incision only one inch long, will answer the purpose in ninety nine cases out of a hundred. So that in fact there is not one iota, more probability of wounding the peritoneum in the posterior, than in the lateral method of operating; unless through the awkwardness of the surgeon it might happen, which may occur in either case. The rectum is of a similar dilatable structure, so that the incision in it does not require to be more extensive.

But suppose, on the other hand, that there was a greater probability of dividing this membrane in the posterior, than in the other methods of operating, should it constitute an insuperable objection to this operation?—I should hope no modern surgeon will be found to answer in the affirmative; prejudice is no longer to keep us fettered:—the doctrine of Hippocrates as noticed before, "that wounds of membranous parts were mortal," should not hold such controul over our ideas: we must discard such shackles! and recollect that those days are past when mere assertions, or the *ipse dixit*, were sufficient to convert sentiments into maxims, and private ideas into established doctrines. This will not now do; the *why* and the *wherefore*, must be satisfactorily answered before implicit credence be given, or before mens minds be convinced of the reality of any thing, no matter from whom it proceeds.

Although much has been already said in this tract, on this subject, yet I cannot avoid again resuming it; as the argument is referable, not merely to the direct cause of peritonitis, but also to other prejudices founded upon false principles, or taken for granted by the profession, without once questioning the *principles*, upon which they are founded.

Notwithstanding the innumerable instances which have lately occurred, where the peritoneum has been injured, even under the most unfavourable circumstances, as in gun-shot wounds, &c., and healing very well, yet almost as great a dread is entertained of cutting it, as of dividing the par vagum.

Let us candidly examine the following question, which may tend somewhat to the elucidation of the subject: whether the fatal effects which sometimes occur after wounds of the peritoneum, depend more on the nature of the parts injured, or on a peculiarity of constitution? To solve this question it must first be granted, which every medical man will no doubt readily concede, that wounds of the peritoneum can by no means be termed mortal. In many instances the fibres of this membrane have suffered every species of injury, and no bad consequence resulted; they have been simply, but extensively divided; they have frequently been bruised, lacerated,

strangulated, and punctured: true, many fell sacrifices to such accidents, but similar injuries of other parts have produced effects as fatal. In the operation for strangulated hernia; the sac of the hernia, which is formed by the peritoneum, and of course is a prolongation of this membrane, is extensively divided. Many are snatched from impending death by the operation, while others perish notwithstanding it; to what do the best surgeons of the day attribute the death of the individual? is it to the extensive incision of the peritoneum? no, not one of them; they uniformly attribute the death of the person to the operation having been delayed too long, and to the strangulation of the intestine, of its muscular, vascular, and mucous coats, equally with its peritoneal tunic, contributing in producing the constitutional derangement, and fatal termination of the case. I understand there is now an eminent surgeon in Italy, who considers wounds of the peritoneum of no greater consequence than wounds of any other structure of parts; when he is called to a patient with strangulated hernia, he *forthwith*, without *any loss of time*, operates, and this gentleman *never* loses a case *.

In the radical cure for hydrocele, the tunica

* I received this information, after a part of this work was in the press.

vaginalis testis, and the tunica albuginea; both of which are formed by the peritoneum, and consequently continuations of this membrane, are, with the greatest safety, excited to inflammation; nay the cure will not be *radical*, unless the adhesive process be induced; for which purpose the seton, excision, or injection, is employed. If any thing peculiarly favourable to destructive inflammatione existed in the structure of this membrane, which we call the peritoneum, there would be no question, I presume, but its prolongations would uniformly exhibit it, when excited by such rough means as just now have been mentioned. I should hope that the fact is no longer doubted that wounds of the peritoneum are by no means so dangerous (provided proper steps be adopted to anticipate possible effects) as has hitherto been believed.

We read in anatomical works, that the reflection of the peritoneum over the pelvic viscera sets bounds to inflammation situated in the pelvis; and that it acts as a barrier in checking this affection, and preventing it extending from the viscera of this cavity to those of the abdomen. How these assertions can be proved, or what reason can be advanced in defence of this doctrine, I am at a loss to know. For if we consult the experience of others, as facts occur in prac-

tice, which are the only infallible criterions; I am inclined to believe we shall find them powerful arguments against those ideas. For instance, it is well known that the generality of those who die after the lateral operation of lithotomy, perish in consequence of peritoneal inflammation; and that, although this membrane is not *touched* with the knife, which fact is a presumptive proof against the assertion. The truth is, that when the constitution is predisposed to inflammation, and that the neck of the bladder is in an irritable condition, which it is most generally at the period of the operation, the incision produces such an excitement, that no bounds can be set to the affection, but the bold use of the lancet, which even too frequently proves ineffectual: any other barrier is as imaginary as that of the abdominal regions.

I have enlarged considerably on this part of my subject, not that I consider the peritoneum likely to be wounded in the posterior method of operating; far from it; for I am persuaded that nothing but a gross ignorance of the parts, or extreme awkwardness, can cause this accident; but I am inclined to believe, that an unnecessary dread exists amongst medical men, of wounds of this membrane. This, I am sure, has originated in the fatality that proceeded from the *violence* of the operations and accidents, in which it was

wounded; the death of such persons was seldom attributed to the *severity* of the injury; but the simple division of the peritoneum was erroneously considered sufficient to account for all the evil consequences; and the peculiarity of the constitution, and the other parts wounded at the same time, were altogether overlooked. Thus, dogmas in medicine are too frequently taken for granted, without the truth of the principles upon which they are founded being questioned.

Of all the objections to this operation which occurred to me, none appeared more formidable than the third one, namely, the danger of the urine becoming extravasated in the cellular substance, between the rectum and bladder. This circumstance alone, if found irremediable, would be sufficient for ever to prevent an attempt at this mode of operating, or indeed any other, that might endanger the occurrence of such an accident, as it generally proves fatal. This is one of the most substantial objections to the high operation. The urine of all the animal fluids is the most destructive; when it escapes from its natural reservoirs into the surrounding parts, there is not one of them, the extravasation of which, proves so fatal. If it has not a free outlet, it excites a putrid suppuration in the cellular substance, which is quickly followed by a gangrenous in-

flammation of the skin, sloughs, and extensive mortification. Sometimes the whole scrotum, the skin of the penis, and that of the groins, perineum, and upper part of the thigh, mortify. The lateral operation is not entirely exempt from this awful circumstance; it requires not a little care to avoid it; but notwithstanding every precaution it sometimes unfortunately occurs. For the purpose of obviating it in the operation alluded to, we are directed to make a free external incision, with the intent of keeping a depending opening for the discharge of the urine. Thus the wound is kept open for weeks.

Impressed with the ideas conveyed in these directions, I was at first of opinion, that I should, in the posterior operation, endeavour to keep open the wound, with a similar intent as that in the lateral one; but a question suggested itself to me, which completely changed my opinion: it was the following—"How long am I to keep this wound open? Reflecting upon this, at once brought me to examine the object I had to accomplish; and not being satisfied with the intent I had in view, I came to the following conclusions on the subject: First, that my determination of keeping the wound open proceeded, not from any direct object to be accomplished, but from the impression made upon my mind by the conduct

pursued in the lateral operation. Secondly, that as there was no substantial reason for keeping it open, it would be much better to let it close as quick as possible. Thirdly, and lastly, that if it was kept open for any time, there would be just reason for apprehending callous edges and a fistulous sore.

The many advantages of allowing the lips of the wound to heal at once must be obvious; the ease and safety to the patient—the process of suppuration being anticipated—and the danger of a fistula being obviated—constitute sufficient reasons, I presume, for its adoption. To more effectually accomplish this end, I have devised a method (which has been already described in another part of this tract), by which the urine is prevented from passing *at all* through the wound, except directly on the incision being made; and this fluid is discharged from the first through the urethra.

Thus, I conceive, that while extravasation of urine is likely to take place in the lateral operation; and a fistulous opening by no means uncommon; neither of these evils is at all likely to attend the posterior operation: nay, further, that there is a moral certainty of their being prevented.

The wound in the lateral method can never be attempted to be healed by the first intention: an

effort to accomplish this would be the effectual means of retaining the urine in the cellular substance; and was there even no danger of this evil, it would be, from the situation of the incision, impossible to heal it at once, as the passing of the urine would render every effort unavailing. But the urine, checked in its course, would insinuate itself into the cellular substance of the perineum, and produce vast destruction of parts; so that, endeavouring to prevent an extravasation of urine in the lateral operation, they are obliged to run the risk of a fistulous opening, and *vice versa*. With a similar intention we are cautioned against wounding the intestinum rectum; and as no possible advantage could arise from cutting this intestine, the accident is by no means excusable; it is somewhat strange however, that this caution, which in this mode of operating has been judiciously given, should so influence the minds of some men, as to make them propose, if it should be nicked, to convert the wound into a similar one as that made for fistula in ano. I conceive that cutting the rectum in the lateral operation, contributes much towards the wound becoming fistulous; and I am not surprised if in those cases they do not heal kindly, in consequence of the urine passing through it.

The many instances where these viscera have

been wounded *together*, and the urine passing for some time through the rectum, sufficiently establish the possibility of their being cut with impunity.

I have read of an instance where a gun-shot wound laid both viscera into one; the ball entered above the pubis, and passed out by the side of the os coccygis; the urine and fæces passed through the wound for some weeks, which left no doubt of both these viscera having been wounded; the person was in a short time restored to perfect health. Another case occurred in Canada, and the person was under the care of Dr. George Selby, of Montreal, the most eminent physician and surgeon in that city; the person falling from the top of a hay-rick, his perineum came in contact with a wooden hay fork (which was laying against the rick), one of the prongs of which traversed the rectum and bladder. The urine and fæces escaped through the wound for some time; the patient, in the course of six weeks, without the smallest fistula, or any impediment, recovered.

These are two instances out of many, I presume, which may be produced, where wounds of these viscera occurred under very unfavourable circumstances (being accidents), and although their contents passed through the wound for some time, yet they healed up as quickly as the

most successful cases after the lateral operation generally do, and that allowing the constitution to have been duly prepared for it. Here we have cases where punctured and lacerated wounds of those organs have healed kindly, and from which no bad consequence whatever resulted.

When these facts are considered, we may fairly ask the question, what is to be dreaded from a simple incised wound of those parts, that can bear with impunity the most complicated description of injuries? Nature herself has, in fact, pointed out this place as the most judicious situation for the extraction of urinary calculi: a case is recorded in one of the Edinburgh Reviews (the work is not in my possession, therefore cannot mention the particular volume), where ulceration took place at that part of the bladder which is in contact with the intestinum rectum, the stone was discharged through the opening, the urine escaped for some time, but finally the person recovered.

Further, the most approved place now for tapping the bladder, in cases of retention of urine, is through the intestinum rectum, in that part of the bladder which is destitute of its peritoneal tunic; and it is worth observing, that the part of the bladder where lithotomy was first performed, appears to have succeeded that of the

place for puncturing this viscus; or, in other words, it was first ventured to puncture this organ in a certain part of it, and then an incision for the extraction of the stone was attempted in the same place; as the situation of the former was changed for a more preferable one; so was that of lithotomy: thus the bladder was first punctured above the pubis, then lithotomy was performed there; afterwards the perineum was preferred for the seat of puncturing; then lithotomy was performed there: lastly, the bladder was, and is, punctured through the intestinum rectum, as the safest, most easy, and with the most trifling pain: but whether this part of the bladder will be preferred for the operation of lithotomy, remains yet to be decided.

In recommending puncturing the bladder through the intestinum rectum, a celebrated author thus writes:—"It is not like the puncture in the perineum, liable to the objection, that the wound is made on diseased or inflamed parts, which afterwards become gangrenous; nor is it like the puncture above the pubes, attended with a chance of the urine diffusing itself in the cellular membrane. It has also the advantage of emptying the bladder completely. The puncture is made sufficiently far from the neck of the bladder, not to increase any inflammation existing in that

situation, and the operation is really attended with *little pain;* since there is no skin or muscles to be wounded, merely the *coats of the bladder and rectum,* at a point where these viscera lie in contact with each other. For here the urine has to pass through a mere opening, without any longitudinal extent, as after puncturing above the pubes. The safety and simplicity of tapping the bladder from the rectum will always recommend this method with impartial practitioners. The wound is made at a *distance* from the peritoneum, passes through *no thickness* of parts, and is quite unattended with any chance of the urine becoming extravasated in the cellular substance. Whether the bladder be morbidly contracted and thickened; whether the neck of the bladder be inflamed, it is equally applicable."

Forasmuch as the preceding quotation refers to an operation performed in the identical parts where mine is, the arguments adopted by this author to recommend it, in preference to any other method, are equally applicable to my purpose: he states that the puncture is made at a *distance* from the neck of the bladder, and also from the peritoneum; that it empties the bladder completely; that it is attended with but little pain; and finally, that there is no possible danger of extravasation of urine. If, after a

puncture in these parts, and the canula withdrawn, that there be no extravasation of urine, the risk, if there be any, in my operation, where there is a simple incision, is, I presume, by many degrees less.

The moment that the bladder is emptied by the cut for the stone, the wound in the rectum is more or less completely removed from that in the bladder; nay, the wound in the different coats of the rectum is considerably displaced, (this is the reason given by the advocates for puncturing through the rectum, for keeping a canula introduced for some time after the operation) which completely prevents the passage of the fæces into the bladder—the lips of the muscous coat of the intestine are everted—the muscular coat, which is composed of two layers of fibres, the internal ones running in a circular direction, the external longitudinally, separates in two opposite directions; the divided fibres of the former layer recede from each other, transversely, as respects the gut, while those of the latter, downwards and upwards; thus the communication between these viscera is almost, immediately obliterated, provided it is not kept open by art.

The frequent operations that are performed on the rectum and the facility with which they heal, sufficiently demonstrate the healing na-

ture of this intestine. Cutting it for fistula, even in the worst of constitutions, generally proves effectual; and the fistulous opening, most frequently the cause of the unskilful and unnecessary interference of the surgeon, heals kindly. When the bladder is tapped through the rectum, a canula is kept in, for the purpose of *preventing* the puncture closing, *previous* to the obstruction in the natural passage being removed: and in cases where the canula has slipped from the rectum, the wound has *immediately closed* up, and a repetition of the operation became necessary. Hence it is evident that my belief in the extreme healing nature of those parts, arises not from hypothetical reasoning, but is founded upon facts, some of which are selected from cases under the most unfavourable circumstances, as wounds in broken down constitutions, &c. Immediately after the extraction of the stone, coagulable lymph is thrown out from the divided vessels, inflammation commences, the cellular substance becomes consolidated, an effectual barrier to the extravasation of urine takes place; and provided nothing be done to prevent the wound healing by the first intention, and that the proper measures which have been detailed, are adopted, the cure is forthwith accomplished.

The fourth objection, "that of the incision in the rectum and bladder not healing kindly, &c., is answered by the arguments adduced in the preceding section, so that any further comment on the subject would be mere tautology.

The fifth objection that may be entertained is the danger of hemorrhage from the arteries of the rectum; but the operations for fistula in ano, in which these vessels are always more or less wounded, when the flow of blood spontaneously subsides, should sufficiently calm the apprehensions of any one on this point. The arteria hæmorrhagia anterior, is the principal one we have to encounter; but this vessel when wounded, invariably ceases bleeding after a short time; or should the bleeding increase exceedingly, that is, beyond what we judge prudent, nothing can be more easy than to adopt the following plan, by which we may command it: pass through a catheter a piece of soft string, introduce the instrument through the urethra into the bladder; feel the extremity of the catheter with your fingers in ano introduced into the wound; take hold of the end of the string, and (leaving it sufficiently long) pull it through the verge of the anus; fasten to it firmly a piece of sponge, then introduce it into the rectum, up to the surface of the wound; after which pull the cord (left hanging

out of the catheter) till the sponge is brought firmly against the bleeding surface; keep it tight in this situation till inflammation has commenced, after which it can easily be withdrawn by pulling the other end of the string left hanging out of the anus. These directions are given, not that the author dreads in the *least degree*, the necessity for them, but as an irregular distribution of arteries is not unfrequently met with, particularly about the pelvis, it is satisfactory to know we possess a method by which we can command them. Thus I conceive all apprehension of a dangerous hemorrhage in this operation, may be considered as unwarrantable.

The difficulty of extracting a calculus through the anus if very large, constitutes, it may be said, a sixth and last objection. I conceive no inconvenience at all could attend taking it from the bladder into the rectum, but the calculus may be rather large to pass with a forceps through the anus, without danger of laceration; in which case I would introduce the moistened bladder of an animal into the intestine, with a considerable opening in it; then, having shifted the stone into this pouch, pull, by means of a tape fastened to the upper part of the opening, steadily, and I presume it would bring the calculus through, without any pain, in the course of a few seconds.

That large bodies can be extracted through the anus is a well known fact; Mr. White, of Manchester, extracted an alvine concretion as large as his fist. He thus relates the circumstance: "Upon introducing my finger into the anus, I distinctly felt a large body moveable in the rectum, which I *easily* took hold of with a pair of forceps, such as are used in lithotomy, and immediately brought it away without much difficulty. It was a ball nearly as big as my fist, and breaking in the extraction, discovered a plumb stone in the centre, which was its nucleus. Upon further examination, I found there was another, nearly as large as the first."—But provided that the stone was of an enormous size, nothing would be easier than to break it in the rectum; as the great objection to breaking calculi in the bladder, that of the danger of leaving fragments behind, which might become the nuclei for other stones, is by no means applicable here.

CHAP. IV.

The Advantages and Disadvantages of the Posterior and Lateral Methods of performing Lithotomy, considered.

I shall now endeavour to make an impartial estimate between my proposed method of performing lithotomy, and the plan most approved of in this country, which, as has been mentioned before, is termed the lateral operation. It may be said, and with every degree of justice, that the posterior operation is not *totally* exempt from danger: the same may be said, and with equal propriety, of the simple operation of phlebotomy or venesection; for no man can presume to say that the most trifling one on the living fibre, is not liable to unpleasant effects, nay fatal consequences. In investigating the merits or demerits of this operation, there are two considerations, I presume, worthy of attention: First, whether the proposed operation be calculated to ameliorate the sufferings of our fellow-creatures, by removing from them that which is gradually undermining their constitutions, and which ren-

ders life itself a misery to them, in a *less painful way*, and with *equal safety*, as any other that has been adopted: secondly, that it is every surgeon's duty to prefer that operation which produces *less suffering* to his patient, provided it can be performed *as safely, although not more so*, and be as effectual as any other method. If it be a surgeon's duty to prefer an operation which produces less pain to his patient, although it may not be attended with *less danger*, how much more is it incumbent on him to prefer an operation which (if certain facts, and an intimate knowledge of the structure of the parts be sufficient to warrant an assertion,) is not likely to produce the one hundredth part of suffering and agony, nor be exposed, in the above proportion, to danger, that the common or lateral operation unavoidably is.

But, I presume, that whether this new method of cutting for the stone be exposed to *any* dangerous or fatal consequences, is by no means the question to be decided; if the approbation of the profession or of the public depends upon this, it will very soon sink into oblivion. The question, in my opinion, is, whether the posterior method of performing lithotomy be *more exempt* from danger, and dangerous consequences, than the lateral operation? this is the important point to

be decided; for as to what I stated respecting the difference of suffering in the two operations, I am inclined to think every surgeon will concur with me.

By performing lithotomy according to the lateral method, you expose your patient to the following *unavoidable* circumstances:—First, excruciating torment (lest it might be thought that I here exaggerate, I shall, before I conclude this chapter, quote a few sentences from the works of the greatest advocates for the lateral operation), not only in cutting through structures exquisitely tender, but also in searching for and extracting the calculus. Secondly, to an extensive wound, which must be kept open for, at the very least, in the most successful cases, three weeks; and besides the urine perpetually passing through this opening. Thirdly, to the loss of a considerable quantity of blood. Let it be recollected, that these three circumstances are *unavoidable,* and *must occur in every instance,* in the fashionable method of performing lithotomy.

Now, before I proceed to enumerate the dangers to which this lateral operation *is liable,* I beg leave to observe, that the posterior, or my method, is *totally exempt from all the above evils.* The lateral operation is exposed to three principal dangers, and these are not imaginary, for

they have proved fatal in too many instances. My method is also, I acknowledge, more or less exposed to the same; these are hemorrhage, extravasation of urine, and inflammation; and to which of them, they or either of them are most likely to occur, I shall now investigate.

First, a troublesome hemorrhage, I consider far more likely to attend the lateral than the posterior operation; for the following reasons: Because, first, the arteria transversa perinei is always divided in the former method, the artery of the bulb not unfrequently; and the pudic itself sometimes. The greatest nicety in the operator, and the most perfect knowledge of the anatomy of the parts is absolutely necessary to avoid wounding the latter vessel, which is the trunk of the two former; and notwithstanding these qualifications, it is now and then divided; as a late author says, "we cut within a hair's breadth of the patient's life." I need not justify this assertion to any one who is acquainted with the course of the pudic artery, and the proximity of the knife to it in many stages of this operation. Besides these, there are a number of lesser vessels around the neck of the bladder and prostate gland, which although not of themselves dangerous, yet contribute much to reduce the strength of the patient; and when a secondary hemorr-

hage occurs, in a system thus debilitated, nature frequently sinks.

When the pubic artery happens to be wounded, there is considerable difficulty in checking the flow of blood; and frequently, notwithstanding the most active and judicious exertions of the surgeon, the patient falls a sacrifice to the accident. It is almost impossible to tie this artery, in consequence of its deep situation, but it has been lately done; graduated pressure with sponge and compresses, is what is generally advised on such occasions. On the contrary, the bleeding that must necessarily take place in the posterior operation, is merely sufficient to check any inflammation which might supervene; the vessels divided are mere twigs, and by no means the size of the labial arteries, which always spontaneously cease bleeding after the operation for hare lip, or cancerous affections. Should the arteria hæmorrhoidalis ant. be wounded, I do not (as I said in another part of this work) think it would give any trouble; if it should, the method advised before might be effectually adopted. It is not larger than the transversa perinei artery, which is always cut in the lateral operation, and never requires the ligature. Thus then it may be observed, that in the lateral operation several vessels are unavoidably wounded, and a

very dangerous artery (the pudic) is within a most inconsiderable space of the knife. In the posterior operation the latter vessel is totally out of the reach of the knife; and the only vessel that *may possibly* be wounded, is only the size of that one (transversa perinei) which is *always* wounded with impunity in the lateral operation.

As to the comparative liability of these two different modes to extravasation of urine, the situation, nature, and depth of the incision ought, one would imagine, to decide the question at once; and indeed I am almost ashamed to advance any arguments on the occasion. In proportion as a tumour is freely opened, at its most depending part, so is the inconvenience of a lodgment of matter obviated: this is equally applicable to the present purpose; for the more direct outlet the urine has from the bladder, the less likely is an extravasation of urine to take place. One formidable objection to the high operation is the longitudinal extent of the incision, by which the parts are much exposed to an extravasation of urine. In the lateral operation, the incisions made are in two directions, the external ones somewhat perpendicular, and the internal, or that which divides the neck of the bladder and prostate gland, horizontal; the latter incision is made, as it were, *over* the rectum, which exposes

the cellular substance lying on the upper part of that gut. From the direction of this cut, extravasation of urine by the sides of the rectum would unavoidably take place, but for the judicious (at the same time I must confess appalling) extensive external incision, which extends from the verge of the scrotum *beyond* the anus, running between that part and the tuberosity of the ischium; further, it is obviated (although it sometimes does occur) by keeping this wound open, being filled with lint, and the urine passing through it. In the posterior operation the incision is made in the most depending part of the bladder, through no thickness of substance; and was it an object to let the urine flow for any time by this cut, it might be done with the greatest safety. I presume these remarks, with those that have been made elsewhere, are sufficient to convince any person that there is no possible chance of extravasation of urine from a cut made into the bladder, in this part of the viscus.

When the nature and structure of the parts which are the seat of the lateral operation, and that of those which are the seat of the posterior one, are compared together, I am convinced no unprejudiced person will hesitate in saying that the probabilities of inflammation are ten to one more likely to occur in the former than in the latter method.

In the lateral operation, the external incision makes an extensive division of the common integuments, cellular substance, muscular and tendinous fibres, &c., of the perineum; the internal incision divides the lining membrane of the urethra (an extremely sensible part, even in a healthy condition), the prostate gland, and neck of the bladder, the latter being at the period of operating in a most *irritable condition.*

In the posterior, the parts divided are not one tenth of those which are in the lateral operation: the incision is made upon a healthy part of the bladder; and should the peritoneum be nicked, it does by no means even balance the chance of inflammation between the lateral and posterior method. See the answers to the second objection. Another argument may be stated, viz. that in this method there is considerable danger of wounding one or another of the vasa deferentia. I acknowledge that it is not by any means impossible; nor is it in the lateral operation: for the accident has occurred, and *perhaps more frequently than the public are aware of,* or the *faculty willing* to grant. I conceive that the knife kept steady in the groove, or close to the side of the staff, together with the smallness of the incision, which is necessary to be made for the extraction of the generality of calculi, will render this accident

not more likely, nor even as much so, in the posterior as in the lateral method. But suppose it was absolutely necessary (which I by no means grant) to cut one of these tubes, in the extraction of an *enormous* calculus; which would be rendering more justice to our patient, to run the risk of his undergoing the lateral operation, and all its consequences, or to run the risk of cutting one of the vasa deferentia? It may be said he is deprived of the power, more or less, of propagating his species. I answer, that a person labouring under the burden of a large calculus, is but in a poor condition to accomplish this object: further, the danger of life, of a fistulous opening, and of this very accident occurring in the lateral operation, with *the agony* he endures, by no means compensate for the chance he possesses of enjoying the use of *both* his testicles; for recollect, that only one of the ducts can possibly be wounded.

Finally, is not the consideration of the patient's feelings to have any weight with us, in giving a preference to one or another of these methods. I conceive it should influence us considerably, provided it be not incompatible with the patient's safety. The simple, single and quick cut which is made in the posterior operation, and that through mere membranes (none of them the

proper seat of feeling) in actual contact, render this method attended with nothing more than a sensation, which can hardly be called *pain:* puncturing through the same parts is stated to give no more pain than bleeding in the arm. On the other hand, it is well known that the lateral operation cannot be performed without giving the most *excruciating suffering;* the necessity of tying the patient's hands and feet sufficiently proves the anticipated torments the person is to undergo: there is no other operation where this precaution is requisite.

The first time I saw it performed, I can only express my feelings in the words of a celebrated poet:—" Obstupui, steterunque comæ, et vox faucibus hesit." Mr. Charles Bell, and the celebrated Cheselden, appear to concur with me in these sentiments. The former says—" The best lithotomists, whom I have seen operate, have gone to work with anxious feelings." Cheselden confessed that he suffered an anxiety even to sickness, before operating; and until the immediate call upon his resolution and firmness banished all thought of the precarious nature of the operation, and the anticipation of the infinite variety of ways in which discomfiture overtakes the surgeon. For my own part (continues the same author), I have seen many good surgeons ope-

rate; but those who have been the most confident, and boasted most of their uniform good success, have generally failed in some essential circumstance. Lithotomy (he continues) is unquestionably the most difficult, and were I to judge by what I have seen, the most precarious operation of the whole circle of domestic surgery. The violence of the operation without hæmorrhage or inflammation, I have seen kill the patient in about ten hours. The *continued pain* and *violence* of the operation is in this case too much for the nervous system to bear, and the powers of life are destroyed before they are assaulted through the vascular system." It is to be recollected that these are not the sayings of a person endeavouring to dissuade the profession from the lateral operation: were this the case, they might be viewed as partial, but they are the sentiments of two of the greatest advocates for the lateral operation.

If the rectum has been repeatedly cut, punctured, &c., with the greatest impunity; nay, if actual portions of this intestine have been extirpated (as in the old way of operating for fistula in ano) with safety: further, if the rectum and bladder have both been wounded together, even under the most unfavourable circumstances, as before related, and afterwards healed remarkably

well; what have we to dread from performing lithotomy here? Certainly not the apprehension (abstractedly considered) that wounds of these parts will not heal well: a host of cases prove the contrary. It cannot be the apparent difficulty of extracting the calculus through the rectum; for cases have been already mentioned in this work, where concretions, the size of the fist, have been extracted from the rectum with facility. It cannot be the dread of wounding the peritoneum, as, I trust, sufficient has already been said on this point to remove every scruple about it. Not the danger of extravasation of urine, of fistulous communications, of violent suffering to the patient; all these are equally improbable; and the length at which they have been separately treated of before, renders, it is presumed, any further observations unnecessary.

CHAP. V.

A brief View of the Anatomy of the Pelvic Viscera.

The pelvis, or bason, situated at the lowermost part of the trunk, which contains certain viscera (principally reservoirs for the excrementitious fluids, and the excretory ducts of certain glands), is bounded anteriorly by the ossa pubis, posteriorly by the os sacrum, superiorly by the abdomen, inferiorly by the os coccygis, the sacro-sciatic ligaments, and levator ani muscle, &c.; and laterally by the ossa ischii. The viscera it contains are *chiefly* two, the urinary bladder and intestinum rectum; these so entirely occupy the pelvis, that the whole lower part of the bladder, and all the rectum, is embedded in fat, and connected with the parietes of the cavity by loose cellular substance. The urinary bladder, in its distended state, is bounded anteriorly and inferiorly by the ossa pubis and perineum, posteriorly by the intestinum rectum, and superiorly by the abdomen. It is somewhat of an oval shape, and is divided by anatomists into its fundus, body,

and neck. It receives a partial coat from the peritoneum; its anterior inferior, posterior inferior, and inferior lateral portions, are destitute of a peritoneal tunic: these parts lie in contact with the pubis, perineum, and lower part of the intestinum rectum. Three strata of fibres have been observed in its muscular coat; these are very strong, and run in different directions; in consequence of which they have been reckoned under the head of one muscle, termed the Detrusor Urinæ. Its vascular coat is nothing more than a layer of cellular substance, with a few blood-vessels ramifying in it. The internal or mucous one is perpetually bedewed with fluid, secreted for the purpose of protecting the internal surface of this viscus from the acrimony of the urine. The power of distention and contraction in the bladder is considerable; it can expand, so as to contain two pints, and contract so as to expel the smallest quantity. It is this mucous or internal coat being continued along the lower part of the penis that constitutes what we term the urethra, which is surrounded by a spongy body, called the Corpus Spongiosum Urethræ: the space (which is very small) between the commencement of this body and the prostate gland, is termed the membranous part of the urethra. Where the bladder contracts towards the arch of

the pubis, and from which the urethra commences, is the neck of this viscus; the superior part of the bladder is its fundus; and the space between these two parts, its body.

The neck is surrounded by a hard substance, about the size and figure of a chesnut, termed the prostate gland; it is of a firm spongy texture, and when cut into, resembles much a schirrous gland. It rests upon the rectum, being situated between the lowest part of this gut, and the neck of the bladder. Mr. Charles Bell accurately describes the relative situation of the parts between the verge of the anus, and the cul-de-sac of the peritoneum, in the following words:— "When the catheter is introduced, and the surgeon examines the state of the parts by the rectum, he will first distinguish the curve of the staff, covered with the bulb of the urethra; behind this, the catheter will feel more bare of parts, but still covered with a greater thickness of parts than one should expect from the description of the membranous part of the urethra. And behind this again he will feel the prominence of the prostate gland, not round, distinct, and accurately defined, but gradually lost in both before and behind, among the surrounding cellular membrane, and muscular fibres which involve it." Two soft bodies are attached to the

base of the prostate gland, termed vesiculæ seminales; they are composed of a number of cells, of a knotted appearance, they are about two inches or more in length, and half an inch in breadth, as they proceed from the prostate up along the posterior part of the bladder they diverge from each other; so that a triangular space is formed by those bodies, and the reflection of the peritoneum from the bladder upon the rectum. The apex of this triangle is at the margin of the prostate gland, while the cul-de-sac of the peritoneum forms its base; between this part of the bladder and the rectum, nothing but a little cellular substance is interposed; in fact the coats of these viscera, at this place, lie in immediate contact. It is here the bladder is punctured from the rectum, and it is in this place that the *posterior* operation is to be performed. On the inner margin of the vesiculæ seminales, the seminal tubes or the vasa deferentia run to reach the urethra, in which they terminate in common with the ducts of the vesiculæ seminales, in that part called the verumontanum. At the outer side of the superior extremities of the vesiculæ seminales, the ureters enter the bladder by a very oblique opening.

The most depending part of the bladder, when the patient is on his back, is this triangular space; consequently all fluid naturally gravitates towards

this place, while the body is in the above position; but when the individual lies on his face, the urine, drippling from the mouths of the ureters, will run down the sides of the bladder, to reach the fundus of this viscus, and not a drop in this position of the body, can touch this triangular space, unless the bladder be distended with fluid.

The rectum, or last gut, which lies between the sacrum and urinary bladder, answers pretty much the same use for the process of digestion, as the latter viscus does for the secretion of the kidneys, namely, as a reservoir for the excrementitious part of the food; to answer which purpose they must be somewhat similar; that is, the rectum must possess power of contraction and expansion, as well as the bladder; and this we find to be the case. Thus the rectum is sometimes so distended with fæces, as to prevent, in a considerable degree, the bladder from containing its usual quantity of urine without great uneasiness; and, on the other hand, the bladder has been so distended with urine, as nearly to occupy the whole of the pelvis, and almost totally obliterate the caliber of the rectum. This intestine possesses an equal number of coats with the other part of the intestinal canal, except at its lowermost part, where it is destitute of its exter-

nal or peritoneal one: this membrane being, as was stated before, reflected from the back part of the bladder upon this viscus. Its muscular coat is composed of two strata of fibres, the external ones running longitudinally, the internal in a circular manner; the latter, as they advance near the anus, become stronger and stronger, till a strong muscle is formed, which guards the extremity of the gut, and closes it so effectually as to prevent the escape, not merely of the solids or fluids, but even of air. This is termed the sphincter ani muscle; it is in some degree under the influence of the will, in consequence of which the fæces can be retained for a considerable time.

The first introduction of a finger or small instrument into the rectum, by which the fibres are in a *trifling* degree separated, gives much more uneasiness than their further distention, even to a much greater degree; that is, after they are a little dilated, the patient appears to feel no inconvenience at their further distention, provided the internal coat of the intestine is not forced out, as is the case in the passing hard fæces, which is, at those periods, the cause of much distress. A considerable muscle, of a funnel shape, is inserted into the extremity of the rectum, and passes between the fibres of the sphincter ani, and the

longitudinal fibres of the gut; it is termed the levator ani, and arises from the inner side of the os pubis, os ischium, and from the tendon lining the obturator internus and coccygeus muscles; after the evacuation of the fæces it draws up the rectum, and assists considerably in shutting it.

The arteries of the rectum are derived from the inferior mesenteric, hypogastric, and pudic; the former after giving off branches to the colon, &c., runs down behind the rectum, completely encircling the upper part of the intestine with its branches; it is called the arteria hæmorrhoidalis interna, or posterior. The latter, as it is passing by the anus, gives off some inconsiderable branches, which go to the bladder, prostate, and rectum, those to the latter part are termed Arteriæ Hæmorrhoidales Externæ. A small artery which runs down the anterior surface of the rectum, called the middle, or anterior hæmorrhoidal artery, is sometimes a branch of the hypogastric, at other times of the pudic; it is not unfrequently wanting: I have seen it bifurcate almost at its commencement. It is chiefly distributed upon the upper part of the intestine, where it anastomoses with the branches of the posterior hæmorrhoidal artery; it gives twigs to the under part of the bladder, to the vesiculæ seminales, and prostate gland. It is this artery that the late

Mr. Hey so unaccountably cautioned us against wounding, in tapping the bladder through the rectum; for my part, I have never heard of the least inconvenience arising from cutting this artery, which must have occurred repeatedly when the rectum is cut for fistula, several inches up the intestine. The veins of the rectum run up at its posterior part, to contribute in the formation of the vena porta.

I have given but a very concise and general view of the anatomy of the pelvis; for it appears to me unnecessary to go more minutely into the subject, as it is so well known now by almost every surgeon, and so ably delineated by our modern authors.

CHAP. VI.

Symptoms of the Stone in the Bladder.

THERE is not one of all the characteristics of this disease (except that of feeling the calculus by sounding) which I have not found fallacious. The sudden stoppage of the urine, and the increase of pain after any violent exercise, as jolting in a carriage, &c., which are considered by the generality of practitioners as infallible symptoms of the presence of calculi, I have frequently found attending other diseases of the bladder, where positively no stone was present; neither do I consider passing of calcareous particles, united to the above-mentioned symptoms, as an infallible sign of the stone; for I have met them all united together, with the other symptoms generally enumerated; such as pain in making the last portion of urine, itching at the extremity of the penis, &c.; and no stone was to be found. Of this fact I had the most positive proof; the individual having died two weeks after I sounded him, in consequence of an old hernia united

with his other complaints. On dissection, I found the coats of the bladder better than an inch thick, of a purple hue, it could not contain more than two ounces of fluid, a few grains of calcareous matter were lodged in the rugæ of the internal tunic. The prostate gland was not much enlarged. Thus it is evident that there is a possibility of all the symptoms presenting themselves, and no stone be present.

I have at this moment several individuals under my care, who have almost all the symptoms of the stone, and yet although I have repeatedly sounded them, cannot discover the presence of a calculus. There is one man in particular, about thirty years of age, who has been affected with (as his mother expresses it) *the gravel* since he was eleven months old, with the exception of an interval of three years, when he was about twenty years of age, during which period he was perfectly well. He is now periodically attacked with the most violent fits, to all appearance, of the stone: the only way he finds relief is by standing on his head, and throwing his feet against a wall. During the attack, which regularly comes on every three weeks, he passes blood, sand, and mucous; his right testicle is forcibly retracted, and he suffers the most excruciating pain. I sounded him six times during the inter-

val of ease, but could never discover the presence of a stone. I afterwards sounded him while a fit was present, and touched a calculus; my students also felt it. A day was appointed for the operation, and several medical gentlemen attended: on introducing the staff, nothing could be perceived either by me or any one else: every possible method was resorted to, but without effect; the operation was of course desisted from. Since that day he has had several attacks, and I have slightly touched the calculus, but in so trifling a degree, as, I conceive, would not warrant any man to operate. If this person has a stone, I am inclined to think that it must be in a pouch of the bladder, and that when it partially escapes from its sack, it produces the symptoms before related. I confess I cannot account for the circumstance in any other way.

To conclude this subject, it may be observed, that the greater number of those symptoms occurring together, the stronger will be the probability of the presence of a stone in the bladder; but even when all the symptoms are present, we should not depend upon them, nor upon any circumstance short of the actual touch of the foreign body with our sound or staff, and that at the moment previous to the operation.

CHAP. VII.

Conclusion.

ALL that has been advanced in the preceding pages, may be now advantageously summed up.

First, The lateral or present method of operating for urinary calculi is (independent of the dangers to which it is *exposed)* invariably, and unavoidably, *from the very nature of the operation,* attended with three great inconveniences, viz. excruciating suffering (Cheselden)—the impossibility of the wound healing soon (Bell, &c.), it being necessarily kept open for a *length of time;*—and, lastly, the loss of much blood *.

Secondly, The lateral operation is one, when performed, even by the most eminent men, extremely dangerous, (Cheselden, Bell, &c.)

Thirdly, The proposed operation (the posterior one) is attended with little or no pain; with very little loss of blood; and with the probability, in

* This is the only one of the three that does not invariably occur.

ninety-nine cases out of a hundred, of the cut being perfectly healed in forty-eight hours.

Fourthly, These assertions are founded upon actual facts; the parts divided in this operation having been repeatedly wounded with the greatest impunity; and healed remarkably well.

Fifthly, The objection, "that the bladder, being frequently in a diseased state from the presence of a calculus, might prevent the healing immediately of the wound, and contribute much towards a fistulous communication between these viscera," can be most satisfactorily answered; for while it is granted that the bladder is generally diseased while it contains a calculus, and that this might prevent the wound in the *coats of the bladder* directly healing; it is to be recollected, that there is something else *besides the coats of the bladder* divided in this operation, namely, the healthy intestinum rectum; so that the wound in the bladder healing, or not healing *directly*, is but of minor consideration, provided the incision in the intestine be immediately healed, or at least that the communication between the two viscera be obliterated, which is proved will be the case. See page 42.

Sixthly, That the lateral operation is extremely *liable* to certain dangers, viz. violent inflammation, extravasation of urine, and fatal hemorr-

hage; to which the posterior, or my method cannot possibly be considered in the one hundredth degree.

Seventhly, Were there not even facts to corroborate this assertion, the nature of the parts divided in the two operations should be sufficient to convince any person acquainted with them, of its correctness.

Eighthly, That the peritoneum being considered peculiarly favourable, or predisposed to extensive and fatal inflammations, is a doctrine founded upon an ancient prejudice, and without a single physiological or pathological fact to substantiate it.

Ninthly, and lastly, That all the objections which have been hitherto advanced against the high operation, the apparatus major and minor, the Merean operation, cutting on the *gripe*, and the recto-vesical operation (as now practised on the Continent), are all effectually obviated by the posterior one.

FINIS.

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NOTES.

I. It was observed in page 49, that the most depending part of the bladder, when inverted, would be its fundus, and consequently that a fluid cannot reach the part of this viscus divided in my operation, while a passage for it lies between them. Suppose a certain vessel with a perforation in its side, no matter how small, it can never be filled while the foramen is unobstructed, and while the diameter of the stream does not exceed that of the opening. To this it may be objected that the urinary bladder differs considerably from any vessel possessing unyielding parietes ; true, but it should be recollected that although the bladder *contracts* to expel its contents, that when collapsed, it is *inactive*, and in the act of being distended, is completely *passive;* so that were the bladder of a dead animal substituted for the experiment, it would be as impossible to distend it (while the conditions above-mentioned are attended to) as to fill the vessel possessing unyielding parietes. There is, I conceive, a great difference between the way in which a liquid, and that in which air, acts in distending a bladder; the latter presses almost equally on all sides, whereas the former accumulates on the inferior surface, and first depresses that part, rising gradually from below upwards. But what, in my opinion, puts this point beyond all doubt is the success that has generally attended the high operation, with the improvement of M. Dupuytren, and described by Mr. Carpue. The principal cause of failure in the high operation, arose from the extravasation of

urine; to obviate which, a counter opening is made by those gentlemen, in the membranous part of the urethra, to keep a depending outlet for this fluid: this has, I believe, accomplished the desired object, that of preventing the urine escaping into the cellular substance, although the bladder be collapsed, and of course the divided portion of this viscus be in actual contact with the inferior part of it. The only difference, then, between the method adopted in this operation and mine, to guard against extravasation of urine, is, that I make use of the *natural passage* to draw off this fluid, they, of an artificial one. But both act upon one and the same principle: if, therefore, the former has been successful, it is only natural to suppose the latter will also.

II. The necessity of keeping a catheter in the bladder for some time after the operation, was stated, in page 52, to be rather doubtful; but I am now fully persuaded of its being absolutely necessary; so that the urine may pass off *spontaneously*, independent of any assistance from the bladder.

III. The mattress upon which the patient is to lie, after the operation, should have an oval opening in its middle, equal in size to the abdomen; by which means pressure of every description on the bladder will be avoided.

IV. The observations in page 71, respecting the succession of the situation for lithotomy, to that of puncturing the bladder, are not intended to intimate, that the latter *originally* preceded the former; but when both come to be practised that they alternately changed.

EXPLANATION OF THE FRONTISPIECE.

A—The Bladder.

B—The Calculus.

C—The Intestinum Rectum.

D—The coats of the Bladder and Rectum in contact, and the part which is divided in this Operation.

E—The Sphincter-Ani Muscle.

F—The Speculum-Ani or Dilating Forceps.

G—The Staff.

H—The Prostate Gland.

I—The Bulb of the Urethra.

K—The Scalpel.

L—The Cul-de-sac of the Peritoneum.