

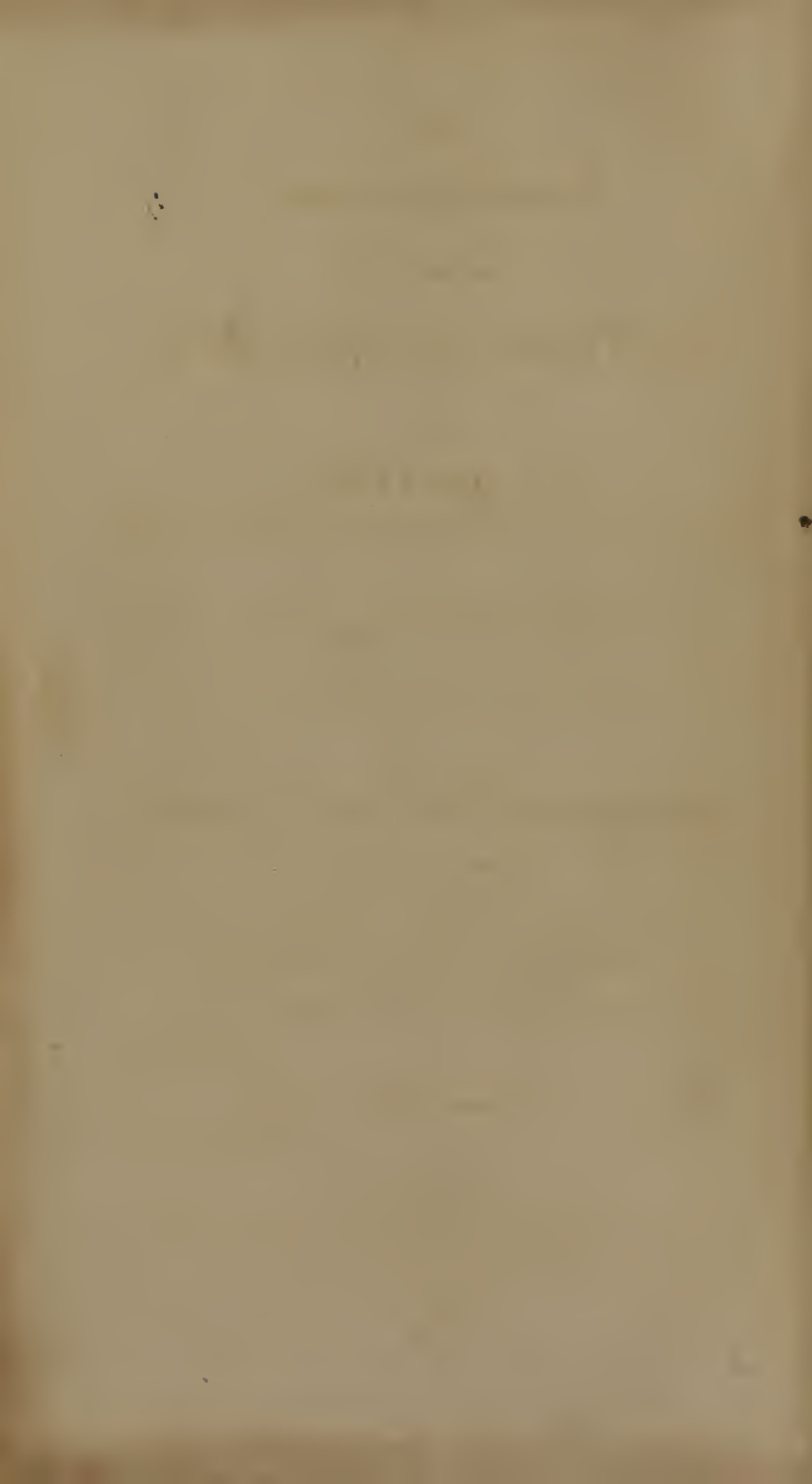
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INDEX

Section, Surgery.

No. 537.



THE
SURGICAL WORKS,
OR STATEMENT OF THE
DOCTRINE AND PRACTICE

OF

P. J. DESAULT,

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

BY XAVIER BICHAT,

His Pupit, adjunct Physician of the same Hospital.

IN TWO VOLUMES.

DISEASES OF THE SOFT PARTS.

TRANSLATED FROM THE ORIGINAL,
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“P. J. Desault, surgeon in chief of the great Hospital of Humanity,
“at Paris; by Xavier Bichat, his pupil, adjunct physician of the same
“Hospital. In two volumes. Diseases of the Soft Parts. Translated
“from the original, by Edward Darrell Smith, M. D. Professor of
“Chemistry, &c. in the South-Carolina College.”

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and other prints.”

D. CALDWELL,
Clerk of the District of Pennsylvania.

TRANSLATOR'S PREFACE.

NO apology can be necessary, for presenting to the Medical world, in an English dress, the works of such a celebrated Surgeon as Desault. The first volume of these Works was translated some years since, and its publication, it is believed, has met with general acceptance. It has probably excited, in all who have perused it, a desire to be acquainted with the illustrious author's other labours, which are comprised in two more volumes. As, from the time that has since elapsed, the translator of the first volume does not appear to have contemplated any further progress, I have been induced to make the following attempt, and now with diffidence offer a translation of the two last volumes, which, I trust, will be found no less important and interesting than the first. With regard to the execution of the translation, it is no doubt imperfect; but I have always carefully endeavoured to understand and convey the author's ideas, although I will not presume to say, that I may not sometimes have failed in both. My aim has been accuracy and fidelity in the rendering of the meaning, rather than elegance of expression in the style. Such as the work is, I hope that it will be useful; and that a well meaning, if it be an imperfect attempt, will meet with requisite indulgence from the candid reader.

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SURGICAL WORKS, &c.

DISEASES OF THE SOFT PARTS.

SECTION I.

Diseases of the Head.

MEMOIR UPON WOUNDS OF THE HEAD.

1. **N**O subject in surgery has given more employment to the pens of authors, than that of wounds of the head. It would be reasonable to suppose, on reviewing the immense collection of their works, that art had nearly reached perfection in regard to this subject. And yet how distant is it still from it! How many doubts are to be removed, how many uncertainties to be cleared up in the diagnosis, prognosis and treatment! The unfavourable influence of these wounds upon the important organ with whose functions those of all other organs are so intimately connected; the numerous phenomena which are the remarkable effects of this influence; the uncertainty of the causes on which these phenomena depend; the difficult removal of the veil behind which these causes are hidden; the obscurity resulting as to the choice of means proper to oppose them;—all seem, by obstructing the path of the practitioner, to animate his

exertions. But these exertions will be of no avail, unless guided by observation, a maxim always acknowledged and always too little regarded.

2. It is true that hypotheses have not been multiplied upon this subject; but does it result that the judgment will progress in a right direction, because it has not been led astray by the imagination? In relying upon facts, general principles must be founded upon their number. A few detached examples cannot afford grounds for rules that are to be generally applied. In this many practitioners, who were too eager to establish precepts, have erred. Even the celebrated Petit is not free from such a charge, in regard to the present subject.

3. Another method must be pursued. We must observe nature, collect a number of facts, assume their assemblage as principles, and at length venture to make some inferences from them. What reason have we to decline this method, especially in the injuries of an organ, in which the mystery that already envelops its functions in a natural state seems to become still more impenetrable?

4. To treat this subject with order, I will examine the influence of external violence: 1st. Upon the exterior coverings of the head. 2d. Upon the bones of the cranium. 3d. Upon the brain and its membranes. Hence arise three divisions. The first, devoted to some reflections on the wounds of the integuments, and particularly on a circumstance frequently complicated with them. The second, to fractures and to compression of the brain, occasioned either by depression or by effusion. The third, to the commotion, contusion, inflammation and suppuration of the brain and its membranes.

ARTICLE I.

Wounds of the Integuments of the Head.

5. Authors have divided wounds in the head, as in other parts, into puncturing, cutting or bruising, according to the instrument which has occasioned them; each presenting particular, characteristic phenomena, and frequently different indications. It is not my intention to bestow a particular consideration on these phenomena and indications; because nothing new on this point is to be met with in the practice of Desault. I refer the reader to modern authors, as Petit, Pott, Sabatier, &c. for the history of bloody tumours, the effect of contusions, the means of reunion in cutting wounds whether simple or with laceration, and the different complications which the injury of the bones of the cranium adds to these wounds. I wish only to call the attention of the reader to a symptom frequently observed here, whatever may be the mode of division, and which very few authors have considered in a proper point of view, although all have made some mention of it; namely, the erysipelatous inflammation of the integuments of the head.

§ I. *Of the Erysipelas of the Integuments of the Head, and of the Wounds affecting them.*

6. Erysipelas, a kind of inflammation whose cause, in a great number of cases, seems to be fixed in the first passages, is generally a very frequent complication of wounds, especially in large hospitals, where unwholesome air, the contact of a number of unsound bodies, food almost always prepared badly, contribute greatly to the production of a state of saburra that often becomes habitual. In no part is the influence of this com-

plication more manifest than in wounds of the head. Most of the wounded experience it in a greater or less extent, and with symptoms more or less alarming. It accompanies wounds occasioned by puncturing, cutting or bruising instruments, but perhaps the first most frequently.

7. A pain, sometimes dull and heavy, sometimes sharp and burning, is the ordinary precursor; to this is added a swelling of the edges of the wound, at first slight, in a little time extensive. About the same period the tongue is covered with a yellow fur; the appetite fails; nausea, inclination to vomit and throwing up bilious matter harass the patient. He feels a disgust for all sorts of food; sometimes a rigidity (*rénitence*) more marked, and a sensibility more acute than usual are to be perceived in the region of the liver. Finally, under all these forms there is a full display of the affections of the *primæ viæ*.

8. If the disease has made some progress, the swelling extends, occupies all the hairy scalp, is propagated even to the face, assumes a colour more or less red, always mingled, particularly in the face, with a yellow tint, which quickly recedes under the pressure of the finger, and as speedily returns. It is often complicated with an edematous puffing, and at other times presents scattered vesicles, that are filled with a yellow serosity.

9. The pains of the head increase; the skin becomes dry, manifests a heat, which is always characterized by a degree of sourness, so striking in bilious affections. The pulse is hard, small, tense and frequent. The aspect of the wound is changed; at the beginning the edges swell, become dry, and suffer no fluid to escape; but if suppuration has been already established, it becomes a yellow fluid sanies, and often fetid. The tension of the integuments is considerable, and if art is not then

able to effect a resolution, abscesses are formed, which make openings for themselves commonly behind the ears and the upper eye-lids, frequently in other places. When the symptoms are more intense, delirium and coma sometimes supervene; but generally, in this state, the bilious character is not so predominant as the phlegmonous.

10. If we reflect on the accurately described progress of the subject before us, it will be perceived, 1st. That the bilious aspect is generally prevalent. 2d. That the seat of the disease exists essentially in the first passages, whose saburra keeps up the symptoms. 3d. That there is an unknown but real connexion between the abdominal organs and the parts affected with erysipelas—a connexion which will appear more obvious, if it is considered how seldom the symptoms become violent without a correspondent affection of the liver, or even the formation of an abscess in it; as has been observed by many authors, and by Petit in particular, in a great number of wounds of the head, which were under his care at the same time in the military hospital of Courtray. But our attention will be devoted more particularly to this point, when we treat of commotion and inflammation of the brain.

11. If from these considerations, founded upon a strict observance of nature, it were permitted to adduce reasons as to her mode of action in such cases, the following appear to be the most probable. 1st. One of the peculiar effects of wounds of the head is to produce in the abdominal viscera a bilious affection, manifested by the appearance of the ordinary symptoms, which we see in effect preceding all other affections. 2d. This disposition, in a little time diffused generally throughout the system, exerts a more particular influence on the integuments of the head, already affected by the wounds,

and determines to it the series of phenomena stated, (8 and 9) from whence it follows, that there is really an action of the wound upon the primæ viæ and a reaction of those upon the wound. What can be the unknown tie that connects with each other the derangements of organs so distant? The knowledge of it is not important. Its existence is sufficient for us to found the indications of cure.

12. However, it sometimes happens that the bilious character is less decisive in this erysipelas; in that case the nausea, bitterness of the tongue, &c. do not precede; on the contrary the tongue is dry, arid and even red; the thirst ardent; the pulse is stronger and less confined; at the same time the swelling becomes considerable, but the skin is more tender and redder than in the preceding case; sharp, throbbing pains torment the patient; the face appears red; the eyes inflamed, and then delirium, coma, &c. often manifest themselves. This phlegmonous character of erysipelas is rarely seen, in comparison with the other, especially in large hospitals, where every thing disposes the patients to that. Besides, in a little time, the symptoms generally become more calm, particularly if suitable bleedings have been employed; and then the tongue begins to be furred, nausea and vomiting supervene, and all the symptoms shortly assume the bilious aspect.

13. Most authors have paid attention to the subject before us, and some have traced its progress; but all have believed its seat to be purely local. Some attribute it to the stagnation of putrid juices in the thickness of the integuments, and sometimes below the pericranium. Pott thinks that the symptoms pointed out (7—10) depend solely upon the injury of the integuments and the cellular membrane; and when they assume the character traced (12) they are to be attributed to the injury of the

aponeurosis of the cranium and of the pericranium. Most other practitioners, without distinguishing, like Pott, the nature of the symptoms, attribute all of them equally to this injury; pretending at the same time that in the puncture of the aponeurosis, its boundaries limit the extent of the swelling; on the contrary, in that of the pericranium, it is generally diffused; an opinion evidently formed from anatomical investigations rather than from the observance of nature.

14. Are these symptoms really to be attributed to the injury of the aponeurosis and of the pericranium? Some doubt may be entertained on the subject, from observing, 1st. That both these membranes are insensible. 2d. That this opinion was formed at a time when they were supposed to possess extreme sensibility. 3d. That in other parts of the body a wound, which affects the aponeurosis or periosteum, is rarely found to be complicated with these unfavourable symptoms. 4th. That in the present case there frequently are wounds, which affect only the integuments and cellular membrane, and still they present the phlegmonous character (12). 5th. That, on the contrary, there are cases in which the injury of the aponeurosis and pericranium cannot be doubted, and where no such affection is manifested. 6th. That it is seldom that these affections do not yield to means employed principally in the *primæ viæ*.

15. However when the inflammation is obvious, especially when it attacks the parts subjacent to the aponeurosis, it must be acknowledged that the difficulty experienced by the parts swelling from the tension of this membrane, and the kind of strangulation which then takes place, aggravate the affections, even change their character and indicate consequently large incisions to remove the effects by destroying the cause. But in general, the influence of this principle has been too

much exaggerated. Most commonly the seat of the swelling is placed in the cellular membrane, above the aponeurosis, whether that has been wounded or not; from whence it follows that the precept of making free incisions, so generally established, ought not to be extended to so many cases as might be supposed, from reading certain authors.

§ II. *Of the Treatment.*

16. From what has been said (7—12), it may be easily conceived what should be the treatment of the affection under consideration, if it assume the bilious aspect. The two principal and natural indications are, 1st. To destroy the evil in its source, by attacking the principle which sustains it. 2d. To combat the local effects. In fact, of what service could the local treatment be, if the bilious disposition, a cause acting incessantly, was not first destroyed?

17. The first indication is generally accomplished by evacuants, which clearing the primæ viæ of the saburra with which they are loaded, remove its influence upon the wound of the head.

18. To satisfy the second indication, emollients and resolvents combined present in general great advantages. They allay the irritation, which is the inevitable effect of the wound, dissipate the pain and favour the resolution. Several authors, Richter, Selle, and Stoll in particular, think the employment of all external applications of no use; a principle always well founded, when the disease depends upon an internal cause, (in which cases Desault suffered the part to be constantly exposed to the air) but dangerous to admit in practice, when it originates from a contusion or a wound.

19. On these two indications rested the practice of Desault in wounds with erysipelatous swelling. For

such the following treatment was employed. As soon as the abdominal viscera appeared to be affected, or the slightest swelling in the edges of the wound was seen, however considerable the heat of the skin or the fever might seem, a grain of emetic tartar was given in a large portion of water. Every delay would then be pernicious, and the advice of certain practitioners, who wish the patient to be prepared by some diluting drinks, could not be followed; because by these means time would be allowed to the bilious disposition to unfold itself, for the swelling to extend, and in a little time there would be no possibility of preventing the formation of pus.

20. At the same time, the head having been shaved, must be covered, at the wounded spot, with a cataplasm moistened with a resolvent liquor, or compresses soaked in it. But here an essential precaution is to be observed, not to extend these applications much beyond the edges of the division. At that spot is the point of irritation; beyond it, the effect of the remedy would perhaps be the disposing of the parts to swell.

21. Commonly the affection subsides soon after the evacuation produced by the emetic, and a single grain is frequently sufficient, although its only effect may have been the increased secretion of perspiration and urine. Frequently, however, it is necessary to repeat the use of the same means twice or thrice. The following case, recorded by Vincendon, is an example of it.

CASE I.

A man, aged thirty-two years, was brought to the Hotel-Dieu, with a wound on the head, extending from the union of the sagittal suture with the lambdoidal to the external angle of the right eye. The drunkenness of the patient precluded him from giving any account.

The head was shaved, and the edges of the wound were brought together by adhesive plasters, and covered with lint and compresses moistened in lead water.

The next day there were symptoms of saburra in the primæ viæ; pain in the neck and shoulders; acrid heat upon the skin. An emetic was given in a large portion of water, which produced copious stools. On the third day, there was an erysipelatous swelling in the right eye and its neighbourhood; the emetic repeated on the next day and the day after; the fourth day the adhesion of the edges of the wound preserved by the simple uniting bandage; the fifth day a fluctuation towards the external angle of the eye; a cataplasm applied upon the part; the erysipelatous swelling being renewed, the same emetic was administered the sixth day; a spontaneous evacuation of pus through two openings; a bloody tumour open in the right temporal region; on the thirteenth day, the wound was completely cicatrized; symptoms of saburra; a fresh dose of the emetic. The thirtieth day, a cicatrization of the opening made in the bloody tumour. On the thirty-sixth day the patient was dismissed perfectly cured.

22. During the whole course of the treatment, a diluting ptisan, such as the decoction of dogstooth edulcorated with oxymel, was prescribed for the patient. The diet, abstemious at first and during the existence of the affection, must be relaxed gradually. In general it may be observed that abstinence, kept up too long, augments the acrimony of the humours, and often reproduces the bilious disposition, especially in unhealthy places, such as prisons, large hospitals, &c.

23. Bleeding, recommended by some authors, always exhibits great inconveniencies. Desault constantly observed, that those patients, on whom it had been practised, particularly several times before their admission

into the hospital, experienced symptoms more severe and alarming.

24. When the affection has subsided and the wound is advancing towards cicatrization, it will be prudent not to expose it too soon to the contact of air; otherwise an unfavourable relapse might ensue, as is proved by the following case communicated by Derrecagaix.

CASE II.

On the 22d of April, 1792, Jean Petit was knocked down by several blows of a pewter pot, which inflicted a wound on the head. He got up and came to the Hotel Dieu, some hours after the accident. Three wounds, one longitudinal upon the forehead, another smaller one on the top of the head, and a third with a detached portion of the integuments near the external angle of the eye, were united and dressed simply with compresses moistened in lead-water. On the next day there was some pain, a slight swelling, a commencement of erysipelas and of saburra in the primæ viæ. The usual emetic was directed. On the third day these affections had almost disappeared. On the fifth day an almost entire union of the wounds. The patient, thinking himself cured, very imprudently removed the dressing, and remained for some time exposed to the air. In the evening there appeared swelling, pain and erysipelas about the edges of the wound, fever and symptoms of the affection of the abdominal viscera. The next day the emetic draught was administered. On the seventh day the affection was amended, except the increase of swelling in the forehead. On the eighth, an abscess formed in the centre of the large wound burst spontaneously. The ninth, slight pains; a fresh dose of the emetic. On the fifteenth, the cicatrization of all the wounds was completed, and the patient was dismissed cured.

25. If instead of pursuing the progress indicated (7-10), the affection had assumed the aspect of the symptoms traced (12), evacuants administered first, might increase the irritation, already considerable. In such cases their use should be preceded by means suited to destroy it, such as bleeding, more or less frequently repeated, emollient fomentations; and if there is cause to suspect a constriction of the aponeurosis or an incomplete division of the nerves, it will be necessary to make large and deep incisions in order to remove these obstacles. In a little time the bilious disposition will manifest itself, and render it necessary to recur to the preceding mode of treatment, which commonly is the most suitable from the first attack, particularly in large hospitals, where every affection seems to assume the bilious aspect.

ARTICLE II.

Fractures of the Cranium in Wounds of the Head.

§ 1. *Of the Varieties.*

26. Fractures of the cranium are most commonly the effect of the action of hard bodies on that bony case. They take place generally in two ways, 1st. Directly. 2d. By a counter-stroke. In the first mode of division the seat of the fracture is in the place where the external body struck. The second is characterized by a contrary phenomenon. The fracture may supervene either in a spot diametrically opposite to that which was struck, or in the bone next to that which received the blow; or the same bone may be broken in a point different from that of percussion, or the internal table alone may be divided, while the external remains entire. From hence result four species of counter-stroke, essentially different. Several authors have denied their

possibility in general; but at the present day, when the most accurate observations attest their reality, and sound physics demonstrate their mechanism, they can no longer be called in question. Desault has seen a great number of examples.

27. In the fracture by a counter-stroke the division is commonly simple; it may also be so in the direct solution, but frequently it is multiplied, and then there are sometimes several rays running from a single centre, making a fracture in the form of a star; sometimes two or three divisions meet at an angle, &c.

28. The one is never accompanied with splinters, fragments, &c. The other often presents this complication, always more unfavourable, as these portions of bone being depressed by the cause of the fracture, may compress the brain and give origin to numerous accidents. The first is commonly covered by the sound integuments; the second is often indicated by wounds, contusions and a denudation of the bone.

29. Both vary in their length, which is sometimes limited to two or three inches, and often prolonged from one side of the cranium to the other, or even to its base; in their direction, which is longitudinal, transverse, oblique, or sensibly curved; in their breadth, the different degrees of which have furnished authors with the distinction, so often repeated in the schools, of crack, fissure and fracture. A very fine separation indicates a crack, in which the edges are in contact and the internal table is sometimes not affected. In a fissure the edges of the division are not so contiguous; and they are always evidently separated in a fracture, the interstice of which is generally filled up with clots of blood. Sometimes only the external table is divided, the internal having resisted the blow, and then only a crack ensues.

30. The bloody effusion, commotion and inflammation of the brain, are the most common and the most severe affections resulting from the fracture of the bones of the cranium. Sometimes instead of fracture, a separation of the sutures is the result of blows upon the cranium, an accident which is commonly occasioned by the counter-stroke.

§ II. *Of the Causes.*

31. It has been shewn (24), that there are two modes of fracture; the one direct, the other by a counter-stroke. To conceive how these take place, it may be remarked that the first effect of the action of bruising bodies upon the cranium, is to impress suddenly upon it a form different from that which is natural, flattening it in one direction and making it more prominent in another. From thence the bony fibres will inevitably suffer a distension, an agitation, which if they be propagated generally through the bones of the cranium, will produce a fracture in that spot where, being superior to the natural ductility of the bones, they find the least resistance. Now if the place struck resists as 10, while another point resists only as 5, it is evident that the fracture will happen in the latter place. This is the counter-stroke. On the contrary if the solidity is less where the blow be struck, the fracture will be direct.

32. But for this process to be observed, it is necessary, as has been already remarked, that the motion should be propagated generally throughout the whole cranium, which happens only when the striking body, being round and large, bruises an equally extensive surface of the cranium. On the contrary if there is a sensible projection or point, the bone yields at the place struck, and the motion being confined to that, cannot be propagated. This will be illustrated by a compari-

son: place one hand upon the extremity of a beam, and let the other extremity be struck with a pointed hammer. The instrument will sink in, and no vibration will be experienced by the hand. Let the same experiment be repeated with a hammer, whose head is considerably convex; the vibration will be violent. The application is easy.

33. As striking bodies commonly have angles more or less prominent, we may conceive the reason of the frequency of direct fractures, always more numerous than those from a counter-stroke, which can happen only from the action of large and convex bodies. Finally, it is unnecessary to give more ample theoretical details in a work professedly practical.

§ III. *Of the Symptoms.*

34. To establish with precision the characteristic symptoms of fractures of the cranium, we must suppose four different states, to which may be referred all the cases offered in practice. 1st. A denudation of the fractured bones of the cranium. 2d. Wound, without denudation, covering the fracture. 3d. Contusion, without wound, corresponding exactly with the division. 4th. No sensible appearance of injury in the external integuments.

35. In the first case there can be no doubt, inspection alone being sufficient to discover the division, when the wound carefully cleaned puts the bone in full view. A suture, according to the remark of Hippocrates, the course of an artery, or the impression of the instrument which caused the wound, can alone occasion any uncertainty; which, however, in the first case is easily removed by anatomical knowledge, which informs whether a suture exists there or not; and in the two others, by the assistance of the scraper, which leaving always the trace of a fissure, after removing a considerable portion of the

bony substance, indicates that there is a division of the bone, better than can be done by pouring ink upon the naked surface, a mean so generally employed since the time of the father of medicine.

36. In the second state (34), there must be one of two things. Either the fracture is accompanied with considerable separation, splinters, depression, &c.; and then the touch alone is sufficient to ascertain it through the wound of the integuments which cover it; or it presents only a simple crack or fissure. In this case nothing can indicate it but the dilatation of the wound and the denudation of the bone: an operation always useless, as shall soon be proved, while no unpleasant affection is manifested, and even after it has appeared. Some authors have pretended that the bad state of the edges of the wound, their swelling, and their sanious suppuration indicate a subjacent fracture; but, in the first place, there is often division and wound without these symptoms; secondly, they sometimes exist without an accompanying fracture.

37. The preceding rule is applicable to the diagnostic of fracture in the third state (24). Here it is only necessary to be attentive in examining the bruised place, in order to ascertain if there be a division of the bone; but we must take care that we are not imposed upon by certain bloody tumours, whose hard and shining edges, soft and compressible centre, offer to an unskilful hand the sensation of a fracture with depression. This remark was made by the celebrated Petit, and has been repeated since by all the authors who have written upon the subject.

38. In the fourth state, where no external injury is manifest, as often happens in the counter-stroke, if the touch does not indicate the fracture, what symptoms are there by which it may be ascertained? They are rational

or sensible: the first leave always such a degree of uncertainty both of the existence and the place of the fracture, that a solid diagnostic can never be founded upon them. A statement of them will be sufficient to form a judgment.

39. 1st. There is a noise, like that of a pot which is broken; but the distress of the patient will then scarcely permit him to distinguish any thing. Is this noise an inevitable result of the division? 2d. An hemorrhage from the nose, ears and eyes. May not the blow rupture some small vessels in those cavities, without affecting the cranium? 3d. A pain at the fractured place, when the patient eats, or when a body placed between the teeth is forcibly pulled away. What is there to prevent a simple contusion of the bone or pericranium from producing the same effect? Besides, experience proves that it is not always attendant on fracture; this symptom is even insufficient, when on pressing the head in every direction we meet with a spot more sensible than others, an index, according to authors, and Bell in particular, of fracture. 4th. The mechanical motion of the patient, who carries his finger to the place of fracture. To occasion this motion one painful spot is sufficient, and how many other causes than fracture may produce this pain! 5th. Tume-faction, puffing and edema at the fractured place. How often does practice exhibit fracture without these symptoms, and these without fracture! 6th. A mark impressed at the place of division, upon a large cataplasm applied to the head for some time. Experience has contradicted this sign, especially in the practice of Desault, who, with other views, constantly employed cataplasms in wounds of the head. 7th. The force of the stroke, direction of the blow, weight of the instrument, &c. But the instrument cannot always be seen, nor can the patient be always able to give an account of the accident. 8th. The

detachment of the pericranium above the fractured spot. How many fractures are there without this phenomenon, and how many times does it exist without fracture! 9th. Insensibility, vertigo, vomiting, paralysis. All these symptoms indicate an injury of the brain, and we know that this often exists without fracture; besides, how many fractures are there without these symptoms!

40. It results from this examination of the signs of a fractured cranium, that if the sight in the denudation of the bones, or the touch when they are covered by the integuments, do not indicate the fracture, it is impossible to pronounce with any certainty its existence or its seat, from the rational signs pointed out by authors.

41. It is then absolutely necessary to lay the bone bare by suitable incisions, in order to be assured of the reality of a fracture. But what rule shall direct the surgeon in these incisions? In the uncertainty left by the signs laid down as the most positive, such as the puffing, the experiment of the cataplasm, local pain, detachment of the pericranium, &c., what principle shall guide the knife? Would there not be a risk of wounding to no purpose a part of the integuments of the head, of augmenting by the pains which would be the inevitable result, the symptoms of the disease, particularly of prolonging the treatment, by the slow cicatrization of such extensive wounds?

42. It will be proved (80) that there is never any indication for the use of the trepan until symptoms of compressed brain are manifest. Then of what importance is the knowledge of the fracture, until they supervene? would it change the treatment? by no means. Why then should the patient be distressed by painful researches, when there is no real necessity?

43. If the symptoms of compression become manifest, such is their uncertainty, as shall be proved (51, 65),

that there is seldom any indication for opening the cranium; but without this indication, of what service is it to know the fractured spot? The fracture being well ascertained will not add to the necessity of trepanning; since alone and on its own account it never demands it. In both cases incisions can have no other advantage than the relief of the cellular membrane and the swelled integuments. This may be accomplished by other means.

44. From hence it results that authors have extended to too great a number of circumstances the maxim of incisions for the discovery of fractures of the cranium. It will not excite astonishment, that an immediate consequence of a principle so generally adopted is the application of the trepan to all cases of such fractures.

45. If it is not common to meet with cases, where recourse must be had to these incisions for the discovery of a fissure or crack, without any apparent sign, it is different when there is a considerable separation of the edges of the division. Then they are required to give vent to the fluids which escape through the interstice; or when there is depression or splinters, a case in which it is necessary to remove or replace the bony pieces; or when sanguineous tumours cover the fracture, a circumstance, in which the effused blood must be evacuated, &c.; but then there can be no doubt of the place of the fracture, which the touch indicates, and there is no danger of multiplying useless and painful incisions.

46. If the symptoms do not render it indispensably necessary to search for a crack or fissure, without injury of the integuments, the puffing favoured by the application of cataplasms, the local pain, the motion of the patient carrying his hand constantly to the same spot, would be feeble guides to the practitioner. If a wound exists, by separating the edges we may penetrate to the bone, and if a fracture be discovered, an incision may

be made according to the direction presenting, either towards an angle or any other part of the wound. If the division be very fine, the scraper will discover it. We pass by the precepts so much insisted upon by authors, and subject to almost as many modifications as there are cases.

§ IV. *Of the Affections.*

47. In general, fractures of the cranium are not of themselves dangerous; all means, suitable to their consolidation, are commonly superfluous, and the unfavourable prognostic, drawn by practitioners, depends only upon the affections which accompany them, and which they produce. Now these affections, the consequences of fractures, may be referred to a single circumstance, the compression of the brain, which may be occasioned equally by two different causes, effusion and depression. It is of importance to examine these two causes before treating of the cure of fractures of the cranium, upon which they have a decided influence.

§ V. *Of Compression of the Brain by Effusion.*

48. It is not my intention now to treat of purulent effusion, the consequence of inflammation of the brain or its membranes, which inflammation it is previously necessary to be acquainted with. I would only consider the effusion that is formed more or less quickly by the effect of the blow inflicted upon the cranium, referring to a particular article, the suppuration of the brain.

49. Now this kind of effusion may take place, 1st, between the cranium and dura mater; 2d, between the dura and pia mater; 3d, in the substance or cavities of the brain. In the first case there is always a detachment of the dura mater from the bones of the cranium to a greater or less extent; and then the sources of the effu-

sion are the vessels of their mutual communication, inevitably ruptured, and the vessels of the diploe which are also broken by the fracture. In the two other cases the effusion is the effect of the general shock, which ruptures the blood-vessels of the brain in the same manner as it does those of the ears and nose, when the hemorrhage comes from those cavities.

50. The first kind of effusion may happen in every part of the cranium; at the basis it is generally mortal; it is always circumscribed in a larger or smaller space. The second is constantly of such a nature, that the fluid, being diffused between the two membranes, occupies almost the whole of their interval, and thus occasions a pressure that is a little sensible, unless the quantity of extravasated fluid is inconsiderable. In the third kind the blood is equally diffused, if the effusion has its seat in the circumvolutions; it is circumscribed if the effusion exists in the cerebral substance or the ventricles. These remarks are important, as shall soon be shown.

51. Whatever may be the species of effusion, it happens as often without fracture as with it. Let us examine in both cases what presumptive signs there are: 1st, of its existence; 2d, of its seat. This research is indispensable to the forming an accurate judgment of the necessity of trepanning, the intention of which is most generally to afford a vent for the effusion.

52. Authors have stated, as symptoms of the existence of effusion, coma, insensibility, vertigo, stupor, and even delirium in the patient. These phenomena are in fact the result of compressed brain. The experience of those, in whom this organ laid bare in some of its parts has been compressed, does not leave any doubt of the symptoms described above; but they may proceed equally from commotion and inflammation of the brain. In order then to form a certain diagnostic, it must be determined

when they depend upon the one cause, and when they are to be attributed to the others. Petit has made the following distinction: coma, happening at the instant of the blow, is the effect of commotion; supervening some time after, it is the result of effusion. But, in the first place, how many effusions are there so sudden, that a few seconds scarcely elapse between the blow and their formation? does it require a long time for the numerous vessels, which are then ruptured, to produce this affection? besides, in general, what accurate information can we receive of these kinds of diseases? 2d. May not commotion and effusion succeed each other, and is not this generally the case? A man falls, a slight commotion is the consequence of the fall; at the instant coma comes on. In the mean time the commotion subsides, but effusion is formed and the coma continues, although from a different cause. According to Petit, ought not the affection, in such a case, to be attributed to commotion? we see the contrary, however, since the effusion continues the effect which the former had produced. 3d. May not effusion and commotion be complicated, and then to which of the two are the affections to be attributed? If the coma ceases and returns alternately, it is commonly attributed to effusion; but Desault has often observed this phenomenon in patients, whose bodies upon examination showed no trace of effusion.

53. The symptoms, caused by inflammation, are generally more easily distinguished from those of effusion; because the former do not come on until some time after the accident; as six, eight, or even twelve days. But if, as is sometimes the case, the inflammation comes on sooner; or if, as when it has been bruised, the brain is engorged, then what distinguishing sign is there? Petit says, that the fever precedes the first kind of coma and is subsequent to the second. How many times has the re-

verse been observed! Two examples are recorded in the *Chirurgical Journal*: in the one, the fever had preceded coma, and yet no effused blood was found; in the other no fever had been the precursor of this phenomenon, and yet the membranes were inflamed. If effusion and inflammation are complicated, what are the characteristic signs? But when inflammation exists separately, and does not supervene until the end of a certain time, the assemblage of symptoms assumes a febrile aspect which commonly discovers it.

54. It results from what has been said, that coma, insensibility, delirium, &c. offer characters too uncertain, and that from their existence we can never pronounce decisively upon that of effusion.

55. Is paralysis a more certain sign? It is true that, like coma, it indicates a bloody effusion; but, like it, it also indicates commotion and inflammation. Whether it comes on at the instant of the blow, or some time after, we cannot establish a more certain rule than in the preceding case. There is the same uncertainty in the maxim of Petit, who says, that the paralysis of one side announces an effusion on the opposite; that there are also evident relations between the paralysis of the superior, inferior extremities, &c. and the seat of effusion in certain parts of the brain. How many times have the examinations of bodies proved the uncertainty of this principle! how often has it been found at the *Hotel Dieu*, that there was effusion on the affected side at the same time as on the opposite; or that the blood was generally diffused while the paralysis was local! Supposing this principle to be true, does it clearly distinguish the compression of the brain from other affections of that organ? supposing that it did distinguish it, does it indicate with precision the particular seat of effusion?

56. What has been said of paralysis is applicable to

convulsions, which are the same affection in a greater degree that paralysis is in a less. Were it true that they existed constantly on the same side with effusion, who could say that they proved this to be their cause? or that they did not originate from the affection of the brain? on the contrary, experience proves that they are most commonly produced by it.

57. To convulsions and paralysis, as general effects, may be referred sundry particular phenomena, such as spasmodic vomitings, involuntary discharges of the *fæces* and urine, the immobility of the pupil dilated or contracted in its opening, and other affections that are produced by several causes, and on that account cannot give a peculiar character to any.

58. The same estimate may be formed of the signs drawn from the hemorrhagy of the nose and ears, from the fever, redness of the face, difficulty of breathing, stertorous respiration, force with which the blow was inflicted, &c. So many causes may occasion these symptoms, that the practitioner can never distinguish a particular one.

59. The different phenomena, that have been examined, relate only to the existence of effusion, without determining its seat. Now, we think it has been proved (52, 58) that they can never, under any circumstances, positively indicate this existence; supposing however that they could prove it, there is but little indication for trepanning. It is yet to be ascertained where the effused fluid is situated; in the first place, if it is to be found between the *dura mater* and the bones of the cranium, in the interval of the meninges or in the brain; secondly, in what spot of the cranium it is placed.

60. Now it is evident that no sign, no character can give precise information in which of these three places the effusion is to be met with; nor can they tell, whether,

when it exists upon the dura mater, it is not also to be found below it, or in the ventricles; and yet this information would be essential. Even supposing that there was a certainty of the existence of the effused fluid under the bones of the cranium, at what part is it to be found? The same difficulty and uncertainty would still prevail; a statement of the signs laid down by authors will bring conviction.

61. The more acute pain experienced by the patient in one part of the cranium, the mechanical motion of the hand, the disposition to lie upon one spot more than another, may depend upon a thousand other causes besides effusion, and practitioners are generally agreed as to the uncertain diagnosis which results from them. The pain felt by the patient in one spot on chewing, or when a body placed between the teeth is pulled away with violence, is not a more positive sign of effusion than of fracture (39).

62. Is it reasonable to admit, as a sign of effusion, the detachment of the pericranium, grounded upon this principle, so much insisted on by some English writers, that wherever this membrane is detached, the dura mater is also separated from the bones of the cranium? At the Hotel Dieu, daily experience refutes this doctrine, both in the case of effused blood and of the supuration of the brain, or its membranes, by showing effusion without separation, and separation without subjacent effusion.

63. Fractures have seemed to all authors a more real sign of the seat of bloody effusion. It has been said, that in fact there cannot be a rupture of the diploe without laceration of its vessels, hemorrhagy and consequent effusion; from thence principally the precept of trepanning in all fractures. But experience and reason equally

invalidate this assertion. In the first place, with regard to experience: on the one side, how many fractures does the examination of bodies discover without any kind of effusion! on the other side, how often does effusion take place without any fracture, or in every other place than that which was divided! Desault was certain that he met with those two cases much oftener than that where effusion was subjacent to a fracture. From whence it follows that there is at least as much probability against as for the operation of the trepan, in the case of naked fractures, even when the affections, pointed out by authors as signs of effusion, are manifest. In the second place does not reason teach us, that there may be fracture without detachment of the dura mater, otherwise than that which is necessary from the separation of its edges, and detachment of the dura mater without fracture; or detachment in a place distinct from that which was broken, or even when the bones of the cranium are divided elsewhere than the place struck, that the edges of the division may be so near each other as to render any oozing impossible, as is commonly the case when the external table is alone affected, the internal remaining unhurt (29).

64. The operation of trepanning confirms what has been here advanced. In large hospitals, where the custom of seeing forms a solid diagnosis for surgeons, who does not know that the trepan is often applied without discovering any thing under the fracture? What practitioner can say, at least when no blood escapes between the edges of the division, that he will find an effusion? Supposing that blood does escape, may it not come solely from the vessels of the diploe broken by the fracture, and not from effusion? May not the dura mater remain adhering to the fractured place, or at least be detached from it, as has already been observed, only in a small space and in a quantity proportioned to the separation

of the edges of the division? Experience has proved it to Desault in many cases.

CASE I.

A mason, falling from a scaffold, sustained a large wound with denudation of the left parietal bone, which was divided by a transverse fracture; at the instant of the blow he fell into a coma. He was brought to the Hotel Dieu, where it was observed that the fracture was sensibly separated at its edges and suffered a fluid and blackish blood to escape. The common dressing was employed and an emetic administered; these remedies were of no avail; the affection augmented, the patient died, and on opening the body no effusion was to be found in any part of the cranium. The dura mater was scarcely separated at the fractured place.

65. From what has been said (60, 63) it results, in the first place, that there is no positive sign to indicate whether a bloody effusion is to be met with above or below the dura mater, or in the cerebral cavities; in the second place, that supposing it to be between the cranium and the dura mater, we can never be certain at what point of the cranium it is seated; but it has been previously proved (52, 58) that even the existence of the effusion is constantly dubious.

66. Hitherto we have considered the diagnosis of effusion only under the relation of the affections, which may throw some light upon it; but the uncertainty of this diagnosis will be increased, if we reflect how often blood is effused without any affection resulting from it: for example, when it is found diffused between the membranes of the brain (50), or when it is formed slowly and as it were by drops between the cranium and dura mater, where it then sometimes occupies a large surface; a double circumstance, the reality of which has been often

demonstrated by the examination of bodies, compared with the state of the patients during life.

67. If we now resume all that has been said upon the signs of bloody effusion, this will be their summary: there must be one of two circumstances—either the injuries of the head from external causes are accompanied with accidents, or they are exempt from them. In the former case there is first, no certainty of the existence of the effusion; secondly, supposing this existence, there is no certainty of its seat even when the fracture is exposed to view. In the second case there is no certainty of the non-existence of effusion. From these positions, who can presume to found rules of treatment upon the diagnosis? who would hazard imprudent researches, unless there was such a reunion of symptoms as to induce the strongest presumption? but how rare are such cases. This article will be resumed, in treating of fractures of the cranium.

68. The effects of bloody effusion are not solely to compress the brain; this is only a primitive result. When the patient has not perished from the affections that depend upon it, there is still reason to fear that at the end of a certain time the bones of the cranium may be affected with caries and necrosis, that an inflammation of the membranes of the brain, or of the substance of that organ, may supervene. Many observations attest these secondary ravages; but in general it seems that authors have exaggerated them too much, and that the blood may be absorbed in many cases, especially when it is diffused over a large surface and in small quantity; when it occupies, for example, the interval of the meninges, the sinuses of the brain, and sometimes even when it exists between the cranium and dura mater.

69. The following remarks prove what has been advanced: first in the operation of trepanning, most com-

monly only a small quantity of effused blood is evacuated; but that which remains, does not always produce the subsequent affections mentioned above: secondly, during the five last years of Desault's practice at the Hotel Dieu in Paris, he did not employ the trepan in the numerous cases of wounds of the head, with fracture of the cranium, which came under his treatment. Notwithstanding, his practice was crowned with the greatest success, unless the nature of the affection indicated the injury of the brain to be such that all means would be superfluous. Now in the great number of patients cured, is it not probable that many had sanguineous effusions. If the symptoms, laid down by authors, afford any certainty, we might be assured that a great number were affected; but whether the effusion is absorbed or not, it is frequently followed by no secondary affection. This observation is important; it diminishes the force of the argument so often repeated, that it is better to make many useless trepannings than to fail in discovering a single effusion, because there is no proportion between the dangers of the operation and those of the disease.

§ VI. *Of compression of the Brain, from the depression of the Bones of the Cranium.*

70. The depression of the bones of the cranium results from a fracture, with splinters or fragments, which the action of the striking body depresses below their natural level. Some authors admit a depression independent of all solution of continuity. But this kind can never happen except in two cases: 1st, When the bones are still soft, as in infants, and then, when the cause ceases to act, their elasticity will restore the original form. 2d, In the case of rickets, and then the depression will be gradual; it will take place in the bones of the cranium in the same manner as the distortion of the ribs, the curva-

ture of the tibia and femur, and the deviation of the vertebral column, happen in this disease. These two kinds of depression are rare and always foreign from indicating the trepan, since the first is but for an instant; and the second being formed slowly, gradually accustoms the brain to pressure, changes its figure insensibly and makes it concave at the corresponding place, so that a cavity would be occasioned, if the depressed portion were removed.

71. The same signs, which indicate compression of the brain from sanguineous effusion, characterise it also when it results from depression, such as coma, vertigo, insensibility, general or partial paralysis, a full embarrassed pulse, difficult respiration, &c. But here more certainty attends the diagnosis, under certain relations. In effect, the touch, when the bones are not bare, and even the sight in wounds with denudation, sometimes indicate the existence of the cause on which these affections depend, or rather afford a presumption of that cause, which may be not only a depression, but also a commotion and engorgement of the brain, these being frequently complicated with it. It may readily be conceived how difficult it is for this organ not to experience some alteration in such violent shocks as are necessary to produce these fractures. Effusion itself is also a more frequent complication of depression; so that in general it may be said, it is rare for a single cause to produce the affections which accompany injuries of the head, and that the practitioner can never be certain from which they proceed. Finally, depression is often very difficult to be ascertained, especially if there be swelling of the integuments which cover the fracture, and if the bones are but little depressed: in such cases avoid the error indicated (37).

72. Although we must almost always be ignorant, if

the affections depend exclusively on depression, even supposing that it existed, let us however examine them, abstracting every other cause. They will then present a prognosis more or less unfavourable, according to the degree of depression, the extent and the form of the bony pieces. Death is the inevitable consequence of these large depressions, which, compressing the brain in a wide extent, destroy its organization, break its vessels, or form an invincible obstacle to the circulation. But if the depression is inconsiderable, if the bony piece is not much below the level of the other bones, then the case is rarely mortal. The first effect of such depression is to produce, it is true, coma and the most of the other symptoms of compression; but in a little while the brain becomes accustomed to this state of confinement; the circulation, at first disturbed, is re-established, and if no other cause, such as commotion or inflammation, keep up the affections, they begin to dissipate gradually, the patient returns to himself at the end of a certain time, recovers insensibly his intellectual functions and the entire use of all his senses, and gets well at length with his depression, which is sensible to the touch under the integuments and which he preserves all his life, or which is spontaneously removed by degrees, in such manner that the bony pieces, at the end of a certain time, become on a level with each other. Desault has often seen these two modes of termination.

73. It being understood how essential it is, for the indication of trepanning, to have an accurate idea of the primitive effects of compression of the brain from depression, and of the degree of danger which they present, it may not be useless to confirm by a few examples what has been here advanced. All authors, who have written on wounds of the head, cite some cases, in which the depression of the bones of the cranium, abandoned to

nature, was perfectly cured notwithstanding the complication of other affections. Magatus relates many such cases; among others, those of a child ten years old, and of an adult, in whom the bones were not elevated, and still they were cured. Scultetus in his Magazine of Surgery, Ruysch, Mery, Rohault, Palfin, in like manner speak of cases where all the symptoms were gradually dissipated without any external assistance. Most of the German surgeons, according to Magatus, never trepanned in any case, and yet their practice was crowned with as much success as that of the Italian and French surgeons. A multitude of other facts, scattered through the treatises on operations, prove that the accidents from depression are not of themselves most frequently mortal; and no doubt there would be more proofs, were it not for the generally received maxim of trepanning in such cases. This is confirmed by the practice of Desault, who, during the five last years of his life, in which the trepan was banished from the Hotel Dieu, cured more fractures with depression than he had formerly done, when the operation was employed to elevate the depressed pieces. Examples have been published in the Chirurgical Journal, and many analogous cases have been found in the manuscript observations left by Desault. Thinking it useless to enlarge this memoir, a single case, recorded by Launay, will be related.

CASE II.

On the 4th of March, 1793, Jean Fortry, aged forty-five years, was brought to the Hotel Dieu, in a state of insensibility, with cold extremities, pulse hard, small and tense. On examining the head, a large wound, complicated with fracture and a sensible depression, was observed on the right side. The whole head being immediately shaved and laid bare, was covered with a large

cataplasm; the patient was covered with warm cloths, and bled copiously. In the evening the pulse was raised and the senses restored; a grain of the emetic was prescribed. The same was continued the next and the following days, in order to combat the affections of the brain, which might be added to the depression. On the third day the patient recovered the use of speech, hitherto suspended; all confusion of the ideas was dissipated; the edges of the wound lost their swelling; the depression was easily perceived. On the following days the convalescence more obvious. The sixteenth, some heaviness of the head; another emetic. The fortieth, complete cicatrization of the external wound, entire cure of the patient, total disappearance of the depression, level between the bones of the cranium re-established.

74. This principle may then be established: 1st. That there is a degree of compression of the brain from depression, in which death is inevitable, unless the bony pieces are quickly restored to their level. 2d. That there is another degree, in which this compression, being constantly continued, ceases to be mortal, and the brain may resume all its functions and the patient be cured in the same manner as if the pieces had been elevated. This distinction must be kept in view.

§ VII. *Of the Treatment of Fractures of the Cranium.*

75. At the present day it is a principle almost generally adopted, sanctioned in the memoirs of the academy of surgery, acknowledged by Petit and most of the French authors who have written since, and confessed by the most eminent English practitioners, that every fracture of the cranium indicates the operation of trepanning, either to prevent accidents if they do not exist, or to remedy such as have appeared. We wish to

examine this question, on which so many pages have been already bestowed, often without any more light being afforded to him who has to decide it at the bed of the patient. To conduct this examination more methodically, we will reduce all the cases that offer to two different states: 1st. The fracture of the cranium may be simple and abstracted from every kind of affection. 2d. It may be complicated with that assemblage of symptoms which is the ordinary result of compression of the brain, whether this compression depend upon effusion, or whether it be the effect of depression, a distinction which will be established afterwards. Let us attempt in each of these cases to resolve the problem of the indication for trepanning.

§ VIII. *Of the Treatment of Fractures, unattended with any other affection.*

76. Ought the trepan to be applied in cases of fracture without symptoms of compression? Practitioners in general answer in the affirmative, grounding their opinion upon this reasoning, specious on a first view: On the one hand no danger arises from trepanning; on the other fatal symptoms may result from the fracture. It is surely preferable then to incur the hazard of an useless operation than of the dangers of the disease. This argument supposes, 1st. That the operation is in itself of no consequence. 2d. That if any other affections supervene, the trepan will remedy them. Let us examine this double assertion.

77. In the first place it is not true that the application of the trepan is harmless. Air can never be admitted with impunity into a great cavity, such as the thorax, abdomen or head; an obvious truth, especially in moist, unhealthy places, where the influence of the air is so unfavourable. For example, it was constantly observed by

Desault, that the operation was almost always unsuccessful at the Hotel Dieu in Paris. Like others, he performed it, on his entrance into this hospital, and he did not abandon it until compelled by uninterrupted ill success. Boudou, one of his predecessors, had made the same remark, and Quesnay acknowledges the justice of it in his memoir upon trepanning in dubious cases. If indications might be drawn from analogy, we would be much less astonished at seeing the greater part of external affections assume an unfavourable character in large hospitals, and also that operations there are often mortal; whilst, all other circumstances of the case, season and temperature, being similar, they succeed in a more healthy place. Ulcers, wounds, &c. present there an aspect which is unknown to them elsewhere.

78. It is to be confessed, that the ill success of the trepan in large hospitals may be attributed in part to the circumstance that the surgeons, being more skilful than elsewhere, frequently do not operate except in extreme cases, where the indications are precise, and then the patient perishes, not from the operation but from the disease; whilst in common practice it is used on the slightest indications, and then the cure is obtained in spite of the opening in the cranium, which is commonly useless. But to this cause may certainly be added, the influence of the air upon membranes almost always diseased, often inflamed, as those of the brain are in fractures of the cranium. Bell has made this remark, and it deserves particular attention. Supposing the cerebral membranes to be sound, will they not be inflamed by the contact of air? The same author is certain, from numerous experiments upon living animals, that the fourth part of those who underwent the operation perished from its consequences; and he has seen men for whom it was employed, and whose membranes were

very sound, perish soon after from inflammation supervening immediately after the operation. Desault has made similar remarks. It may then be established as a principle, that trepanning is always a dangerous operation, especially in large hospitals.

79. But abstracting the dangers of trepanning, who can tell if it will be useful, supposing that the affections manifest themselves (76)? These will depend either on bloody effusion, inflammation or purulent effusion. As to the first, from the little time elapsed since the accident, it is seldom that there can be any apprehension of bloody effusion. Secondly. Would the trepan remedy inflammation of the membranes? On the contrary it would doubtless favour it, from the contact of air. Thirdly. Would it be advantageous to perform it in anticipation, in cases where a suppuration would succeed this inflammation? It would not; because on the one hand it would be uncertain in what part of the membranes this effusion would be formed: On the other, supposing that it should be opposite to the opening of the cranium, most frequently that would be insufficient to give it vent; for the pus, viscous, tenacious and diffused over the whole surface of the membrane to which it strongly adheres, could not escape except in very small quantity, as shall be proved afterwards:—a double reason which here renders the trepan useless, for preventing the purulent effusion.

80. From what has been said it results, 1st. That trepanning is very dangerous in itself. 2d. That in fractures where it is employed, before any affections take place, it may sometimes induce them, can never prevent their formation, and very seldom remedy them in cases where they are manifest. After these two general positions, who will presume to make a patient undergo the hazard of a very severe operation, when it is uncer-

tain whether any affections will happen;—whether their nature will require the trepan, in case they should happen;—whether engorgement or inflammation have not given origin to them, independent of suppuration;—whether the trepanning may correspond to the seat of the suppuration if that should succeed the others;—or whether it would be able to vent itself through the opening? Is it not better, when there is so much uncertainty of success and so much certainty of ill success, to delay the operation until the symptoms are manifest, and to be regulated by them?

81. From what has been said (76, 80), this consequence may be drawn and established as a practical principle; that the trepan is never indicated by the simple existence of fracture before the symptoms of compression of the brain are manifest; and then that the object of the practitioner should be to prevent the effects of irritation of the brain, produced by the fracture, such as engorgement, inflammation and subsequent suppuration. Bleeding, according to the state of the pulse, stimulants and evacuants fulfil this indication. We shall again resume the subject of the means.

§ IX. *Of the Treatment of Fractures, accompanied by the Symptoms pointed out by authors, as signs of Effusion.*

82. But supposing that to the fracture are added those affections which authors lay down as signs of compression of the brain, must the trepan be then applied? To examine this question methodically, two states are to be distinguished. 1st. That, where no depression exists, and where the symptoms are supposed to depend on effusion, although we may always be uncertain of it (67). 2d. That, where there is a manifest depression of the

bony pieces. Let us examine what ought to be the conduct of the practitioner in both.

83. Ought the trepan to be applied in the first case? Here the object of the surgeon can only be to give vent to the effusion. Now to accomplish this object, let us see what advantage may be drawn from the operation. The effusion will be found either in the brain, or between the meninges, or under the bones of the cranium (49).

84. If the blood be extravasated in the brain, the trepan is useless, not that it would be mortal, as has been believed, to wound that organ, especially at its surface; but because, there being a constant uncertainty of the existence and seat of the effusion, it would be hazardous uselessly to make incisions, that are always dangerous, to discover it. Some fortunate examples, related by practitioners, make exceptions, but do not authorise general rules.

85. If the effusion exists between the pia and dura mater, at the surface or in the sinuses of the brain, then as has been observed (50), almost always it is diffused over the whole surface of the membranes and in all their intervals, so that it would be necessary for the cranium to be pierced with openings in different points, in order that these might every where correspond to the effusion; for, as has been stated, experience proves that all the fluid will not proceed from the different parts where it was effused, to escape by a single opening; because at that spot there was the least resistance. In cases where an incision has been made into the dura mater, to give vent to the blood, only a small quantity has escaped, although after death the whole surface of the membranes was found to be covered with this fluid.

86. In the remaining case, where the blood is found between the dura mater and cranium, if, as often hap-

pens, the effusion is propagated even to the base of the cranium, what advantage would be derived from the operation? In order then to have a reasonable prospect of success it must be found below the parietal, the coronal, the superior portion of the occipital or the squamous portion of the temporal bones.

87. But in this case to decide the question (83), let us resume the consideration of the circumstances which may enlighten us. On the part of the operation of itself, great dangers always accompany it, especially in hospitals, and when the membranes of the brain have suffered violently (77, 79); with regard to its possible advantage all is uncertainty; there is no sign, no index for its application. 1st. There is frequently no certainty of the seat of the fracture (39). 2d. Supposing it was discovered, there is no certainty of the existence of effusion, or whether the affections which manifest themselves, are not to be attributed to other causes (52, 59). 3d. Supposing the existence of the effusion, there is no certainty whether the injury of the brain, its commotion, its engorgement may not be complicated with it, and render the operation useless, by perpetuating the affections in spite of the evacuation of the effused blood (52). 4th. Supposing the effusion to exist separately, there is no certainty whether it may not be in the brain or between the membranes (60). 5th. Supposing that it exists between the cranium and dura mater, there is no certainty whether it may not be found at the base of the cranium (86.) 6th. Supposing that it was not prolonged to that, there is no certainty of the place to which it corresponds, and where consequently the trepan ought to be applied.

88. It is evident that a single circumstance of those that have been stated, is sufficient to make the operation of the trepan fruitless. Consequently, how many proba-

bilities must there be against it, in the case of fracture, accompanied with affections which are regarded as symptoms of compression. Such are these probabilities, that we may be assured, says Desault, that the cases in which the operation would be useless, either from an inability to find the effusion, or to evacuate it, or from its being complicated with injuries of the brain, possessing as much and more influence than it in the production of accidents, would be more numerous than those in which it could be useful. Add to this consideration that of the dangers of the operation, and it will be seen if both will not counterbalance the numerous arguments of Petit, Quesnay, Pott, Bell, Sabatier, &c. to prove the necessity of trepanning, which, no doubt, would always be urgent if we could with precision determine the seat of the extravasated fluid.

89. After this statement, what answer can be given to the question proposed (83). The opinion of Desault on this point was as follows: For a long time he inculcated the application of the trepan in the case of fracture with affections; reasoning in this manner, that it was better to incur the risk of an useless operation than the dangers of effusion. Upon this basis was founded his practice at the Charity and Hotel Dieu, during the first years that he practised surgery there; but in a little time experience convinced him that he incurred not only a risk but dangers from the operation; and that of ten patients, if two or three were saved by it, perhaps as many perished from its consequences, and to the others it was of no advantage. Then he began to employ it only in cases with the most manifest indications; at length he proscribed it entirely during the five last years, on the double reason of its danger and ordinary inutility (87), and on the success obtained by the method he employed, which shall be explained—a success of such

nature, that comparing the years of his use of the trepan with those of his abstinence from it, the number of patients cured in the latter, surpassed greatly the number of those saved in the former.

90. It may be remarked that this doctrine and practice of Desault, during his latter years, merits from surgeons a consideration to which that professed at his commencement is not entitled. Then, in fact, experience had not instructed him; but afterwards it alone, disengaged from all theory, pointed out the path which he pursued until his death.

91. There is one circumstance, however, which seems to demand the operation: It is when there is a very sensible oozing from the fracture, at the same time that the symptoms of compression are manifest and continue at the same degree in spite of the oozing. But in the first place it has been proved, that even this case is not a certain index of effusion (64). In the second place, it is sometimes possible to give vent to the extravasated fluid in young subjects, without opening the cranium. The following case, by Giraud, is a proof of it.

CASE III.

A. Pichot, aged eleven years, was brought to the Hotel Dieu on the 27th of Thermidor in the year IV., affected with all the symptoms of compression, in consequence of a fall from a second story. Coma, insensibility, feeble pulse, difficult respiration, &c. Gault, who was at that time surgeon of the ward, being called to her, thought that he perceived a fracture of the os frontis. He sent for M. Giraud, who made an incision through the integuments, and found, in fact, that bone divided transversely in its whole extent. The edges of the division being separated from each other, suffered the escape of a considerable bloody oozing, which was

the probable index of effusion. To give it vent, a bit of wood in the form of a wedge being placed between the edges, separated them, increased their interval, and supplied the place of the trepan. A proper dressing was then applied.

The symptoms were equally severe the next day; in the night a bilious vomiting occurred. On the third day, some progress towards amendment; the dressing was renewed, a slight suppuration established, and the usual emetics given. On the fourth day the pulse was stronger; emetic renewed; no evacuation until the eighth. On the ninth, the emetic was suppressed. On the eleventh, the senses partly restored, sleep tranquil for some days past; the bit of wood was now removed. On the fourteenth day, copious stools, and amendment of the pulse. On the fifteenth day, the sensibility was perfectly re-established. The dressing being renewed every day, nothing new occurred until the thirty-second, when a mild purgative was given, which produced evacuations. On the forty-third the cicatrix was greatly advanced, and completely finished, on the fifty-third, without exfoliation of the bone. On the seventy-second day the patient was dismissed.

92. It is obvious that this mean is applicable to a very small number of cases, even in childhood, when the bones yield with facility; and without doubt if there be any circumstance in which trepanning is indicated, it is that of this oozing, with permanent symptoms. But if the fracture is of such size as to permit the escape of the effused fluid, why enlarge the vent?

§ X. *Of the Treatment of Fractures with Depression and symptoms of Compression.*

93. Must the trepan be applied in cases where the fracture is attended with depression and symptoms of

compression. There must be one of two things: Either the affections are very severe, threaten the patient with imminent danger, do not seem to diminish at the end of a certain time, and even increase notwithstanding the use of all the general means (74); or, much less severe, they do not act but in an inconsiderable degree, the intellectual functions remaining stationary,—they even diminish after some hours, whether bleeding has been employed or not, and leave a hope of there soon being a real progress towards amendment.

94. In the first case, when the assemblage of phenomena affords, if not a certainty, at least a strong probability for believing that they are owing to the compression of the bony pieces rather than to the commotion of the brain, especially if the bones, being bare, appear very much below their natural level, it is always necessary to recur to the trepan for the elevation of the depression. Desault constantly advised it in this extreme case, which, in fact, practice seldom offers.

95. In the second case, always abstain from opening the cranium. In reality it has been proved (72, 74) that, most frequently, when the depression is inconsiderable, the brain gradually accustoms itself to the pressure it experiences; that then the symptoms disappear in proportion as the circulation of the humours begins to accommodate itself to the state of the vessels, and that the patient thus gets well, whether the depression of the bone subsists or becomes effaced. Why then should a patient be exposed to the risk of an operation, when every thing favours the presumption that it will not be necessary; especially if care is taken to combat, by appropriate means, those other affections of the brain that do not depend on compression.

96. But how are the limits of the two cases to be ascertained? How is it to be declared when the trepan is

required, and when it is useless? The right of determining can result only from extensive experience. The aspect of the symptoms, the state of the pulse and the strength, may offer some grounds for our decision; but they can never be solid until they are confirmed by the habit of seeing. Finally, the degree of depression, when it can be known, elucidates the indications greatly. Is it probable indeed that the symptoms, if they are very severe, should indicate this cause when the bones are depressed but little beneath their level? In such circumstances ought we not rather to presume, there is an affection of the brain, and ought we not to prefer to trepanning the means proper for remedying that affection?

97. If the depressed pieces can be elevated without recurring to the operation, that method should always be adopted. In it, however, is not to be included the use of the terebra and other analogous instruments, whose inconveniences practice has so often demonstrated.

98. The depressed pieces of bones do not act upon the brain solely by the compression which they exercise; being carried against its membranes and into its substance, they lacerate, irritate, bruise and determine inflammation to them. In such cases the trepan is useless for elevating them, as they are most commonly restored of themselves. We may almost always attain the object by seizing them with forceps or other instruments. If, however, they cannot be elevated otherwise, and the symptoms are imminent, recur to the operation.

§ XI. *Of Cases in which the Affections manifest themselves, without any apparent Fracture.*

99. Hitherto we have only considered the symptoms of compression of the brain as being complicated with a fracture whose existence was certain, from its having

been exposed either by the wound or by incisions made for that purpose. But if art cannot discover it; if it does not exist, as often happens, whilst the symptoms of compression are manifest, what conduct must the practitioner adopt? Ought he to trepan? At what part of the cranium shall he attempt it? Where the blow was inflicted—where the patient complains—where he places his hand—where the bones are denuded and of a duller colour—or where the pericranium is detached? I will not recapitulate the uncertainty of all these signs, which can neither establish the existence nor the seat of the effusion (59, 65). It will be sufficient to relate a case, which will prove the inutility of the trepan under such circumstances.

CASE IV.

A man fell from a first story upon a heap of hay. He went home a little stunned; complained in the evening of a heaviness of the head, and at the end of some hours fell into coma, delirium and other signs of effusion. Desault was called. It was during the first years of his practice. There was no trace of external injury upon the integuments, except a small puffing on the *os frontis*. An incision was made, there was no fracture; the trepan was applied, there was no effusion. The symptoms continuing, and paralysis supervening on the right side, the trepan was applied on the left parietal bone, with the same failure of success. Still the patient laid upon the trepanned side. A new application was made without finding any effusion. On the death of the patient, the cranium was discovered to be sound, and an effusion to have taken place under the right temporal bone.

100. Without doubt, among a number of patients, some may offer the fortunate chance of discovering an effusion: But, should a sacrifice be made to the proba-

bility of this good fortune, which advances the cure but little, since other affections will certainly remain to be subdued? Should a sacrifice be made to it of the better founded probability of those affections that will result from opening the cranium, considering the small number of patients to whom it would be advantageous, and the much greater number of those to whom it would be useless? Desault did not think so.

§ XII. *Conclusion.*

101. The following general consequences result from what has been said respecting the fractures of the cranium. 1st. That the precept of trepanning has been extended to too great a number of cases. 2d. That a fracture, independent of all affections, is never an indication for it. 3d. That in the case of affections without depression, the uncertainty of the existence of the seat of effusion, and of knowing whether a more severe affection of the brain be not complicated with it, added to the dangers of the operation, ought, in the greater number of cases, to arrest the hand of the practitioner. 4th. That if there is depression, sometimes the operation is indicated: more frequently it is superfluous. 5th. That it must always be withheld, when no fracture is discovered.

102. What method of cure must then be applied to fractures of the cranium with presumptive symptoms of compression? In order to determine this, it must be recollected that these symptoms do in reality depend most commonly on commotion existing alone; that if there be compression of the brain, very frequently there is at the same time commotion and engorgement; that if compression exist alone, there is always a tendency of the fluids to proceed to the brain, irritated either by fracture, or by the shock it has received, or by effusion

or depression, and to produce a subsequent inflammation.

103. It results from thence: 1st, That evacuants, stimulants, bleeding, and other means, proper to oppose the primitive effects of commotion and to prevent inflammation, are very often exclusively indicated in fractures of the cranium. 2d, That, supposing the indication of the trepan to be real, these are still always essentially necessary, either to destroy the affection of the brain actually existing and complicated with depression or effusion, or to prevent the development of other affections, which may arise from those, if they exist alone. Now, as we are most frequently unacquainted with the indication of the trepan, although it may exist, it follows that we must generally limit ourselves to the use of general means, in fractures, especially to evacuants, which will be particularly examined in the following articles. Here it is sufficient to declare their use, in order to show what were the principles of Desault, in his treatment of fractures of the cranium, and that his object was not, as has been asserted of him, to absorb, by means of an emetic, the effused fluid, nor to elevate, in some inexplicable manner, the depressed pieces of bone. What picture will not be disfigured, when presented by the hands of ignorance or envy!

104. Finally, it may perhaps be objected to him, that he did not sometimes combine the preceding method with the application of the trepan; and that he exaggerated the uncertainty of effusion, and the dangers of searching after it. There is no doubt, that, situated in an atmosphere more sound and less unfavourable to external injuries, he would have pursued a different practice, and would have regulated it by these principles, generally acknowledged: namely, 1st. That the trepan saves the lives of many patients, who would perish

without it, from the effects of effusion or depression. 2d. That in many cases no proportion can be established between the danger and the frequent inutility of the operation, on the one side, and the advantages which it would present on the other, if the seat of effusion should be discovered. It is the province of the practitioner to reconcile, at the bed of the patient, the different reasons that demand and forbid it; and he will perceive, that if the application of the trepan in all cases of fracture, with signs of compression, is too great an extension of its limits, the rejection of it in every case is also too great a restriction of its use. But we must confess, that it is impossible to lay down here rules of general application, as many surgeons of this age have wished to do. Art furnishes principles, and practice consequences. To multiply the former too much, is frequently to perplex the latter.

ARTICLE III.

Of Commotion of the Brain in Wounds of the Head.

§ 1. *What is Commotion?*

105. Commotion is one of the most frequent effects of the action of hard bodies upon the cranium. It is not easy to give an exact idea of it, from the writings of authors. They commonly define it to be a concussion of every part of the brain. But what change does this concussion occasion in that organ? What is the immediate effect? These are questions of important determination. Is the effect a general sinking, or a kind of contusion, or universal irritation? The celebrated case of Littre, and many others, related since by different practitioners, seem to answer the first question in the affirmative, by showing in the bodies of persons, suddenly destroyed by violent commotion, a manifest in-

interval between the dura mater and the brain, which was sensibly more sunken than in an ordinary state. But may they not have been imposed upon by the manner in which these bodies were opened, or by an effusion of blood formed under the membranes and occupying that interval! For it must be difficult to any, acquainted with the organic structure of the brain, to conceive how it can thus withdraw within itself, and suddenly diminish its volume. It appears that pressure, exercised upon it, either by effusion or by depression, is the only cause capable of producing this phenomenon.

106. So far is commotion from occasioning a sinking, that on the contrary it produces an engorgement of the brain, which however is only subsequent, and to be distinguished from commotion itself; the one being the cause, and the other the effect. In like manner a vesicatory first causes an irritation, and then an inflammatory swelling of the parts to which it is applied.

107. From thence it appears that the primitive effect of commotion consists essentially in a kind of contusion and general irritation of the brain, occasioned by the shock it has received in every part; a shock which may be easily conceived, when we recollect the manner in which hard bodies act on the bony case of the cranium. Struck by one of these bodies, it changes its form, is flattened in the direction of the percussion and enlarged in the opposite direction, as happens to all round and elastic bodies in such cases. From thence an universal concussion, a total compression of the organ, which is bruised, irritated and thus predisposed to the ingress of the fluids.

108. The truth of this doctrine is proved by experience, which teaches us: 1st. That in the greater number of cases, inflammation of the brain succeeds its commotion, which must then be the most probable cause of it.

2d. That the best means of preventing this secondary effect, is to cause, in another point of the animal economy, an artificial irritation, which may oppose its influence to that of the irritation produced in the brain by the commotion.

§ II. *Of the Varieties and of the Signs.*

109. Whatever the nature of commotion may be, it presents a number of varieties, which are especially marked by the different degrees of which it is susceptible. How many shades are there between that slight stunning, the sudden effect of an inconsiderable stroke, and that complete disorganization which annihilates life and motion at the instant of the blow! These shades are to be referred to the greater or less sum of motion communicated; to the form of the striking body, or of that against which the head is struck; to the resistance presented by the cranium—in general, the concussion is in the inverse ratio of that resistance; to the disposition of the subject.

110. From thence the numerous modifications of the signs of commotion. Let us examine these signs, which are all to be referred to the nervous system.

111. 1st. Dizziness, offering sometimes a vivid light, sometimes one more obscure, whose degree generally indicates that of the concussion. 2d. The falling down of the patient, which is sometimes sudden, and sometimes preceded by staggering motions, similar to those of animals killed for the table, when they receive the fatal blow. In the first case it is not easy to distinguish to which of the two, the blow or the commotion, the fall is to be attributed; in the second, there is no doubt, so that in this case it is characteristic. If the commotion is slight, the patient does not fall; he is only sensible of vertigo, and staggers; the disturbance of the nervous,

suddenly communicated by the muscular system, explains these phenomena. 3d. Insensibility, coma, sometimes complete, sometimes interrupted; then the patient rouses himself, answers and relapses. 4th. Confusion, derangement, even constant delirium, according to the degree of the affection; loss of memory in such manner that sometimes new things are forgotten, whilst old ones are remembered. Desault cited the history of a water carrier, who, at first, recollected only such objects as had occurred recently, but soon afterwards remembered only those that took place in his infancy. 5th. The pulse soft and feeble. 6th. Respiration confined for a few moments, then suddenly more free. The patient seems to snore, a state designated by the appellation of stertorous breathing, and which may be easily explained from the general deficiency of strength in all the organs, and particularly in the lungs, which become embarrassed, and at length compel the patients to make a strong inspiration, in order to relieve themselves. 7th. Paralysis, partial or general; immobility of the iris; insensibility of this membrane to the strongest light; involuntary discharge of the fæces and urine. 8th. Convulsions, spasms of the stomach, from which arise vomitings; these, however, must be distinguished from those produced some days after by the bilious affection of the first passages. 9th. Hemorrhagies from the different cavities of the head.

112. This explication of symptoms, observed in patients affected with commotion, indicates a general disturbance in the nervous system, a defect of harmony between the brain and the organs of motion and secretion; a defect which may be equally produced by the compression of this organ from an effused fluid, or a depressed piece of bone. From thence the difficulties of the diagnosis, which will not now be recapitulated, having been already sufficiently explained (52, 59); it

will be only necessary to observe the difference of the symptoms, as stated by some of the moderns. 1st. That the respiration is more confined and embarrassed in compression; more free in commotion. 2d. The state of the pulse, which is slow and irregular in the one, soft and equal in the other. 3d. The effects produced upon it by bleeding, which always diminishes the strength in the latter, and leaves it nearly the same in the former. This difference is always extremely uncertain, and can never positively indicate their separate existence.

§ III. *Of the Symptoms, which are the Effects of Commotion.*

113. Death is always the inevitable consequence of great commotions; the extent of the disorder is then such, that every mean is impotent for re-establishing the functions of the brain. But if the concussion has been less considerable, these functions return gradually and to a degree more or less perfect; frequently the patient continues to feel all his life the influence of the accident. Imbecility, total oblivion of the past, and a marked change in the character, are sometimes the permanent result. The history of the lunatic, who fortunately recovered the use of his reason by a violent commotion, is well known. Commonly these effects do not continue, but there is for a long time derangement, confusion in the ideas, memory, &c.

114. These are only the subsequent effects of commotion; there are primitive ones, which ought more particularly to fix our attention, with regard to their treatment. They relate either to the brain itself or to other organs. It has been said, that the first effect of commotion of the brain was to determine to it a kind of general contusion, universal irritation; from thence, according to the expression of the humoral physicians,

arises a tendency in the humours to flow to it; from thence different engorgements of the brain, analogous to those, which, in other viscera, are the result of some irritation. Sometimes slight and insensible, these engorgements terminate in a speedy resolution, and then being soon dissipated, the symptoms occasion little uncertainty in the treatment; but often more melancholy consequences succeed commotion. The brain becomes the seat of an inflammation, whose character partakes of the place, temperament and constitution, &c. We will not stop to treat of this affection, which will constitute the subject of a particular chapter, but will proceed to consider the effects of commotion upon the other viscera.

115. The actual state of all the organs is connected by means of the nervous system with that of the brain, their common centre; from thence the connection of its affections with theirs, and the influence exercised upon them by commotion; but in none is this influence more remarkable than in the biliary passages. All authors have noticed it, ranking, among the subsequent effects of concussion, nausea, loathings, the saburral affection of the *primæ viæ*, bilious vomitings, distinct from those spasmodic ones that take place at the instant of the blow.

116. Most authors also make mention of the different engorgements, of which the liver then becomes the seat; of the tension, hardness, and pain in the right hypochondrium, which indicate them; principally of the abscesses that terminate them, and which are so often observed in subjects who died from such affections.

117. Many have sought the explanation of these phenomena in the disturbance of the circulation. Bertrandi, Pouteau, and David, have supposed, the one that more, the others that less blood than ordinary was then transmitted to the brain; from thence the dangers or advan-

tages of particular bleedings, to prevent the affection of the liver. But theory alone gave birth to all these systems, which we may dispense with stating, and the badly constructed edifice of which is overturned by every day's experience.

118. Let us then confine ourselves to what has been demonstrated by strict observation, namely: 1st. That there exists an unknown but real relation between the brain and the liver, a relation more particular than between the other viscera. 2d. That by means of it the affection of the first almost always occasions in the functions of the second, an alteration demonstrated in the dead body by the traces of engorgement, inflammation and abscesses that are observed there; in the living, by nausea, bilious vomiting, &c. This relation is not limited to the brain; its internal and external coverings receive the influence of it equally (10).

119. All practitioners are not equally agreed with respect to this immediate connection of the two viscera; and the affection of the liver, in wounds of the head, appears to them to be only the effect of the general concussion. But why then is this effect particularly attached to one organ? Why do not others experience it also? This simple reflection removes every difficulty. It seems that the nervous system is here the principal agent of communication, on which the circulation has no direct influence.

120. After considering the action of the brain, affected with commotion, upon the liver, we ought to examine the re-action of that upon the brain; but this will be particularly treated of when we come to speak of bilious inflammation, of which it is one of the principal causes.

121. Abscesses in the liver are a complication of commotion, that is almost inevitably mortal. It must

therefore be the particular object of art to prevent their forming, by means of the treatment now to be examined.

§ IV. *Of the Treatment.*

122. Since the primitive effect of commotion is to produce an irritation in the brain (107), from which afterwards arise its engorgement, and often an affection of the biliary passages (114, 117); to prevent this double subsequent effect, by destroying the principle that produces it, must be the essential indication. We must also re-animate, by impressions made on the whole system, the disturbed action of the vital forces. Now art has in general three principal means of accomplishing these indications. 1st, Bleedings. 2d, Stimulants. 3d, Evacuants. Let us examine the advantages of each, and the limits by which they should be circumscribed.

123. The greater number of authors have exaggerated the utility of bleeding, in wounds of the head, and especially when they are complicated with commotion. Here there is most frequently a general feebleness, depending on the injury of the nervous system, and which is indicated by the state of the pulse, respiration and all the assemblage of symptoms. Add to this feebleness, the frequent disorder of the first passages, and there will be a general, double counter-indication of this mean. The considerable loss of blood, by means of the blow, and the stomach being full when it was received, are also particular counter-indications.

124. However, if these two last circumstances do not occur, if the pulse is soft and full, the face red, the eyes lively, then have recourse to one bleeding. Frequently the pulse is reduced by it, the face loses its redness, the signs of weakness become manifest, and the first passages are disordered; in such cases, a second bleeding is to be abstained from. When circumstances are con-

trary, it may be employed; but in general, Desault seldom made use of a third.

125. In general, practitioners attach much importance to opening particular veins, although they are equally indifferent of themselves. If they are distinguished by any circumstances, it must be in this way: bleeding in the jugular vessels, to the advantage of immediately relieving the brain, joins the inconvenience of requiring a ligature, which forms a greater obstacle to the descending blood, than the relaxation produced by opening the vessel; on the other hand, no blood will flow without this ligature. Abstain then from opening a vein in this place, unless it be very much swelled, as in wounds of the neck. Lecches and cuppings are always to be preferred.

126. In the arm, the opening of any of the veins is indifferent, since they all proceed from a common trunk, and we know not upon what principles certain authors advise the cephalic to be punctured. But in general, it may be observed, that bleeding has here less influence on the brain, than when it is performed upon the foot. This is proved by fainting being more easily produced by that kind of bleeding. Therefore prefer the use of it in that part, if the engorgement is considerable, and the symptoms violent and obstinate. If they are less severe, bleed in the arm, but never in the jugular except in the manner indicated above (125).

127. Stimulants, the second kind of remedy to be examined, present, in general, considerable advantages in commotion. 1st. They determine to some other point than the brain an artificial irritation, that prevents the engorgement, which is the effect of what was fixed upon it. 2d. They act upon the sensible system, which they arouse from its stupefaction.

128. The hairy scalp is the most favourable place for

their application, either because it is nearer to the disease, or because there exists between it, the brain and its membranes a marked relation, which is demonstrated by the frequent communication of inflammation from one to the other, and of which the nerves and vessels, that pass through the bones of the cranium, are the undoubted agents.

129. The most active substances merit the preference here, because their principal object is to produce a violent irritation. The common blistering plaster, thickly sprinkled with cantharides, and the volatile liniment, highly charged, were the two particularly employed by Desault. He applied them from the forehead to the nape of the neck, and from one temple to the other, so as to cover the whole head.

130. At the removal of the dressing, blisters are found only on the forehead; but all the hairy scalp is covered with a thick, whitish, mucous crust, which must be removed by scraping it with a spatula; then dress with common digestives. At each dressing, carefully remove this crust, which is formed anew; be not afraid of occasioning pain by resting the spatula upon the naked flesh; this pain is essential, especially if the commotion continues and the patient does not rouse from his stupor and coma. There is not a better irritant, and this method dispenses with the application of new blistering plasters, recommended by Bell.

131. This method is cruel, but its effects are astonishing. Patients have become sensible, spoken, and moved themselves before the blistering plasters were taken off. If the change for the better is slower, the pulse first begins to rise, the countenance to be animated gradually, the powers of motion to return, and the intellectual functions to be gradually re-established. Every thing may be hoped, when these good effects are observed and

continue for some days. On the contrary, if the patient remains in a state of stupefaction, if he is insensible to the pain of the dressings, if the pulse does not rise and he continues to grow weaker, there is reason to despair.

132. In general, the use of blistering plasters, although sometimes attended with wonderful success, is often insufficient; and it may be objected to them that they do not act upon the biliary organs with sufficient power always to prevent the engorgements which make their seat there. Desault has observed, that the favourable change, effected by these means, was not always durable; that the patient relapsed into coma, and that subsequently abscesses were formed in the liver. These circumstances induced him gradually to relinquish their use, after having long employed them, and to recur in preference to evacuants, the third kind of remedy to be examined, and which he employed solely in the latter years of his life.

133. Evacuants, particularly emetics, add to the double effect which blistering plasters have of causing another point of irritation than the brain and of exciting the nervous system by impressions made upon the whole machine (127), the advantage of acting with efficacy upon the biliary passages, of facilitating the flow of the bile, of preventing the engorgement of the liver, the abscesses which form there, and thereby preventing the re-action of that affected organ upon the brain, already diseased (120); of tending to the skin, of exciting there a salutary perspiration, and under this view dispensing with the sudorifics recommended by celebrated practitioners, particularly by Bromfield, who preferred Dover's powder to all others.

134. From thence the preference which these means merit, especially in large hospitals, an abode in which is already a predisposing cause to the bilious affection of

the abdominal organs, independent of the commotion of the brain.

135. With this view, Desault made use of emetic tartar, commonly giving it in the dose of a grain in a large quantity of water. But the dose cannot be fixed; it must vary like the degree of commotion and be proportioned to it. Sometimes one grain will vomit in a slight concussion, when four would have no effect if the shock has been violent. Thus, in palsy, the strongest purgatives sometimes have no influence on the patient. The sensibility, being then blunted generally, and particularly in the intestinal canal, serves to explain this phenomenon.

136. The emetic tartar does not always produce vomiting; sometimes it occasions stools, and even when it has no sensible effect, it is of service. By it the stomach and intestines are irritated, more fluids are carried there and less to the brain; in a little while, a sensible alteration for the better becomes manifest, and the symptoms are calmed gradually. The emetic is not then to be laid aside; the irritation of the brain being permanent, that of the primæ viæ must also be made so; its use must therefore be continued during six, eight, ten, or even twelve days without interruption. The affection is not here as in a redundancy purely saburral; it is not the object of the practitioner to evacuate, but to irritate; add to these means the use of purgative and stimulating injections.

137. If the affections continue in the same degree, and the remedy appears to have no influence upon them, it will then be advantageous to combine with it the application of blistering plasters to the head. Desault has sometimes obtained success from the union of these two means, when he could procure it from neither separately. In ordinary cases, he was accustomed to cover

the whole head with a large emollient cataplasm, which, by keeping the hairy scalp in a moderate and moist heat, invited the fluids to it, and diverted them from the brain. At the end of this memoir, we will again treat of the evacuating method, exclusively adopted by Desault in his last years.

ARTICLE IV.

Of the Inflammation of the Brain and its Membranes, in Wounds of the Head.§ I. *Of the Differences and the Signs.*

138. The commotion of the brain is very often succeeded by an inflammation of that viscus, which may also arise from contusion inflicted in any part of its extent by the action of a hard body. Whatever may be the causes that produce or modify this affection, causes that will soon be examined (155), it presents in general two different aspects: 1st, the phlegmonous; 2d, the bilious.

139. In the first kind, the pulse is hard, frequent and full; the respiration slow and full; sleep interrupted; tongue red; countenance inflamed; the retina excessively sensible to the impression of light; the eyes prominent and often haggard; a sharp and throbbing pain in the head; heat generally diffused; absence of all the symptoms of saburra in the primæ viæ; soon after, vertigo, insensibility, delirium, coma, convulsions, &c. If there is any wound of the external integuments, a swelling of the edges takes place, also tumefaction of the neighbouring parts, redness, tension and erysipelas with the character indicated (12).

140. In the second kind of inflammation, the pulse is locked, frequent and small; the fever general, offering

that assemblage of phenomena, which are so exactly described by Stoll; dull pain in the head; dryness, and acrid heat in the skin; bitterness of the mouth; nausea; bilious vomitings; clammy crust upon the tongue; oftentimes weight, pain and tension in the region of the liver; stools of a deep yellow; urine frothy, thick and of the colour of saffron; a more or less marked assemblage of the symptoms of abdominal affections; as in the preceding case, delirium, insensibility, &c. but in a less remarkable degree; if there are external wounds, tumefaction of their edges, a purulent and ichorous sanies instead of the laudable pus that flowed from them; and erysipelas more or less extensive, and offering the characters traced (7, 10).

141. Sometimes, all united and sometimes more or less separated, such are the symptoms that indicate to us the inflammations of which the brain or its membranes are so often the seat in wounds of the head. If we reflect on these different symptoms, we will perceive that, if the inflammation always presented itself in a distinct form, it would be easy to ascertain it. Indeed, in the first the inflammatory character is very decided; every thing announces the increase of vital strength; the irritation is considerable; the delirium is sometimes furious. On the contrary, in the second, the symptoms are less violent; their progress is slower; but particularly they are all modified by the appearance of abdominal affections, which evidently reveals their nature and which is never met with in the other. The former has its seat particularly in the substance of the brain, as is proved by the opening of dead bodies. The latter, exclusively affects the superficies of that organ, and also its membranes. The one, commonly shows itself on the sixth or tenth day from the accident, and is preceded by no symptoms of abdominal affections; the other, com-

monly more slow in forming, sometimes does not appear until after the fifteenth day, and is constantly preceded by a disturbance of the *primæ viæ*. Finally, great light is thrown upon the difference of the two inflammations by an examination of the causes that give origin to them, the consideration of their seats, the prevailing constitutions, the temperament of the patient, &c. (151).

142. But it does not always happen that their character is so decided. Frequently they are combined and reciprocally borrow phenomena which make them appear to be mixed; or if one prevails, it at least receives from the other more or less numerous modifications.

143. Although the symptoms in both inflammations often exhibit the same appearance as in commotion and effusion, it is more easy, it is said, to distinguish them from these two affections, than from each other. 1st. In inflammation, whatever may be its kind, the appearance of the symptoms is more slow than in the two other affections. We must confess, however, as it often succeeds them and then continues to produce the symptoms to which they gave origin, it would be very difficult to say when it began to be manifest, unless it was a long time after the accident; often it is impossible to warrant its existence. Thus we are sometimes uncertain, if there is commotion or effusion; because the latter succeeding the former may continue to produce the same effects and cause a false diagnosis. 2d. The hard, frequent pulse, the inflamed countenance, the sensibility of the iris to the impression of light, have appeared to make an essential distinction of inflammation; but frequently the pulse is feeble, the face pale, the eyes dull, and yet inflammation does not the less exist; a circumstance, that may perhaps be attributed, in part, to the custom of making immediately, in wounds of the head, a great number of bleedings, which weaken the patient, and, so

to speak, give an unnatural appearance to the inflammation.

144. In general, we may be assured that it is not so easy to pronounce with certainty upon the difference of the signs of inflammation from those of effusion and commotion, as Bell and Pott have pretended; especially if the first is very quick in showing itself, as is sometimes the case. However, less uncertainty exists here than between commotion and effusion.

§ II. *Of the Causes.*

145. To explain, in order, what is to be said respecting the causes of the inflammation of the brain, in wounds of the head, we will consider: 1st. Those which produce it generally. 2d. Those which determine the kind, making it, for example, phlegmonous rather than bilious, or reciprocally.

146. The primitive effect of commotion being the production of a general irritation of the brain (107), it is evident that this affection will be one of the most active causes of inflammation. Then indeed, as was said by the ancients, the fluids are carried in abundance to the irritated organ; it becomes the seat of an engorgement, which terminates in a speedy resolution, if it be inconsiderable, or if the means indicated (122, 136) have been sufficiently employed; but to which succeeds an inflammation, if the concussion has been violent, or if nothing has been done to prevent it. Having treated separately of commotion, we shall add nothing at present respecting the consideration of it as a cause of inflammation, excepting that the passage from one to the other is not always easy to be marked; and that sometimes nothing is more difficult, than to say when the symptoms are to be attributed to commotion, or when the engorgement of the brain succeeding it, occasions them.

147. A second cause, not less frequent, is the contusion of the brain and its membranes. We have seen how, in a blow inflicted upon the head, one of its diameters diminished, while the others were proportionally elongated (107). From this position, it is easy to conceive how the contusion happens. For example, let a body be struck against the anterior part of the forehead: the antero-posterior diameter will be immediately shortened, the motion suddenly impressed upon the place struck, will be communicated to the corresponding portion of brain; there the fibres of this viscus or of its membranes will be pressed, rubbed against each other, and some small blood-vessels be ruptured; there will then be contusion, which may take place equally, and for the same reason, in the place opposite to the blow. Experience confirms this theory, by showing us, in the opening of dead bodies, either place bruised, inflamed, or in a state of suppuration.

148. The same mechanism produces, as has been said, commotion (107), a kind of general contusion of the brain, which often seems to be in the inverse ratio of local contusion. In fact, if the motion is universally diffused, the place struck will experience it less forcibly. On the contrary, if it acts particularly on the spot where the blow was inflicted, the cerebral mass will be affected less. Finally, both affections may be complicated together, or exist separately. Frequently we perceive a perfect soundness in the brains of persons who have been killed by commotion, or a great contusion in those who were exempted from the primitive symptoms of commotion; or finally a concussion of this viscus at the same time local and general.

149. Considering the local contusion of the brain, abstract from its commotion, it is evident that here, as every where else, it must frequently produce inflamma-

tion, which supervenes first in the bruised place, and soon extends more or less, according to the disposition of the subject. Desault has often seen, in dead bodies, a suppuration at the place struck, joined with a phlogosis of the surrounding membranes.

150. In wounds of the head, such are then the two general causes of inflammation. 1st. The commotion. 2d. The contusion of the brain. To these may be added the presence of a fluid, effused upon the membranes, irritating them and occasioning swelling and inflammation (102). Let us now proceed to those causes which determine the species.

151. To this second kind of causes is to be referred particularly the influence of age, climate, temperament, constitution, season, &c. If the patient is young, robust and vigorous; if he resides in a brisk and pure air; if he is naturally sanguine; if an inflammatory constitution prevails; if the accident has occurred in the spring—then commonly the brain becomes the seat of a phlegmonous inflammation. On the contrary, if the subject is of a middle age, and naturally bilious; if the constitution is analogous; if it is the season for abdominal affections; if the place of residence is damp and unhealthy—then the engorgement assumes the character of bilious erysipelas.

152. From thence it is easy to conceive, why, as a consequence of commotion or contusion of the brain, the phlegmonous inflammation is common in dry and elevated countries, for example, among the peasants of the mountains; and on the contrary, why it is so rare in most large hospitals and prisons, where the bilious inflammation prevails so often.

153. But, besides the general causes, there is a particular one which merits in this place great attention, with respect to the second species of inflammation. We have seen that one of the subsequent effects of commo-

tion was, from the relation that exists between the brain and the biliary organs, to excite in those a kind of irritation (115, 118); from whence arises the saburral state of the primæ viæ; a state which is announced by the loathings, bitterness of the mouth, nausea, vomitings, &c. Now to this action of the brain upon the biliary organs there soon succeeds a re-action of those upon the brain.

154. The bilious disposition then predominating in the system impresses its character on this viscus, already engorged; so that it may be said, that the material cause which modifies the inflammation here, exists essentially in the primæ viæ. But how does this cause act? Is it the saburral matter of the intestines which is then carried to the brain? Stoll does not presume to decide; he says, *fortasse nihil omninò morbosæ materiæ ad cerebrum ablegatur sed ægrotante ventriculo, ob inexplicabilem quemdam consensum incephalum quoque ægrotat.*

155. Of what importance is the manner provided we know the fact, the reality of which is attested by daily experience. Examine a subject that has died from wounds in the head, with an abscess in the liver, and almost always there will be found a mucous, yellow, viscous suppuration covering the membranes of the brain; a certain index of the bilious inflammation that preceded it. In a patient where it is manifest, remove, by vomits, the bilious turgescence, and the symptoms will abate; let this turgescence re-appear and they will also be re-produced; it is always antecedent and gives them the appearance under which they show themselves.

156. The re-action of the biliary organs upon the brain, whose commotion has acted upon them, may then be considered as an essentially active cause of bilious inflammation. Frequently there is no re-action, but only a simple action of these organs; that is, when abstracted

from the concussion of the brain, the bilious disposition has been excited by errors, regimen, unwholesome air, and the other causes stated (160).

157. In general, the causes of inflammation of the brain, in wounds of the head, have a disposition to act for a long time. Hence the danger to which the patient is exposed, and the necessity of attentive observation.

§ III. *Of the Treatment.*

158. The treatment of inflammation of the brain, in wounds of the head, must vary with the species of which it is susceptible. From thence, two methods, that are essentially different: the one relative to phlegmonous inflammation; the other to bilious inflammation.

159. Bleeding, repeated more or less frequently, according to the strength of the patient; leeches and cups, applied to the temples; the use of acidulated drinks and laxative and cooling injections; a strict diet; the constant application of emollient substances to the head, shaved and naked; coolness of the air which the patient breathes;—such are the principal bases of the first method, which under every view enters into the class of anti-phlogistic means. The happy effects of this method are found in country places, where it is not rare to bleed six or eight times, in wounds of the head.

160. The second method must be particularly directed to the causes which excite and keep up the bilious disposition. Now these causes exist specially in the *primæ viæ* (154), from whence it follows that evacuants must form the base of this method.

161. Bleeding must be constantly proscribed, as it would rather tend to favour than prevent the evil. As in the preceding case, the head being shaved, should be covered with emollient cataplasms. On the appearance of the symptoms, give in a large portion of water the

emetic tartar in the dose of one, two or more grains, according to the difficulty of producing the effect. Repeat the same means every day, without apprehension of the vomiting producing an unfavourable irritation of the brain, already inflamed. There is never any danger; on the contrary, the pulse becomes soft and loses its tension; the tongue is cleansed, the weight and pain of the head diminish; all the symptoms abate when the patient has vomited. Do not stop at this first success; in a little time the symptoms will return, if the use of the emetic is interrupted. Desault often continued it for fifteen successive days.

162. It must be relinquished gradually; giving it at first every two days, then every three days, and at length ceasing; but if the least symptom of abdominal affection manifest itself, or any weight be perceived in the head, recommence the administration. The brain remains in a state of irritation longer than other organs; from thence the frequent relapses, unless the most accurate attention is paid. It is a commonly received opinion, that after the fortieth day, there is no reason to apprehend accidents; but experience proves that the danger lasts much longer, and that the patient is not secure at the end of two, three, and even four months. It is the duty of the surgeon to watch his situation during this time; heaviness and confusion of the head being the ordinary precursor of relapses, these circumstances must be observed with attention.

163. All errors in regimen, even the slightest, have unfavourable consequences and must be carefully avoided.

CASE V. *Recorded by Chorin.*

A man fell from a scaffold, and fractured his cranium, but did not experience for eight days any kind of affection. At that period, fever supervened, the *primæ viæ*

were disturbed, the head became heavy, the region of the liver painful, and in a little time, all the symptoms of bilious inflammation were manifest. The patient was brought to the Hotel Dieu; an emetic was administered immediately, and repeated every day; on the twelfth day, the symptoms had nearly disappeared; on the fourteenth, the patient seemed to be doing very well, when being suffered to eat abroad, he indulged his appetite and drank immoderately. In the evening, there was an inclination to vomit, nausea, and general indisposition; the next morning, the symptoms of inflammation were renewed, and in a little while there was insensibility, coma, delirium, and death on the seventeenth day.

164. These excesses in regimen are so much the more to be feared, from the constant use of the emetic giving the patient a voracious appetite, which he incessantly seeks to satisfy. On the other hand, too strict a diet would be as prejudicial, by continuing the prostration of strength; the middle course between these two extremes must then be pursued. Food, that is light and easy of digestion, must be given in small quantity. As soon as the patient begins to be better, he must increase it a little, and thus return gradually to his ordinary diet.

165. With the use of the emetic, must be conjoined diluting, acidulated drinks, laxative injections, and emollients, which being applied to the head, have the advantage of favouring the afflux of humours to the external integuments, and of diverting them, as the ancients asserted, from above the cerebral membranes. See, at the end of this memoir, the other details of this method of treatment.

ARTICLE V.

Of the Suppuration of the Brain and its Membranes in Wounds of the Head.

166. However accurate the means used to combat inflammation may have been (158, 164), sometimes they are insufficient, and cannot prevent the suppuration of the brain or its membranes—a suppuration often inevitable, if the treatment has not been methodical. Let us examine this last affection, from wounds of the head, considering it only as the result of inflammation.

§ I. *Of the Varieties and Signs.*

167. The suppuration of the brain varies here, according to the species of inflammation preceding it. In the phlegmonous, it is seated in the substance of the brain, where it forms an abscess or collection of matter, analogous to that which phlegmon produces in different parts of the body. On the contrary, in bilious inflammation, it is not a purulent collection, but a clammy, yellow, viscous crust, adhering tenaciously to the membranes or to the superficies of the brain, a great extent of which it occupies. Most commonly this adhesion is so strong, that even in the dead body it is extremely difficult to remove all the matter.

168. This second species of suppuration, analogous to that of all the membranes, is most commonly observed at the Hotel Dieu. Almost all the wounded, who die some time after their accident, show traces of it, evidently proving, if it were indicated by no other signs, that the bilious inflammation always predominates there.

169. But whatever may be the nature of the pus formed in the brain or its membranes, we have reason to presume its existence when, at the end of the eighth

or tenth day of the inflammation, the symptoms do not diminish, but on the contrary the head grows heavy, and a coma, more profound than in the beginning of the inflammation, manifests itself;—when the patient is seized with shiverings and experiences night sweats, with a more marked discoloration of the features of the countenance;—when to the primitive affections are added paralysis and convulsions, signs in general more characteristic of compression than of any other affection of the brain.

170. From these symptoms it may generally be presumed that suppuration exists. But where is it to be found? This question is essential to the indication of the trepan. In suppuration of the first kind (167) it is always impossible to answer it, because the pus, being collected in mass, occupies too small a space, and nothing indicates to us to what portion of the cranium this space corresponds. The spontaneous detachment of the pericranium, a symptom so much insisted on by Pott; the collection of putrid humours between that membrane and the bones of the cranium; the bad aspect of the edges of the wound, if one exists; the sanious suppuration that escapes from it; the side which is affected with paralysis or convulsions—offer only uncertain probabilities, and we may be assured, according to Desault, that the practitioner can never say nor even presume where the purulent effusion is situated.

171. In the second species of suppuration there are more probabilities, because being diffused over the brain and its membranes, it occupies a much larger space (167); but even here we can never say on which side of the cranium it exists. Finally, if we were sure of discovering it by opening the cranium, it will be proved that this knowledge would be useless.

§ II. *Of the Treatment.*

172. All authors advise, that here, as in the case of bloody effusion and fracture of the cranium, the trepan should be applied, being in their opinion the only means of cure. Let us examine this doctrine in both species of suppuration.

173. Must the trepan be applied, if the symptoms of suppuration manifest themselves as a consequence of phlegmonous inflammation? Before an answer is given, it may be remarked: 1st. That we never know positively if there is a purulent collection. 2d. Supposing there was a probability of it, nothing can lead us to suspect where it may be found. 3d. That it is very difficult, often impossible, to determine which of the two species (166) of suppuration exists; and yet this is very essential, since, as will be seen, the trepan is useless in the second. 4th. That the opening of the cranium, very dangerous when the brain is sound (77), is almost constantly mortal in those cases in which all its parts are affected, where inflammation is without doubt still existing, where a collection of matter, more or less extensive, will be exposed. The access of air immediately renews the fever with violence, the phlogosis increases around the centre of suppuration, it comes on afresh if it had disappeared, delirium and madness supervene, and in a little time death terminates the affections. Such has been the series of symptoms observed by Desault in those patients, whom, in the commencement of his practice at the Hotel Dieu, he had occasion to trepan for purulent effusions. Analogy would persuade us of it, although experience should fail to convince. Indeed, who does not know that opening purulent collections in large cavities almost always hastens the death of the patient, especially in great hospitals, where a thousand

causes tend to impress upon the air a pernicious character, which is otherwise foreign to it, and whose action is immediate upon the open abscess? Who does not know that the operation for empyema is generally more injurious than useful, &c.

174. From these positions it will be easy to answer the question proposed. In fact, said Desault, let there be ten patients, all affected with suppuration of the brain and subjected to the application of the trepan;—take away from this number, 1st. those in whom the access of air to the diseased surfaces would cause death: 2d. those in whom the operation would be useless, either from the non-existence of effusion, or because it cannot be found; either from the pus, when the effect of bilious inflammation, being diffused, or the disease from its nature being mortal,—how many would be left, in whom some advantage might be obtained? Without doubt there would not be sufficient to encourage an operation, against which there are so many probabilities, which has so little in its favour, and which might be attempted oftener, supposing the place of effusion to be accurately known.

175. This doctrine will acquire a new degree of certainty, if we reflect, that the purulent collection of the brain is not always necessarily mortal; that there are cases, although seldom, in which it has passed through the bones themselves or their sutures, either in a single point or in a greater extent. In such cases suffer nature to act; do not remove any pieces of bone but such as are already detached spontaneously; exfoliation will supervene, and a new substance will fill up the place of the fallen portion. Too great eagerness to give vent to the pus by the trepan will occasion accidents, which would not be experienced, if a patient practice were adopted.

We must certainly assist nature, when she is incom-

petent, but why overwhelm her with aid, when she does not ask it! But it is not pretended to deduce from this practical fact, which Desault sometimes met with, consequences generally applicable. Daily experience would contradict the assertion, by showing victims of purulent effusion in the brain. Still this proof, added to those already stated, appears sufficient to answer the question in the negative (182).

176. Let us proceed to the treatment of the second species of suppuration, that which succeeds to bilious inflammation. Must we resort to the trepan, to remove the symptoms, which depend on it? Let us examine the probabilities for its demand or rejection: 1st. There is no more certainty with regard to the existence of effusion than in the preceding case. 2d. Supposing this existence to be ascertained, the place of its seat would indeed be more probably discovered on making an opening with the trepan, because the pus is more largely diffused. 3d. The danger of the operation would be the same. From whence we may perceive that under this first view, its necessity will not be better proved than in the first species of suppuration.

177. But here it will always be evidently counter-indicated by the state of the pus, which it has been said is largely diffused and adheres in an intimate manner to the dura mater or superficies of the brain (167); from thence the impossibility of making the whole of it flow out through the opening of the trepan. That portion only can be removed that answers to this opening; so that it would be necessary to expose a large surface, often the whole dura mater, for the effusion to be completely evacuated, which is manifestly impossible. On some occasions Desault experienced this difficulty of giving vent to the purulent matter, when he was in the habit of employing the trepan. Besides, analogy directs

us:—would we attempt to perform the operation of empyema in those cases, where, in consequence of certain inflammations, the pleura is covered through its whole extent with that kind of lymph which is inflammatory, whitish, viscous, hard, and of the consistence of lard at a certain period, and which we so often meet with in examining dead bodies?

178. Here then, still more than in the preceding case, the operation of the trepan is never indicated; even if we had ascertained the exact seat of the fluid, or rather the mucous and tenacious crust adhering to the membranes. Indeed, the least inconvenience of the operation would be its absolute inutility.

ARTICLE VI.

General Conclusion.

179. From what has been said in this memoir, it results, 1st. That the same signs characterise, in wounds of the head, affections of the brain that are essentially different. 2d. That these affections are specially compression, commotion and inflammation. 3d. That this identity of their signs leaves us most commonly in uncertainty to which particular one they are to be attributed. 4th. That the uncertainty is especially applicable to commotion, and to compression as the effect of sanguineous effusion; inflammation being more easily distinguished. 5th. That from thence result difficulties which are great and generally acknowledged, and upon which less light has been diffused than was at first hoped, from the labours of Petit, Pott, and all authors who, like those, have sought into the signs and circumstances which might render them exclusively characteristic of particular affections.

180. What rule must then guide the practitioner here? Must he go blindfolded to combat that of whose

nature he is often ignorant? Employ remedies, when he is uncertain of their being indicated, or run the risk of injury with a view of doing good? We have sufficiently shown what particular means are demanded by each of the affections of the brain, in wounds of the head, supposing those affections to be known. But, when their existence is doubtful, there must be a mode of treatment, which, if not equally applicable to commotion, compression and inflammation, will at least be favourable to one and not pernicious to the others, and which, in fulfilling all the indications of one, may satisfy some of those of the others.

181. To illustrate this matter as much as possible, and at the same time to give an exact and general idea of the motives which directed Desault in his treatment, let us suppose a patient, with or without a fracture of the cranium, experiencing, in consequence of a blow received on the head, coma, insensibility, delirium and the other symptoms pointed out as the effects of sanguineous effusion (52, 59), of depression (71), of commotion (111), and of inflammation (131 and 140). Let us suppose also, as is the case most commonly, that no particular circumstance indicates to us on which of these different causes they depend. Now, when a patient in this situation was brought to the Hotel Dieu, the following method of treatment was employed by Desault during the latter years of his practice of surgery, founded upon the following motives.

182. If the stomach was not filled with food, if the pulse was excited, if the patient had not lost too much blood, a bleeding was prescribed first, but rarely repeated, lest it should occasion a weakness always unfavourable. The head, being shaved and laid bare through its whole extent, was covered with an emollient cataplasm, and the wounds, if there were any, dressed ac-

ording to their nature. A few hours after, or at the moment of the patient's arrival, if bleeding was not indicated, a grain of the emetic tartar was given in a large portion of water. Sometimes the patient vomited, frequently a few stools were produced, and frequently there was no sensible evacuation. In this last circumstance the effect of the remedy is not less important, as has been stated (136). An irritating injection was also administered.

183. The next day, and each successive day, the dressing was renewed, and the emetic tartar regularly prescribed, in the same dose, if it had produced evacuations, and if it had not, in the dose of a grain and a half or even two grains. The use of it was continued for eight, ten, and even fifteen successive days, according to its more or less speedy effect.

184. When on the first day, sometimes the second, or even the third, the patient was relieved from coma, then the intellectual functions were re-established in proportion as the emetic tartar was administered. At length the patient was entirely recovered at the end of fifteen, or at latest twenty days. Then the use of the emetic was gradually relinquished, as already stated (162), and at last entirely dropped, with the precaution of renewing it as soon as there appeared to be any heaviness in the head, any change in the pulse, or any signs of fulness in the *primæ viæ*. The ulterior details of the treatment may be seen in the articles of commotion and inflammation.

185. But, if on the third or fourth day of the treatment, the symptoms do not diminish, and even increase, generally the means are impotent, and death is certain. It takes place more or less speedily, according to the nature of the affection of the brain and the different degrees of that affection. In general, if it be true that

experience is the sole arbiter of our curative means, the advantages of this may be certified.

186. Let us now examine the bases of this method, which, at first view, seems very empirical; since it is applied to all cases where the symptoms are manifest, although these symptoms may depend on very different causes (179); yet, if we reflect on what has been said respecting these causes, it will be perceived, whatever they may be, that the preceding method is always indicated, if not exclusively, at least under a greater or less number of relations.

187. If there is sanguineous effusion, the trepan, which is without doubt very advantageous to combat that complication if it could be ascertained, is rarely indicated by the symptoms that result from it and strike our senses, on account of the uncertainty which they leave, 1st, of the existence; 2d, of the seat of the effused fluid (52, 65). In this uncertainty we must then combat the effects, if we cannot remove the cause. Now these effects are inevitably an irritation, an engorgement of the brain, a disposition to inflammation (102), which will be successfully repressed by the daily repetition of the emetic. The application of a cataplasm to the head, by favouring the afflux of the humours to the external integuments, will divert them from the brain, to which they have a tendency to go. Blistering plasters will be an advantageous substitute for the cataplasm, if there is need for more active means (127). Besides, there is generally added to the effusion during the first days, a more or less considerable degree of commotion (52), and to combat its effects upon the brain, evacuants and stimulants are exclusively indicated (127, 137.)

188. When the symptoms depend on a depressed portion of bone, whether this case demands the trepan

or not (94 and 95), we must not the less combat and prevent the affection of the brain. Indeed, is it possible that from a blow sufficiently violent to produce such an effect, this viscus should not be bruised and injured; that it should not consequently be disposed to inflammation, and that there should not exist at the same time a slight commotion? Here then the preceding method is still exclusively indicated, if we do not trepan; and if we do, it is an important auxiliary.

189. If the commotion of the brain is the origin of the symptoms, it has been proved that an artificial irritation, produced either upon the intestines (133), or upon the hairy scalp (128), was the only mean of arresting them or of calming their violence.

190. If inflammation exists, we have seen that its nature was generally bilious, especially in large hospitals (162). The evacuating is still, then, generally indicated here (160). As to purulent effusion, it occurs at too remote a period to cause in the diagnosis any uncertainty that may influence the curative means.

191. This short recapitulation of all that has been said in this memoir, suffices to give a conception of the principles upon which the practice of Desault was grounded, in wounds of the head complicated with the ordinary affections, such as coma, delirium, insensibility, &c. His object was to subdue the irritation of the brain, which is the only indication in commotion and bilious inflammation, and an essential one in effusion and depression. The experience of five successive years proved that he seldom failed in it.

192. There is no doubt that in many cases he might have added the perforation of the cranium to the evacuating and stimulating method, and perhaps that many patients under his care were victims to the non-application of the trepan; but, if we consider those to whom

it would have been mortal at the Hotel Dieu, and who have been saved, we will be convinced that his doctrine, which proscribes this operation in the treatment of wounds of the head, with some cases of effusion and depression, rests upon more solid and less arbitrary bases, than the opinions in which we have been educated would seem to persuade us.

MEMOIR

UPON THE

INSTRUMENTS OF TREPANNING.

Although the preceding memoir has reduced the necessity of trepanning to a very small number of cases, still practitioners will, without doubt, find some in which this operation may be of real advantage, and under this consideration I do not deem it useless to offer some remarks on the perfection of the instruments which it requires. These remarks were unknown to Desault, and were suggested to me by the simplicity of most of his instruments, compared with the complication of those used for the trepan. They have been already published in the *Memoirs of the Medical Society*; but, notwithstanding, it is presumed they will not be out of place here.

The actual state of operative practice offers two means of perfecting it. On the one hand, to simplify the processes already known, by retrenching their superfluities; and on the other, to supply the void which they leave, by adding new modifications. It may be said that there is more to be done under the first than under the

second view, and that the progress of this art is less retarded by the deficiency of operative methods, than by the great number of those in existence, which embarrass by their useless complications.

The end of the last century was remarkable in surgery, on account of the extravagant prodigality of instruments which it displayed. Every operation was surcharged with them; all were desirous of the easy merit of inventing a new instrument. Every surgeon had his arsenal, and did not perceive that the scarcity of success originated from the very abundance of resources. At length the middle of this century has seen these errors of genius disappear gradually. Art has returned to nature, and like it, has become frugal of means and prodigal of results.

Still all traces of the false taste of the past century are not effaced. Many processes yet have their impression. On beholding the great assemblage of pieces intended, in operations of the trepan, to make a small opening in the cranium, who does not recall the times of Hilden, Garengéot, &c.? It is difficult to conceive how all this apparatus could escape the genius of those celebrated men, who recalled their art to that happy simplicity which characterises it at the present day. I have attempted to supply this forgetfulness, by giving to the trepan the new form now to be stated.

It is well known, that the common trepanning instrument is composed of fourteen pieces, three of which being useless in the operation, as it is performed at present, only figure as instruments in the box. 1st. The actual mode of dressing excludes the *meningofilax*, which besides may be advantageously replaced by the lenticular knife, supposing that it was still necessary. 2d. At this day, the danger of the *terebra*, formerly employed to draw back the separated piece of bone, is no

longer problematical. 3d. The exfoliative is only in superannuated practice a mean of procuring exfoliation.

It follows from thence, that the number of the pieces of the instrument is reduced, in fact, to the wood of the trepan, to the crowns, their pyramids, the elevators and scrapers. These last, the elevators and scrapers, are evidently necessary. Whatever may be the form of the instrument employed, it must always take up the bony piece and previously strip the bone of its periosteum.

The corrections of the operative process must then principally comprise the difficulties that result from the necessity of mounting or dismounting successively the perforator and crown upon the handle; of their employing that with its pyramid; of laying aside at length this last, and finishing with the crown only the section of the bony piece. Indeed, we may conceive, that all these different parts of the operation cannot succeed each other with rapidity, and that they must occasion the loss of much time, which is troublesome to the operator and cruel to the patient. If, then, a single moveable crown fixed upon a perforator and placed at a different height, according to each part of the operation, could replace all the apparatus of the process, it may be conceived that this would be a step towards its simplicity, and consequently towards its perfection. Such is precisely the mechanism of the instrument now to be described. It is composed of a stalk (fig. 1.) analogous, in its handle and in the curvature of its body, to the stalk of the ordinary trepan, but which differs below in having a steel blade (*cc*) soldered to it, and degenerating insensibly to a point similar to that of the common perforator. Upon this fixed blade a crown is mounted (fig. 2.); this being of a cylindrical form and indented outwards, differs from ordinary crowns: 1st, in the deficiency of a pyramid: 2d, in the prolongation (*bb*) which rises from

its base, and is pierced with a quadrilateral opening, proportioned to the size of the blade, which it is intended to receive and upon which it moves. A screw (*d*) serves to fix it at the desired height. These things being premised, the operative process is as follows:

1st. The integuments being divided, the bone that is to be trepanned is laid bare and stripped of its periosteum by the common means, which it is useless to describe.

2d. The surgeon grasps the trepan, whose crown being fixed very high, as at *b* (fig. 4.), leaves the point of the blade (*a*) projecting, with which he makes a small hole in the bone, in order to fix it there during the operation.

3d. The crown is lowered to the height *b* (fig. 5.) in such manner, that the blade (*a*) does not exceed the level of its teeth in a greater degree than the common pyramid, which it is intended to replace. The surgeon then holding the instrument like a writing pen, fixes its point in the hole already made in the bone, and performs with the crown, whose motions by that mean have a point of support, a circular section sufficient to secure it.

4th. The section being sufficiently deep, the crown is disengaged by a half-turn, unscrewed and then lowered to *b* (fig. 6.) in such manner that the point of the blade, being withdrawn towards the superior part of its concavity, cannot wound the dura mater by penetrating into the cranium. Free from apprehension in that quarter, the surgeon continues the section of the bony piece, following the general principles of the operation.

5th. The piece being removed, the rest of the operation is performed as usual. A cursory parallel, made between the old method of opening the cranium with the trepan and that which is now proposed, will enable the

reader to judge of their respective advantages and inconveniencies.

1st. In the first part of the common process, the perforator must be mounted upon the handle to make the opening in the bone, and then dismounted. Here, on the contrary, only the opening is to be made, because the blade, being soldered to the instrument, will replace the perforator.

2d. The second part of the operation in common use, consists in mounting the crown, arming it with its pyramid, and then making a semi-circular section. Here it is sufficient to lower the crown a little before making the section, which then becomes so much the more easy, as the blade being cut like a perforator penetrates without difficulty at the same time with the crown; whilst the square form of the common pyramid makes the perforation of the bone difficult, when that part of the instrument is employed.

3d. In the third part, the pyramid is unscrewed, lest it should wound the dura mater, and the section is finished with the crown, which, being then deprived of support, often moves with little solidity. Here, on the contrary, the simple lowering of the crown produces the triple advantage, 1st, of equally avoiding the injury of the dura mater, because the extremity of the blade is elevated above the level of the crown; 2d, of fixing the bony piece during its motions, of preventing its vacillations, and consequently that inequality of depth in the circular section, which is almost inevitable in the common process; 3d, of retracting, after the section, the bony piece in which the point of the blade is fixed, and thus very often dispensing with the elevator. If the piece should be fastened, as sometimes happens, in the cavity of the crown, in order to draw it out, it will be sufficient to unscrew that, and to push the blade down,

which will carry the bony piece in the same direction. We perceive that the different parts of the operation here succeed each other with a rapidity that nothing impedes. It is only requisite to lower to a certain degree, the moveable crown of the instrument upon the blade which is soldered to it, and whose disposition supplies the place of the perforator, the pyramid and consequently the key, intended to mount and dismount it. Add to this, the result of the experiments made with this process, which have constantly succeeded on dead bodies, with me and also with all the pupils whom I have made perform it.

It must be confessed, that no occasion of employing it upon the living has yet offered; but in this case, the practice on dead bodies is sufficient. In fact, it is not with instruments intended for the hard parts as with those for the soft; which, being more or less stretched or relaxed by the influence of disease, increased or diminished in thickness and density, offer in their division, difficulties which are done away by death. The division of the prostate gland, in a calculous person, who has perished from his pains, is not the same as that of one who is living. On the contrary, the change caused by death in the organic texture of the bones, is of no consequence with regard to the instrument to be applied to them. I will here limit my reflections to the application of the instrument which I have proposed. I have prohibited myself from all scientific parallel with the instruments in use at the different periods of the art. Experience has banished them all, to substitute that which is now generally received; that alone must then be the object of the parallel. Of what service is it to relate things already a thousand times repeated? Erudition is a pompous frame, which seems to me often to serve no other purpose than to divert the attention of the reader from

the picture which it embellishes. Take away from the greater part of our memoirs, the pages which are filled with useless eloquence, those that are usurped by erudition, and those which a strict discussion of the subject would retrench, and what will there be remaining?

Explanation of the First Plate.

Fig. 1. Stalk of the trepan; (*aa*) its handle, (*bb*) its body, (*cc*) its declivity soldered to the body and cut in the shape of a perforator.

Fig. 2. The crown; (*bb*) its summit pierced with an opening, in which the fixed point of the stalk is engaged; (*d*) the screw to fasten it.

Fig. 3. The stalk armed with its crown, which is mounted very high to (*b*), in order that in the first part the point (*a*) may serve as a perforator.

Fig. 4. The crown lowered upon the stalk to (*b*) in such manner, that, in the second part, the point (*a*) may replace the pyramid.

Fig. 5. The crown lowered very low to (*b*) in such manner that it may exceed the level of the point, and to prevent that from wounding the dura mater in the third part of the operation.



Fig. 1.

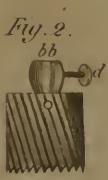


Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



MEMOIR

UPON THE

EXTIRPATION OF THE CARCINOMATOUS EYE.

SECTION I.

1. **CANCER** of the eye attacks all sexes and manifests itself at every age; but still it seems, more than other tumours of this nature, to be attached to childhood. Experience has proved this at the Hotel Dieu, where more than one third of the patients, on whom Desault operated, were under twelve years. It succeeds sometimes to an obstinate ophthalmia, sometimes to a blow received upon the eye, sometimes to wounds and staphylomas of that organ, often to fungous excrescences that arise on its surface or in its cavities. It has also been produced by the imprudent use of topical irritants, and is frequently the effect of an internal disease.

2. Whatever the cause may be, the following is the series of symptoms that commonly announce its attack and accompany its progress: Pains in the head and heat, greater than usual, are the precursors; a troublesome itching harasses the eye and its environs; frequently it is filled with tears; and at first sensible to the impression of light, in a little time it supports it with great pain, except when a preceding malady has already occasioned blindness, as is the case when the cancer occurs after the formation of a film, &c. At a certain period the itching is succeeded by a sensation of pricking, which is replaced by a pain, at first dull, then poignant and lancinating. The eye swells and assumes, not the

red colour of ophthalmy, but a hue, dull, and somewhat livid, yellowish and black; the sight becomes obscured and then extinguished; the pains are more severe; the volume of the organ augments, not as in hydrophthalmy, according to its natural dimensions, but by an increase unequally spread over its surface, which becomes rough and uneven; the hardness increases with the volume; the transparent cornea, having become white, then red and livid, is excoriated, ulcerated, opens, and through it fungosities proceed, from which a purulent and fetid sanies flows.

3. The disease still progressing, in a little time a manifest disproportion exists between the eye and the cavity in which it is lodged—as in hydrophthalmy it is pushed outwards, exceeds the level of the orbit and makes a hideous prominence on the face. The portion of the conjunctiva reduplicated upon the posterior part of each eyelid, which it lines in a natural state, is detached from it, and being stretched by the eye, is applied to its anterior part, where it forms a red band, that covers it.

4. The suppuration assumes a more unfavourable character; the fungosities increase, become livid and black, hemorrhagies supervene more or less frequently and in greater or less abundance. More constant pains torment the patient incessantly, and if art does not relieve him, the eyelids swell, inflame, and become schirrous. The inferior eyelid, upon which the sanies flows, is excoriated, fungosities arise there, the affection is propagated to the cheek, to the nose, and perhaps then offers one of the most frightful of all the pictures that are so often presented by external diseases. The flat portion of the os ethmoides becomes carious, also the os unguis; the pituitary membrane is affected; the pains increase and become general; the cancerous

diathesis manifests itself, and then the history of the disease becomes the same with that of cancers in general.

5. The progress of the disease does not always follow exactly the order in which it has been traced; it varies accordingly as it originates from an external blow, a disease of the eye, or an internal disposition. To trace these differences would only be a repetition of what has been so often said respecting all cancers. It is sufficient to observe that here, as in analogous cases, the patient is inevitably dragged on to death through a road strewed with frightful sufferings, unless art affords a radical remedy for the evil. But, barren in the means of cure, art can only accomplish the object by removing the affected part; but for a long time more timid, than with other cancers, it has not presumed to attempt the extirpation of the cancerous eye until several ages after performing that operation upon other parts attacked with the same disease.

SECTION II.

6. The ancients are silent respecting this operation, and art is indebted to the German surgery for the first notions of it. It was first performed in the sixteenth century, with an instrument clumsily constructed, in the shape of a spoon with cutting edges, by means of which the eye, being separated from the surrounding parts, was extracted from the orbit; but being too wide to penetrate to the narrow bottom of that cavity, the spoon of Bartsch (for he first proposed it) either left a portion of the diseased part, or fractured the delicate and fragile bones, when it was pushed too deep. Experience manifested these inconveniences to Fabricius Hildanus, who to avoid them, invented a kind of knife with a button at its extremity, an instrument without doubt more per-

fect than that it was intended to replace, but inconvenient in the operation, and forgotten by practitioners for near a century. Sometimes they employed that of Bartisch, sometimes they had recourse to means that were cruel and not methodical, such as a kind of pincers, hooks, &c. Muys, Bartholin, Job a Meckren furnish examples of operations thus performed. More judicious than his predecessors, Bidloo made use of scissars and an angular knife: his process, although not methodical, was crowned with much success, a strong prejudice in its favour, as Louis remarks. A lancet appeared to Lavauguyon sufficient for the extirpation of the eye: he is the first of the French surgeons who mentioned this operation. Almost all of them considered it as useless, cruel, and dangerous, until St. Ives, who, without describing his process, says that he performed it successfully. In the institutions of surgery there are engravings of two tumours of the kind now under consideration, which the celebrated author of that work removed with the scalpel alone, that being sufficient, according to him, and preferable to the means of Bartisch, Hildanus, and Muys. Many English surgeons made use of a kind of curved scalpel, with a fixed handle, whose figure is to be found among those in Bell's work; but which, in the dissection of the tumour, presents inconveniences not experienced with the straight form of that instrument.

7. Hitherto the processes, indicated by authors, had not been submitted to fixed and invariable rules. Louis attempted to lay down those rules, and his process, described by himself, and retraced by Sabatier who adopts it, has for a long time been most generally used in France. It consists in dividing the attachments of the eye with the lids, in then cutting first those of the small, afterwards those of the great oblique muscle, and then those of the elevator of the superior eyelid; varying, accord-

ing to their insertion, the manner of holding the scalpel; at length separating the globe and dividing, with scissors curved on their flat side, the muscles that move it, and the optic nerve.

8. This manner of operating, founded upon anatomical principles, seems at first view to offer a method, where, as Louis said, each stroke of the instruments was directed by the knowledge of the parts. But we may observe that these parts, being altered from their natural state by the disease, most commonly then cease to offer the structure and relations that are natural; that the situation of the muscles, which are flattened, lacerated, destroyed or confounded with the eye, cannot serve, as in the operation for the stone, for example, as a basis to the precepts of this operation; which may be performed very methodically and according to general principles, but not after any marked, precise method. Besides what necessity is there to combine the use of the knife and the scissors? The addition of an useless instrument to an operation is a retrenchment of its perfection. Now it is easy to see that, in fact, the scissors are useless, although Louis did not think the operation could be performed methodically with the scalpel alone. The inclination of the external side of the orbit always permits this last instrument to go to the bottom of the cavity, and to cut both above and below the optic nerve and the muscular attachments pulled forwards, by putting them in a state of tension.

SECTION III.

9. Reasoning upon the principles stated above (7, 8), Desault, after having performed and taught the method of Louis, adopted the opinion of Heister, who advises the scalpel alone to be used. In order to form an exact idea of the process, always simple and easy with this

single instrument, we must suppose the carcinoma to be in three different states. 1st. When the tumour, being concentrated within the orbit, barely exceeds the limits of the eyelids, which remain free. 2. When, being much more voluminous, it makes a considerable prominence forwards, draws in that direction the sound eyelids that are applied upon it, and also the portion of the conjunctiva which lines them posteriorly and which has been detached from them. 3. When in a still more advanced period the eyelids partake of the cancerous state. In the first case we must separate them from the eye by cutting the conjunctiva in that spot where it is reduplicated to be reflected on it; in the second, we must dissect the eyelids and the conjunctiva, that are applied to it, from the diseased globe; in the third we must amputate these moveable veils at the same time with the globe.

The operative details adapted to each of the three cases, will be found in the three following examples:

CASE I.

M. D. aged 45 years, came to Paris to consult Desault respecting a carcinomatous tumour, which had been formed for a year past in his left eye, and had succeeded a film that took place in consequence of a blow. The pains, dull at first, had been for some months so severe as to deprive the patient entirely of rest. Hard, unequal, and strewed with varicose veins, the eye had not acquired a very large bulk. The eyelids, being sound, covered it as usual. A phenomenon, not common in this affection, was observed here;—this was the constant œdema of the eyelids on the opposite side, since the development of the cancer, an œdema that no other cause seemed to have occasioned. Extirpation was the only resource. It was proposed by Desault.

Some general means, administered during eight days, prepared the patient, who was operated upon in the following manner on the 7th of January, 1794. He was seated upon a chair, with his head about the height of the surgeon's breast and supported upon that of an assistant, whose hands, crossed upon the forehead, served at the same time to lift up the superior eyelid. The sound eye was covered with a cloth, lest it might be alarmed by the appearance of the instruments. The surgeon then lowering the inferior eyelid with his left hand, took an ordinary scalpel in his right, with which he cut first towards the small angle the union of the two lids for the space of half an inch. The instrument, being then introduced between the globe of the eye and the inferior eyelid near the internal commissure, was conducted circularly, with its cutting edge turned outwards, to the external commissure, and divided the conjunctiva at the place of its reduplication, as also all the parts which constituted the lower attachment of the organ to be extirpated; then carrying the point of the instrument upwards, where he began the first incision, the surgeon conducted it anew to the small angle, between the superior lid and the eye, cutting all the upper attachments. The insertion of the great oblique muscle which still remained within, was also divided. Being disengaged anteriorly, the eye was grasped by the thumb, index and middle finger of the left hand so as to stretch the optic nerve and make its division more easy. The scalpel being slipped between the diseased organ and the external side of the orbit, with its cutting edge turned below and applied to the nerve at its escape from the optic hole, divided it with the artery of the same name and the attachments of the muscles, and thus completely separated the globe of the eye, which was drawn out by the hand that secured it. The index was carried

into the orbit to examine if there was any remnant of the engorged cellular membrane. Small knots that were found in the upper and outward part, were removed by the cutting instrument. The lachrymal gland was also extirpated, although it did not seem to partake of the engorgement of the surrounding parts.

The hemorrhagy being considerable, in order to arrest it the cavity of the orbit was filled with pledgets of lint, sprinkled with colophony, and upon these the eyelids were applied, they being covered with other pledgets disposed in such manner as to be on a level with the eyebrows, nose and malar eminence; a square compress covering the whole, was secured by another long one, which was retained in its place by an oblique bandage, whose circular turns passed upon the frontal inequalities of the side opposite to the posterior part of the head, under the ear of the affected side, and at length finished by covering the sound eye. The blood being completely stopped ceased to flow, and the patient was laid down.

In the evening a bleeding from the foot was prescribed; a strict diet was observed for several days, with the use of diluting ptisans. On the fourth day the lint placed externally upon the eyelids was removed, and some more moistened with the water of guimauve substituted. On the fifth day the suppuration beginning to detach that which was placed in the orbit, it was removed in part, first opposite to the upper eyelid which was carefully raised, and then opposite the under one. On the sixth day all the lint that was first applied was taken away. From that time the dressings were renewed regularly every day. The wound resulting from the incision of the external commissure of the eyelids, was brought together by adhesive plasters.

On the fifteenth day fungosities, arising through the

whole extent of the sides of the orbit, filled it in part; but they having perished in a little time, it was covered with a prolongation of the conjunctiva which lines the two eyelids posteriorly, and which extending to the optic hole, served for its cicatrization. The eyelids being drawn by it, sunk in and left a vacuity which was corrected by an artificial eye.

10. In this operative process there are some circumstances that merit a particular attention, of which authors have taken little notice. The precaution of previously cutting the external commissure is always essential, both because more facility results in the section of the nerve, the introduction of the instruments into the orbit being then more free, and because after this section, there can be no obstacle to the escape of the organ from its cavity. On the contrary, when the eyelids are not divided, if it should be a little bulky, they will impede it and incur the risk of being irritated or torn by attempting to force the passage. There can be no apprehension of more deformity, because as soon as the suppuration is established, the edges are reunited and nothing appears.

11. Instruments, intended to fix the globe of the eye during the operation, such as the purse of Fabricius Hildanus, the forceps with double handles of some, that with a single handle recommended by Sabatier, are in general of no use. The fingers of the surgeon are sufficient alone, when they have the advantage of being armed with long nails, an advantage trifling in appearance, but really precious in many operations, which it renders more simple by retrenching artificial aid.

12. After the tumour is removed, whatever may be its form and size, we must never omit the extirpation of the lachrymal gland; for either it partakes of the engorgement, and will then become the germ of a new

cancer; or it remains sound, and in that case the tears which are there separated, flow upon the wound and retard the cicatrization. Even when this is complete, a fistula remains, and the patient always experiences the fatiguing inconvenience of an habitual weeping.

13. We will not here repeat the inutility of the scissors curved upon their flat side. Experience has proved the facility of substituting the scalpel in the section of the nerve, provided the precaution is used of stretching, as has been already said, the parts to be cut, and of not pushing with too much violence the instrument, whose point might be broken against the internal side, or rather might penetrate the fragile substance of the ethmoid bone.

14. If the tumour, being much enlarged, has arrived to the second state indicated (9), there must be some modifications in the operative process, a detail of which will be found in the following case, recorded by Mouillet.

CASE II.

Therese Gillotte, aged five years, was brought to the Hotel Dieu with a carcinoma of the right eye, whose size, four times as great as natural, made a hideous prominence on the face. The eyelids being drawn forward, covered the posterior part of it. The portion of conjunctiva, which lines these moveable veils, being detached from their internal surface by the tension of the tumour which was protruded forwards, was applied upon it anteriorly in such a manner that it formed a red band, about an inch wide, which did not seem to partake of the disease.

The ordinary preparations having been made use of, the little patient was carried to the amphitheatre, where Desault operated in the following manner. The external commissure of the eyelids was previously divided,

for the reasons stated (10), and to a greater extent than in the preceding case, on account of the size of the tumour. Then the surgeon divided the anterior edge of the red band, from the internal to the external side, at the place where it was confounded with the portion of conjunctiva that ought naturally to cover the eye. The scalpel then gliding under it, separated it inferiorly, as also the eyelid, from the affected globe. Superiorly a second semi-lunar incision united with the two extremities of the first. The eyelid and the corresponding portion of the conjunctiva that were applied to the eye were also separated. The scalpel being carried more deeply, divided all the cellular membrane of the orbit; then being engaged between the tumour and the external side of that cavity, it cut the optic nerve and the attachment of the muscles of the eye. The dressing, as in the preceding case, consisted in filling the orbit with dossils of lint sprinkled with colophony, in applying the eyelids upon them, and in laying upon these fresh dossils, which were secured by two compresses and a circular bandage.

On the fifth day the dressing was partly removed, and the external lint changed. The whole was renewed on the sixth. The rapid progress of cicatrization offered nothing particular in the treatment. The cure was completed by the forty-ninth day. The portion of conjunctiva saved having served to cover the fleshy granulations, the deformity was much less. A glass eye replaced that which had been removed.

15. In this case the operation presents difficulties that are not to be contended with in the preceding, in which the conjunctiva was divided at the place where it reduplicates from the eyelids upon the eye. Here this reduplication no longer existed; the portion of the membrane forming it being stretched, as also that which

lined the eyelids posteriorly, by the increase of the tumour, had been brought to its anterior part, which it covered, and there formed the red band spoken of (3). Now if this portion of conjunctiva does not partake of the disease, if it retains its natural colour, always preserve it, by beginning the incision at its anterior edge and then gliding the knife under it, in order to dissect it as in the preceding case. By these means there will be a greater extent of parts for the cicatrix; the portion saved will sink into the orbit in order to form it, and the eyelids being compelled to yield very little to meet it, the deformity will be less.

16. But if the disease should be propagated to that portion of membrane, and if its very deep red colour excites suspicion, cut it off, beginning the incision at the level of the free edge of the eyelids, which is then found adhering to the tumour, but is indicated by the place where the white colour of the coverings of the eyelids ceases and the red of the conjunctiva commences. Let the nail be placed upon the border to protect it, during the double semi-lunar incision, from the contact of the instrument.

17. If the eyelids, as well as the portion of conjunctiva which lines them, partake of the engorgement, they must be removed. This forms the third state (9) of extirpation of the eyeball. In the following case, the particulars of the operative process, in this circumstance, may be seen.

CASE III.

A man was brought to the Hotel Dieu, in 1792, to be there operated on for a cancer of the eyeball, which had already extended to the eyelids. The superior, adhering to the organ, was affected with sensible schirrosity through its whole extent; the inferior, ulcerated by the

contact of the ichorous pus that fell upon it, was moreover affected by fungosities that arose from its internal surface. The evil did not seem to extend to the bones of the orbit, and no sign of cancerous diathesis manifesting itself, Desault determined on the spot to operate, as further delay would, no doubt, only add useless pains to those the patient already experienced. On the third day from his admission, he was conducted to the amphitheatre, where Desault operated in the following manner. The position of the patient and surgeon was the same as in the preceding case; an assistant, standing behind, drew upwards the skin of the superior eyelid, while another lowered that of the inferior towards the cheek. The surgeon, elevating this eyelid on the other side, in order to stretch the integuments, plunged his scalpel, held as if he were cutting against himself, between the great angle and the commissure of the eyelids, pushed it considerably forwards into the orbit and then bringing it outwards cut the skin, orbicular muscle, large inferior ligament, the small oblique muscle, and the cellular membrane which unites the eye to the orbit; then lowering with one finger the superior eyelid, which the assistant drew upwards, he carried back the scalpel into the internal extremity of the first incision, the cutting edge being turned outwards, plunged this instrument into the orbit, and conducting it circularly towards the small angle, he reached the external extremity of the first incision, by including the skin, orbicular muscle, its tendon, the large superior ligament, the great oblique muscle and the cellular membrane. Being separated forwards, the eyeball adhered behind only to the optic nerve and to the insertion of the muscles. The scalpel, carried along the external side of the orbit, cut these, as in the preceding cases; and the eye, having been secured solely by the fingers during the operation,

was easily extracted from its cavity. The engorged cellular membrane was removed, and the dressing was the same as that indicated (case 1), only with this difference, that the eyelids being wanting, the lint formed a single pyramid, whose summit was at the bottom of the orbit and the base at the level of the eyebrow, nose and malar eminence. The treatment and mode of dressing were the same as in the preceding cases. The cicatrization was much longer, because here it could take place only at the expense of the skin of the cheeks, nose, and forehead, which, being gradually stretched, sunk into the orbit and united at the bottom to form it. The patient was dismissed in the fifth month, entirely cured, but with a considerable deformity, which it is difficult to remedy in such cases by an artificial eye, on account of the extent of the wound.

It was learned from later information, that at the end of a year, the cancer broke out again and destroyed the patient.

SECTION IV.

The preceding cases show, as has been said, the different varieties of the operative process in the extirpation of the eye; but, whatever means may be adopted to remove that organ, the subsequent dangers of the operation are always the same. The reproduction of the tumour is always to be feared, and is the terrible consequence of most of the cancerous tumours that are extirpated. We endeavour in general to shun this consequence, by removing as much as possible all the affected parts; but the disposition of the orbit does not always allow an exact removal of the whole of the engorged cellular membrane. This removal is often very difficult in the bottom of the cavity; besides, the periosteum may partake of the affection, and how can it then

be extirpated with accuracy! In certain cases, might not the sides of the orbit be scraped by employing instruments analogous to the form of the orbit, and thus obtaining the assurance that nothing remains? This idea is proposed, because in many cancers, for example, in those of the mouth, fire is employed to destroy what remains after extirpation; and here this mean would be more dangerous, on account of the proximity of the brain, than that indicated would perhaps be, and might be replaced advantageously by it, although Desault never thought of this remedy.

MEMOIR

UPON THE

OPERATION FOR THE FISTULA LACHRYMALIS.

ARTICLE I.

General Observations.

1. IF the progress of art in the treatment of a disease, were estimated by the multitude of operative processes, no operation would have arrived nearer to perfection than that for the fistula lachrymalis. Since the commencement of the present age, a number of surgeons have made it the object of their researches. Anel, Voolouze, Laforêt, Palluci, Méjan, Petit, Monro, Foubert, Pouteau, Lecat, Louis, Heister, Cabanis, and Jurine, seem by their ingenious processes as it were to have overwhelmed nature with the means of art, and to have offered resources in greater profusion than the existing obstacles.

2. Still, in the midst of so many obvious paths, the artist is often uncertain and hesitates which to prefer. Let us endeavour to point it out to him, by presenting the practice of Desault on this subject. If he has not invented a new operation, the methodical assemblage which he has made of those already known, the useful modifications under which he has presented them, the practical details with which he has enlarged them, entitle his name to rank in celebrity with those already mentioned.

3. It is not my design to recapitulate the multitude of processes, some of which have perhaps been more frequently described in books, than practised upon patients. Those only will occupy attention, which relate to that of Desault. Thus, as it results essentially from those of Petit, and Méjan, I will examine them first, appreciating their advantages and inconveniencies; and will then consider the various modifications which have been given them, by different authors; afterwards passing to that of Desault, I will describe both his mode of operating and subsequent treatment; but it will not be useless to offer previously some views of the disease itself and the different methods of treating it.

ARTICLE II.

Reflections upon the two general modes of operating for the Fistula Lachrymalis.

4. It is well known that this disease generally consists in a contraction or obliteration of the nasal duct, which is produced by some accidental cause; whether the sides of the sac remaining entire present a lachrymal tumour from whence there is a continual reflux of the tears upon the cheeks through the lachrymal puncta; or, whether these sides, being partly ulcerated and destroyed, present a fistula that offers an unnatural passage to the tears, which is incessantly kept up by them;—it follows that these two states of the tumour and fistula are almost always different degrees of the same affection, and that the treatment which answers for the one, rests upon the same basis, as that for the other.

5. Now this treatment is divided here, as in all fistulæ, into two general methods, each including a great number of processes and conducting to the same end by two routes, essentially different. 1st. The supplying the contraction or obliteration of the nasal canal, by an

artificial route. 2d. The re-establishing the diameter of this canal in its natural state. Let us make a brief examination of the advantages, and inconveniencies of these two methods, abstracting those that are peculiar to their processes.

6. The one offers to the tears an artificial passage, where they have not much more tendency to flow than through the unnatural opening already existing. It is the establishing an internal, instead of an external fistula. The other presents to them a vent through which they are naturally disposed to pass, and which re-establishes the soundness of the organs. In the first the edges of the opening are incessantly disposed to close; because, nature always endeavours to destroy that, which is contrary to the organic system she has adopted. In the second, if a methodical, long continued compression has destroyed the obstacles to the flowing of the fluid, if the sides of the canal have become sound, a new contraction is less frequently to be apprehended. Less facility is sometimes met with in this, especially when the canal is almost entirely obliterated; because, then a new passage, as it were, must be opened in the midst of very resisting parts, and more space is to be passed through before arriving at the nasal fossæ; the other is exempt from this inconvenience, having only the thickness of the *os unguis* to pass through. The sides of the artificial opening can never possess that organic action which is necessary to the motion of liquids. In this case will we find here the mucous fluid, intended to lubricate the nasal canal, to render the membrane more smooth and to preserve it from the impression of the tears? Certainly not, but a cicatrix, easy to swell and to give origin to excrescences that are evident obstacles to the passage of the fluid, will line the sides of this opening, if nature has preserved them; the re-

establishment of the natural passage, will never be attended with these different inconveniences. In the first method, the injury of the bones, and their loss of substance may occasion inconveniencies as grievous as those we wished to remedy. With regard to this, there can be no apprehension in employing the second method; experience frequently seems to condemn both, by showing the frequent inefficacy of the most methodical efforts; but, in one oftener than in the other, success is mingled with the reverse.

7. From this brief parallel of the two methods of treating the fistula lachrymalis, it results: 1st. That the artificial opening always presents a sum of inconveniencies greater than of advantages. 2d. That the re-establishment of the natural passage is preferable to it, under the greatest number of views. 3d. That this re-establishment should be the object of the practitioner, in operating for the fistula. 4th. That if there are any cases in which the artificial opening is indicated, they must be only in a complete obliteration of the nasal canal, an obliteration rarely met with in practice.

8. These consequences would appear to be deduced from still more solid grounds, if we considered the disadvantages peculiar to the different processes of the first method, such as those of the ancients, of Voolhouse, &c.; disadvantages that are not intended to be retraced; however, we must allow that among those processes there is one, that of the celebrated Hunter, that merits a distinction to which the others have no claim, and which has been sanctioned by the practice of Desault himself: but, it will be resumed at the end of this memoir, in a particular article, and in the interim we will pass on to the processes of the second method, which have served as a base to what is now to be described.

ARTICLE II.

§ I. *Of the processes from which that of Desault is derived.*

9. It has been declared (3), that there would not be an examination of the processes of either method, foreign to this which is now to be made known; let us therefore take a cursory view of those, of which this is an assemblage, and then make a comparison between them.

10. We are indebted to the celebrated Petit for the ingenious idea of re-establishing the natural passage. It gave rise to his process, the common base from which all those that came after him have proceeded. A common scalpel, another narrow and short, with a blade grooved on its anterior surface, a common canula, a bougie;—such is the assemblage of instruments necessary for the operation, which is performed in the following manner.

1st. Divide, with the common scalpel and by a semi-lunar incision, the integuments, from the straight tendon to the distance of six lines lower and more outwards, following the edge of the orbit.

2d. Penetrate into the interior of the sac by a second incision made with the grooved scalpel, and keep it there with the left hand, in the direction of the canal.

3d. Glide the canula along the groove, and then withdraw the knife.

4th. Let the canula, moved in every direction in the nasal canal, overcome the obstacles that are found there, and open itself a passage into the nasal fossæ, where some drops of blood will announce its presence.

5th. Pass through the canula a bougie, proportioned to the diameter of the canal, secured by a thread, which, being attached to its superior extremity, retains it above,

and is supported by some compresses that are covered with a suitable bandage.

6th. The first days of the operation having passed, and suppuration being established, the bougie must be changed, renewed every two or three days, and its use continued until it goes in and out without causing pain, and draws after it nothing but a little mucus. It is then to be entirely suppressed and after supplying its place by detersive injections, the cicatrization of the external wound is to be encouraged.

11. Méjan took another route to attain the same object. His process was as follows: The instruments required, are, 1st, a probe, six inches long, flexible, terminated at one end by a button, at the other by an opening, through which a thread intended to withdraw the seton is passed; 2d, a seton, being a cylindrical assemblage of some threads of lint united together; 3d, a blunt hook, a forceps, a canula with a hole at its extremity, or rather the pallet (*palette*)*, which Cabanis substituted for it. Every thing being thus disposed, and the patient placed as in the other methods, we must

1st. Introduce the probe through the superior lachrymal punctum, first from without in, then from above to below, to arrive at the lachrymal sac.

2d. Penetrate into the nasal canal, pass the obstacles to enter the nostrils, and if we cannot reach there, substitute a pointed probe for the blunt one that is commonly employed.

3d. Withdraw the probe with one of the instruments mentioned above, and disengage the thread, which remains thus for twenty-four hours, passing through the lachrymal punctum and the nasal fossæ.

4th. Fix to this thread the seton, smeared with digestive ointment, and let it be drawn from below upwards.

* A small thin silver plate, with several holes at one end.

5th. Withdraw the seton every day, by means of the thread fixed to its inferior extremity, substitute for it another charged like it, with different medicaments, and continue this treatment until the seton allows no more pus to flow, or until it goes up and down at pleasure.

§ II. *Parallel of the two Processes.*

12. Such is in general the detail of the processes of Petit and Méjan; let us now inquire into the respective advantages and inconveniencies of both, and let us prove—that both must be retrenched, that either when separate is insufficient, and that their perfection can arise only from their union. For this purpose, we must distinguish two parts in the operation: 1st, that of the incision of the sac and the clearing of the canal; 2d, that of the dilatation of the latter.

13. In the first part of the operation, the artificial route of the canula, in the process of Petit, is preferable to the natural route followed by the probe of Méjan. In fact, in the one, there is the advantage of exposing to view the sac, whose internal membrane, almost always diseased, requires to be suitably treated; there is less space to be passed to arrive at the canal, and a more free opening, facilitating the rest of the operation. In the other, to the narrowness and defective direction of the passage, to the length of the space, and consequently to the difficulty of introducing the instrument into the sac, is added the inconvenience of the constant presence of the thread in a natural canal, whose sides may excoriate, inflame, even be divided, as has been seen, then reunite and be obliterated, or lose their organic action, and their faculty of absorbing the tears.

14. Still we may object to this first part of the process of Petit, the inutility of a particular knife with a groove in its blade, the too great extent of his incision, the manner of performing it with two repetitions, the

semilunar form which he gives it, from whence may arise the reversion of the edges and even of the eye-lids.

15. The ordinary canula is preferable to the proof be Méjan, for clearing the sac. Having more resistance, it overcomes the obstacles without difficulty and gets into the nose; whilst the other, being very flexible, bends and yields before the least resistance; and if then recourse be had to the pointed probe (11, 2d), false passages may be the result of it. Its extraction from the nasal fossæ is difficult; the introduction of the instruments which it requires is painful, and capable of producing an unfavourable irritation.

16. However, we may object to the canula of Petit, that it is too large, and consequently liable, when conducted with little precaution, to fracture the *os unguis*.

17. In the second part, the seton of Méjan claims an exclusive preference to the bougie of Petit. More soft and flexible, it accommodates itself to the figure of the canal, which the other irritates by its presence and pressure. The latter, being placed from above downwards and left between the edges of the wound, inverts them inwards, separates them, compresses them, and by these means retards their reunion more or less;—inconveniencies that belong in part to the canula of Foubert, which is left in the place during the treatment, and upon which it was attempted to cicatrize the wound. Besides, this canula may become obstructed; it rarely remains fixed in the canal; when free, it escapes into the nose, the patient swallows it, or it gets entangled in the throat. If it remain in its place, being pushed against the cicatrix of the great angle, when the patient sneezes, coughs, or hawks a little stronger than usual, it irritates, inflames, and perhaps lacerates it. Finally, the first principle of the union of wounds is here manifestly violated, since the presence of an extraneous body is an evident

obstacle to it. On the contrary, the seton of Méjan, being drawn from below upwards, is secure from this inconvenience.

18. Notwithstanding these advantages, Méjan merits the double objection, 1st, of not increasing his seton sufficiently to enlarge the canal gradually; 2d, of considering it rather as a mean proper to carry medicaments, than as a mean of dilatation.

19. From this comparison between the processes of Petit and Méjan, it results, 1st. That the former is preferable for clearing the canal. 2d. That the second is most advantageous for its dilatation. 3d. That still the merit of both is disfigured by some inconveniencies. 4th. That, in order to have a good process, we must borrow from the one its first part, and from the other its second; then unite these two parts, by modifying the defects of each. This idea has not escaped some surgeons, who have attempted to realize it; but their processes, more or less insufficient, do not present such advantages as might be expected from such solid bases.

§ III. *Of the different Processes that are grounded on those of Petit and Méjan.*

20. Monro, in adopting the process of Petit, substituted for his bougie a thread, introduced by means of a curved, semi-oval canula, straight for the space of half an inch towards its extremity, and which he caused to penetrate into the nose with much ease. The thread which it had introduced was charged every day with desiccative and detersive remedies, and its use was continued as long as was deemed necessary. But, 1st. It is well known how useless are all these medicaments, formerly so vaunted in the treatment of fistulæ. 2d. The thread, which serves for a seton, will either be too large to adapt itself to the diameter of the canal, and then it

will separate too far the edges of the external opening, which it will prevent from uniting; or it will be so small as to leave the edges in contact, except in one place, and it cannot dilate the canal, whose sides will not be compressed by it.

21. Lecat employed the seton of Méjan, introduced nearly in the same manner as the bougie of Petit. Being drawn at each dressing, from above downwards, like the thread of Monro, it had here, besides the two preceding inconveniencies (20), that of inverting downwards the edges of the wound each time, of drawing in the same direction the membrane of the canal, and of bringing it towards the inferior orifice, where it may form an excrescence that will impede the flowing of the tears by contracting their passage.

22. At the same time with Lecat, Pouteau associated with the incision of the sac, performed within, the use of the seton. But, the place of this incision, capable of causing the irritation and inflammation of the conjunctiva and the eye, accidents which cannot be compared with the advantage of shunning a slight deformity, the defect of a gradual increase of the threads of the seton, and the difficulty of passing it, place his process in the same rank with that of Lecat, who disputed it with him.

23. Of these different modifications, that of Jurine would, no doubt, be the most advantageous, either because the external opening (having only the necessary extent for the passage of the thread) permits the union of the edges, or because the seton is drawn from below upwards. But, as remarked by M. Sabatier, is there not cause to fear that the trocar, which opens the passage for the probe that conducts the thread, being carried at hazard and without a guide into the nasal canal, may wound its sides, make false passages, pierce even the os unguis and penetrate into the nose?

24. From these different considerations it results, that authors leave in general much to be desired, in the assemblage which they have wished to make of the processes of Petit and Méjan; and that their processes, although advantageous under certain views, cannot be admitted under many others. Let us examine if more advantages and fewer inconveniencies are to be found in that of Desault.

ARTICLE III.

PROCESS OF DESAULT.

§ I. *Description of the Process.*

25. In general it consists sometimes in dividing the sac, clearing the canal, and then passing the thread that serves to withdraw a seton, which must effect during the treatment what Petit performed with his bougies: sometimes in only enlarging, by bougies, the fistulous opening and the canal, without any incision, and then passing the thread and seton.

26. In this case the preparatives of the patient have nothing particular, being relative to the degree of his strength, to the cause on which the affection depends, a cause which if known must always be previously combated, to the state of the abdominal organs, whose influence upon operations is so great. They vary according to these different circumstances, and are most commonly useless if there is no error in the animal economy, and if there is, they are, as has been said, only precautionary.

27. The instruments necessary for the operation vary accordingly as an incision of the sac is to be performed, or the existing opening to be only dilated. They are, 1st. A common scalpel, with a narrow blade and strong point, lest when pushed too violently into the sac, it

may bend or break. 2d. Bougies of catgut, of a size gradually augmented, and of a length proportioned to that of the canal, each surmounted with a thread destined to secure them, and prepared in such manner that they have superiorly a rounded head, which the surgeon himself makes with the flame of a candle, and inferiorly a blunt point made with a penknife. 3d. A common whitlow director, or what is still better, a silver probe six inches long, and solid enough to overcome the obstacles of the canal. 4th. Small canulæ of silver or lead. Either metal is indifferent, when the canula is introduced upon the whitlow director: if it be of lead, the surgeon may make it at the time of the operation, with a sheet disposed in such way that it may be rolled round a mandrin,* after having folded one of its edges so as to make a prominence which may arrest it above, and after taking externally the measure of the length of the canal. But if, as will be mentioned (30), the canula is introduced upon a probe, it will be better that it should be of silver, because it then has more solidity, and in this case its diameter will be exactly proportioned to the size of the silver probe. Whatever may be its composition, it should be a little larger superiorly than inferiorly, and should have above, a small hole or ring, to fix there a thread, intended to secure it. 5th. A thread, not waxed, intended to pass the seton. 6th. The seton, a cylindrical assemblage of many threads of lint, whose number being augmented every day, enlarges it at pleasure.

28. Every suitable arrangement being made, the patient is seated upon a high chair, with the head supported, as in all the other processes, against the breast of an assistant, whose hands are crossed upon the forehead.

* *Mandrin* (*Fr.*), a solid silver probe used for the urinary passages.

29. Then there are two modes of operating, relative to the state of the sides of the lachrymal sac. 1st. If these sides are sound, as in the lachrymal tumour; if, being open, the fistulous opening is very narrow, and out of the direction of the canal; if a probe, carried through the hole to sound the parts, perceives a great resistance and cannot reach the nasal fossa—the incision of the sac is then necessary. 2d. But if the fistulous hole is sufficiently large, if it is in the direction of the canal, and the contraction being inconsiderable, will permit the probe, which sounds the passage, to go through it, it will be sufficient first to dilate it with bougies, during some time, and then with the seton. Let us examine the manner of proceeding in both cases.

30. If the incision of the sac is indicated,

1st. The assistant, who supports the head, must draw upwards the superior eye-lid, while the surgeon assures himself of the situation of the sac by seeking the edge of the projecting apophysis, marks with his nail the place of incision between the edge and tendon of the orbicularis, stretches the integuments with the index placed upon the nose and the thumb on the maxillary bone, and makes the tendon project, below which the scalpel is to be conducted.

2d. He holds the scalpel like a writing-pen, in the right hand, if the fistula is on the left side, reciprocally turns the back against the nose, and plunges it at once into the sac in the superior part of the canal, and even into the nasal fossæ if the blade is sufficiently narrow; thus including in the same incision the skin, the fibres of the orbicularis, and the sides of the sac. If a considerable swelling exists, the incision of Petit at two different times (10, 1st and 2d), merits the preference.

3d. From thence results an oblique incision from above downwards and from within outwards, two or three lines in extent. When the direction and situation

of the sac are known, it is easy to reach the mark, without the previous precaution of Pouteau, who suffered the pus to collect in order to make the sides more prominent. The scalpel meeting with no resistance, indicates that it has penetrated. If the tumour extends above the tendon of the orbicularis, the incision must be commenced there; because in the following treatment the frænum which results, preventing the pus from running down, might give origin to a new tumour.

4th. Upon the anterior surface of the blade of the scalpel, firmly secured in the direction of the canal and a little inclined outwards, the surgeon glides his silver probe, withdraws the scalpel, now become useless, and at the same time opens the sinuses, if, as sometimes happens, they are found along the edge of the orbit. The neglect of this precaution might be pernicious to the success of the operation.

5th. The probe is inserted into the nasal canal with precaution and slight rotatory motions, if a very considerable contraction opposes its passage. Sometimes another cause prevents its advancing. The superciliary arch, when too projecting, forms an obstacle above, which renders it necessary to take an oblique direction, in such manner, that being carried too much backwards, its extremity may bruise the opposite side of the canal, be stopped by it, and if force is used, perhaps make a false passage. In this case, curve the probe slightly opposite the arch, in such manner as to be accommodated to the projection. Desault, being one day a spectator of an operation in which an entrance into the nasal fossæ could not be obtained, advised this mean, which was indicated by the disposition of the eye-brows, and the probe penetrated immediately. Its presence in the nasal fossæ is announced by a tickling which the patient experiences there, and by the escape

of some drops of blood, especially if the obstacle has been hard to overcome. Then turn the probe in different directions, in order to clear the canal.

6th. When the passage is sufficiently enlarged, take a canula whose diameter must be well proportioned to the size of the probe (27, 5th), make it slide upon it, exactly as in the operation for the fistula in ano, withdraw the probe when the canula has arrived in the canal and nasal fossæ. It is seldom difficult of introduction, if its inferior edge is nicely tapered and accurately adapted to the probe.

7th. The canula being thus introduced, serves to pass the thread which must withdraw the seton. The extremity of this thread, several times reduplicated, is to be made to slide into it and to be pushed down with a probe, so that an end sufficiently long may reach the septum of the nasal fossæ.

8th. When the patient perceives that it has arrived there, he must blow his nose with force, taking the precaution of closing the mouth and the opposite nostril, so that the whole column of the expired air, passing into the nostril where the thread is, draws it towards the anterior opening; whence we perceive the necessity of not waxing it, as in ordinary operations, for it would then be too rigid. The first attempts are sometimes fruitless. Do not, therefore, be discouraged, but after permitting the patient to rest a little, begin again to make him blow his nose; the thread will at length pass. It must be confessed, however, that sometimes we are obliged to wait a long while. If success cannot be obtained in this manner, a blunt hook or curved probe would be of service to seek for it. Sometimes the difficulty of extracting the thread proceeds from this circumstance—that the canula, resting immediately upon the septum, retains it there; or from this—that being di-

rected backwards, it removes the thread from the anterior opening of the nostrils. The first obstacle is avoided, either by raising the canula a little, when the patient blows his nose, or by giving it inferiorly an oblique inclination, like the mouth of a pipe, which allows the thread to escape through it. The second will be remedied, by giving a curvature, whose concavity being directed forwards would carry its inferior extremity in that direction. This correction is due to M. Giraud.

9th. To the thread thus passing through the nasal fossæ a seton is attached, of a size analagous to the actual contraction of the canal, previously smeared with cerate to make it slip more easily, and terminated inferiorly by another end of thread, to the other part of which a small ball of lint is attached. The portion of thread that passes below the great angle being then drawn from below upwards, carries the seton into the lachrymal sac, without however causing it to ascend between the edges of the opening, where the thread remains alone, an essential precaution, as will be mentioned (50). If the operation has been very painful and there is too much irritation in the canal, the introduction of the seton may be postponed until the next day, but in general it is better to do it at once.

10th. The ball of lint and the end of thread which unites it to the seton, are then concealed in the nostril, from whence it is withdrawn at each dressing, and with it the seton. The rest of the thread, rolled around a card, is enveloped in a piece of white paper, which is concealed in the hair.

11th. A small plaster of gum diachylon is applied upon the fistula and sustained by a compress, secured by the monoculus.

31. Such is the process to which recourse must be had in cases where the incision of the sac is previously

indicated. It has undergone many variations, and those who have followed Desault will not be surprized at it; for they know that his genius modified, almost every time, the details and even the operative processes.

32. He combined for a long time the use of the seton and bougies; the latter being placed in the canal after the incision of the sac, remained there during some days, and dilated the passage gradually, into which the canula being then introduced, served to pass the thread that retracted the seton. But this is an useless multiplication of means, and it is better, when there is a necessity for introducing the probe to clear the canal, to make the canula slide upon it at once, to place the seton and to reserve the bougies for the cases that are to be yet examined.

33. Instead of the probe, a whitlow director was formerly employed to clear the canal; the canula then glided upon the groove turned forward; but it is evident that the probe would experience less resistance, when introduced as has been indicated (30, 6th), because its inferior extremity would present less surface to the obstacles which arrest it. Let us proceed to other more minute changes.

34. It has been said (29) that, if the fistulous opening is sufficient and the contraction inconsiderable, the incision of the sac would be useless; that then it would be requisite first to enlarge the canal by the use of bougies, and afterwards substitute the seton for them. This method, although slower, is in general preferable, when possible; because the gradual compression of the bougies will irritate the already diseased membrane of the canal less than the momentary violent introduction of the canula and probe.

35. In this case take a bougie proportioned both to the opening and contraction of the canal; for example,

the treble string of a violin, if the one is very small and the other very large; prepare it as has been indicated (27), then insert it, smeared with cerate, impressing on it slight rotatory motions; if successful, in reaching the nasal fossæ, let it be fastened superiorly to an adhesive plaster by the thread which is attached to it, as without this precaution it might escape and it would be very difficult to draw it out. The next day, the moisture having doubled the size, the canal and fistulous opening will be a little dilated; then pass a bougie a little larger. On the third day one still larger, and so on until the dilatation is sufficient to admit the canula which must conduct the thread (30, 6th). The canal is known to be sufficiently dilated: 1st. By the ease with which bougies of an ordinary size ascend and descend in it. 2d. By the free passage of air through the fistulous opening, when the patient blows his nose.

36. In this case Desault sometimes employed another method of passing the thread. He twisted it round a bougie, folded it upon itself many times at its extremity, fastened it there with a piece of wax, so that it was incorporated with it, and inserted it thus. The next day, the heat having melted the wax, the thread was at liberty in the nasal fossæ, and was drawn out either by an instrument or by making the patient blow his nose. The seton was attached to the thread, its size being always determined by that of the last bougie used, and then the process became the same as that indicated (30, 9th, 11th), to which reference may be had for further details. If the fistulous opening was considerable and the dilatation of the canal sufficient, we might dispense with the previous use of bougies, and pass the thread, with the canula and probe, immediately.

§ II. *Of the subsequent treatment.*

37. In whatever manner the seton may have been introduced, whether it has immediately followed the incision of the sac, or whether this incision not having been made, bougies have been previously employed, the following is the subsequent treatment to which recourse must be had after this introduction.

38. The next day the seton is withdrawn through the nasal fossæ, covered with a purulent crust of more or less good quality, sometimes blackish in a portion of its extent, often in the middle, a circumstance which indicates the denudation of the bony canal, and caries of the corresponding place; the portion of thread which has passed through the sac must be cast off, and another seton placed at the extremity to be drawn upwards as at first.

39. It is thus changed every day, with the precaution of adding to it a thread of lint each time, so as to augment the size gradually and thus dilate the canal in an insensible manner.

40. Sometimes a local inflammation is the result of the operation, especially when much exertion has been made to overcome the obstacles with the probe; then an emollient cataplasm must be applied upon the opening and continued until the affection disappears.

41. When the thread is worn another replaces it. It is made to pass by fixing it superiorly to the remnant of the old, which is withdrawn through the nasal fossæ. Perhaps it may not be a matter of indifference to point out the form of the knot that unites the two threads; because, having to pass through parts already irritable, it is essential that it should present the least size and inequality possible. A noose, first formed with the extremity of the new thread, is held with the two first

fingers of the left hand by the surgeon, who passes there from behind forwards, the superior extremity of the old thread, with which he makes a second noose, whose anterior branch being the smallest, is carried to the right, then backwards, then to the left, and finally before the posterior which is the longest; it is then passed into the superior noose, so as to form a kind of love knots, that are tightened at pleasure; the new thread is thus drawn downwards, the seton as usual being attached to its extremity and enlarged every day.

42. When by its successive additions it has attained a size equal, or even superior to the ordinary diameter of the canal, so that it slips easily, and the external wound being almost closed, presents only an opening sufficient for the passage of the thread; when the seton, instead of being covered with a purulent and sometimes blackish (28) matter, comes out imbued only with the natural mucus of the canal, then the use of this mean may be suppressed, with the precaution, however, of still leaving the thread in the canal during a certain time, so that the seton may be again introduced, if there should be any further necessity for its use.

43. A small plug of lint is attached to the inferior extremity of the thread, which is then concealed in the nostril, from whence it is easily withdrawn (40, 10th). The small wound is covered with a plaster of gum diachylon; the tears, which hitherto still flowed upon the cheeks, the presence of the seton forming an obstacle to them, then begin to resume their natural route, and at the end of a longer or shorter time, the epiphora is completely cured; then, the thread being taken away, the edges of the opening close spontaneously, or their cicatrix may be favoured by a slight cauterization with the lapis infernalis, and the patient is cured.

44. Such is the most favourable progress of the dis-

ease and the subsequent treatment to be pursued after the operation; but how often do matters take another turn? How many times, in spite of the most methodical and most constantly continued efforts, does the fistula continue to subsist, or if closed for a time, is soon reproduced? The obstacles met by the practitioner in this case, have been exposed by different authors, and especially in France, with a precision that dispenses with any further details.

45. Finally there is nothing constant in the duration of the treatment; two months have sometimes been sufficient; but more frequently six months, or even one year's use of the seton is necessary; and Desault, in the case of a patient whom he cured in 1787, did not take away the thread entirely, until the fifteenth month.

§ III. *Of the process of Desault, compared with the others.*

46. Since as has been seen (13 and 15), the first part of the operation for the fistula, which relates to the clearing of the canal, has, in the process of Petit, more real advantages than in that of Méjan; and that this latter process, on the contrary, offers more facility in the second part, that is to say, in the dilatation of the canal (17), it results from thence, that the process of Desault, being an assemblage of the good properties of the two preceding, claims in general the preference to either of them separately.

47. But it remains to demonstrate: 1st. The perfections which he adds to each of the parts of the process that he borrows. 2d. The advantages which he has over those who, like him, have taken the discoveries of Petit and Méjan for their base.

48. The defects which disfigure the first parts of the process of Petit, so advantageous in other respects,

have been pointed out. Now it is evident, that here these defects disappear. 1st. If the incision of the sac is made, it is of small extent, has not the semi-circular form which would expose it to inversion in the dressings, to irritation of the edges from the kind of flap which it forms, and after the cure to a deformed cicatrix. 2d. Being performed at one single period, it does not prolong the operation. 3d. A common scalpel is sufficient, without making one of a particular form. 4th. The probe which clears the canal, or the whitlow director intended for the same use, being less bulky than the canula of Petit, do not run the risk of breaking the long sides of the canal. 5th. Frequently the incision is avoided, and at the same time the use of every instrument which, by suddenly forcing the resistance that the contraction of the canal offers, always occasions a considerable irritation in the already diseased membrane (34). 6th. The incision of the callosities that surround the fistula, recommended by Petit, is almost always useless; the passage of the tears produces and keeps them up, and they will disappear when this fluid is diverted by being brought back into its natural channel. In like manner, the indurations in the fistula in ano get well, when the oozing of the stercoral moisture ceases.

49. Under these first considerations, the means relating to the clearing of the canal, and which have been described (30, 35), have then real advantages over those which correspond to them in the process of Petit (01).

50. Mèjan employed the seton, less as a mean of dilatation than as a proper vehicle for conveying into the canal medicaments necessary, according to him, to cure the affection of the membrane (18). In fact, he charged it with basilicon, with green balsam, &c. But we now

know, that its action can be of advantage in no other way than by dilatation, and that the least inconvenience of all this apparatus of topical applications, is their constant inutility; so that there is no other manner of employing the seton but by increasing its size insensibly, as was done by Desault (39), who under this second consideration improved that part of his process which was borrowed from Méjan.

51. Finally, if this process is compared with those which, like his, have aimed at the union of the two others, it will be perceived to have decided advantages over them. The double inconvenience applicable to the process (20) cannot take place here. The lips of the division are not separated during the treatment; in fact, the thread alone, and not the seton, passes between these lips, which gradually approach each other and adhere, while the dilatation of the canal is going on. When this is complete, only a point remains to be cicatrized at the place of the thread; so that, when the natural canal is re-established, there does not still remain a wound to be healed, which would then be more difficult, as the lips, fatigued by the dressings and by the presence of an extraneous body continued for so long a time, would become callous, and almost lose the property of forming adhesion. The seton being drawn upward at each dressing, does not pull down the membrane of the canal. No excrescence, opposing the passage of the tears, is to be apprehended (21). No irritation can result to the eye from the incision, and the pus that escapes from it. The thread seldom finds any difficulty in entering the nasal fossæ (22), nor is there any danger of making a false passage (23) when the probe is methodically introduced and directed with the precautions that have been pointed out.

52. On the other hand, this process is simple, always

easy to the surgeon and never fatiguing to the patient. It dispenses with that multitude of instruments, which by their abundance, impoverish our other methods of treatment. This statement is sufficient to answer the numerous objections that were at the time accumulated against it. "I grant," said Chopart one day to some members of the academy, who proposed them to him, "that other processes may be more ingenious, but this is the most successful." In fact, there are many cases, in which it has been crowned with complete success, both in the hands of Desault, and in those of other surgeons. If this success is not always constant, it is because it seems that nature, intending most fistulæ to exist always, rejects all means that are contrary to her views and mocks our best combined efforts.

53. The following cases, recorded by Gavard and Giraud, will confirm the doctrine established in this memoir. In the first only the bougies and seton were employed; in the second, the incision and clearing of the sac preceded the employment of the seton, without the intermediate use of bougies; a process which was exclusively adopted by Desault, in cases of lachrymal tumour, where the fistulous opening was very small and the contraction of the canal considerable (29).

CASE I.

A mason, named Boudin, aged fifty years, entered the Hotel Dieu, on the 14th of November 1795, to be treated there for a fistula lachrymalis, which he had for two years, and for which he had already undergone different treatments. The parts were in the following state: a fistulous opening, with hard and callous edges, two lines below the tendon of the orbicularis, swelling and redness of the inferior eye lid, habitual weeping, and

the escape of a whitish matter, through the fistulous opening, on compressing the tumour.

The patient being in good health otherwise, all preparatives were useless, and Desault proceeded to the operation on the same day. A catgut, of a size measured externally on the distance that separates the septum of the nasal fossæ from the great angle, was introduced into the fistulous opening, then pushed into the nasal canal, whose obstacles it overcame without difficulty, in order to arrive in the nostril. It was left in its place until the next day, when it was replaced by another double in size, to which one still larger succeeded on the third day, and so on until the seventh; when the passages being very free, the air escaping freely whenever the patient blew his nose, recourse was had to the seton, which was easily introduced by the process indicated (30, 7th, 10th). On the eighth day it was withdrawn by the nostril, charged with a purulent coat, white, coherent, and of good quality except in the middle, where its blackish colour indicated, a denudation with caries of the bone at the corresponding place. A new seton was introduced, and a ptisan of dock prescribed. On the thirteenth day the thread, being entirely worn out, was renewed in the manner indicated (41). There was nothing new until the twenty-second, the erysipelatous redness of the eyelid always continuing. On the twenty-second day there was an entire disappearance of the blackish trace, impressed upon the seton at each dressing, and a sensible withering and softening of the lips of the fistulous opening. On the twenty-fifth an almost complete disgorgement of the eyelid, and a contraction of the fistulous opening, only allowing a thread to pass. On the thirty-fourth, the seton in the canal moved very freely, and the natural mucous humour substituted for the purulent coat which imbued the lint. On the for-

tieth the seton was suppressed, only the thread being left in its place, and this suppressed on the forty-seventh; the edges of the opening were slightly cauterized to favour their union. On the fiftieth the cicatrix was completed, the passage of the tears entirely re-established, and the patient dismissed from the Hotel Dieu.

CASE II.

Pierre Benevent, aged 34 years, entered the Hospital of Humanity on the 2d of May, 1790, to be treated there for a fistula lachrymalis of the right side.

In 1788 he had at the great angle a tumour, without any change of the colour of the skin and without pain, accompanied with weeping and dryness of the nostril on the same side. A surgeon being called to him, thought he discovered an abscess, which he endeavoured to bring to maturity by exciting applications. Their effect was to produce an inflammation of the skin, to which there soon succeeded an ulceration that opened the sac and occasioned a fistula whose edges, having become hard and callous in a little time, were uselessly dressed with resolvents for one year.

At his entrance into the hospital, Desault wishing to sound the passage, experienced a considerable resistance, before which the probe bent and could not penetrate into the nasal fossæ. The external opening besides being extremely narrow, indicated the incision of the sides of the sac; this was done on the 10th of May. The operation was attended with nothing particular, except much difficulty in withdrawing the thread, which could be brought without only by a curved probe. The seton being then passed as usual, dilated the canal gradually by the successive additions it received. On the forty fifth day it was suppressed, the thread still remaining until the sixtieth day, when the flowing of the tears

seemed to be completely re-established. The patient, when examined a long time after, appeared to be perfectly cured.

§ V. *Remarks upon the Process of Desault.*

54. Although, under a great number of views, the process of Desault claims an exclusive preference as we have seen, still there is one difficulty in this process which may embarrass the practitioner, and which Desault himself sometimes experienced; it consists in the extraction of the thread from the nasal fossæ. The method of making the patient blow his nose, after the thread is introduced there through the nasal canal, is not always very sure; it often occasions delay, because, being folded upon itself, moist with the mucosity of the nose, and retained under the inferior spongiosum, the thread obeys with difficulty the air which tends to draw it from within outwards.

55. Since the publication of Desault's works, I have twice had occasion to perform the operation of the fistula lachrymalis. In the first, which was on the brother of citizen Pigault-Lebrun, an esteemed dramatic author, I could never accomplish the egress of the thread, by making the patient blow his nose, although the incision had been accurately made. I experienced also the greatest difficulty in drawing it out with a blunt hook. I then postponed finishing the operation until the evening, that the patient might not be too much fatigued: the thread was left in the nose, and in the evening new attempts were as fruitless.

56. Perceiving that success could not be obtained, I took a thread of lead, found accidentally upon the toilet of a lady, and analogous to that used in the operations for the fistula in ano; a sufficient length of it was inserted into the nose, so that being many times folded upon

itself, it might be easily caught by a blunt hook. In fact, the introduction of this instrument brought it out immediately; the two extremities being thus free, I twisted a linen thread around the superior, and then drawing it from above downwards, it brought the thread out and the operation was finished as usual.

57. The facility of this process induced me to repeat it frequently upon dead bodies. The success was always complete, and from that time my pupils have been constantly exercised in this manner. The following is the detail of the operation:

58. The canula being placed in the sac previously opened, instead of inserting the linen thread I passed into it that of lead, which may be folded upon itself many times without its folds pressing against each other, as inevitably happens to the linen thread. The thread of lead being thus doubled many times in the nose, it is sufficient to separate the anterior opening most frequently to see it and always to seize it with facility. In general it is better to employ a leaden thread that is rather too long than one too short, because the more folds there are in the nose, the more easily is it laid hold of. When it has once passed out both on the side of the eye and on that of the nose, the linen thread is to be attached to it, and every thing is then the same as in the ordinary process for the operation.

59. This process is by no means painful; the presence of the leaden thread incommodes a little, but when extracted immediately, the patient is scarcely sensible of it. I have not, as has been said, but two facts to prove its advantage on the living body; but it is evident that here the experience on the dead subject is sufficient. For the introduction of the leaden thread, and for its folds, there is not in fact, any difference in the state of the parts during life and after death. It is one of those

operations in which a constant success on the dead body is sufficient, and I can assert that I have constantly obtained it in exercising the pupils in my courses of operations.

60. Finally, I am not the only one who perceived that the part of Desault's process which consists in the introduction of the thread, might be improved. Citizen Giraud, second surgeon of the Hotel Dieu, who has already given an advantageous curvature to the canula of Desault, has also invented a small instrument that conceals an elastic shank, which going through the nasal fossæ, is intended to receive a thread fixed there, and then to draw it out with facility.

ARTICLE IV.

§ VI. *Reflections on the Process of Hunter.*

61. The first method of operating for the fistula lachrymalis, or the re-establishment of the natural passage (5), sometimes presents difficulties, that in certain cases give a decided pre-eminence to the second method or artificial route. It is principally when the contraction is of long standing, very considerable, and almost approaching to obliteration; when the membrane has acquired a schirrous hardness, and when all hope is lost of clearing it by compression, that we must, if we may so speak, open an artificial route in the midst of the natural passages. It is when a polypus of the nasal fossæ, or of the maxillary sinus, an exostosis of the maxillary bone, the position of the inferior meatus, whose edge touches the septum of the nasal fossæ, prevent all communication between these fossæ and the lachrymal sac.

62. The process of Hunter then presents advantages which are not to be found in others of the same method, such as those of Voolhouse, of the ancients, &c. This

process must then be had recourse to, if that indicated (30) cannot be used, or if when possible, the sum of its inconveniencies is too great. Desault employed it at one time on many patients. Some successes that were at first obtained, induced him to believe that perhaps it was indicated in cases where the re-establishment of the natural passage was practicable, which would have been without doubt, a real advantage; since its execution is always more easy than that of the ordinary process, where the incision of the sac, the clearing of the canal, and the passage of the thread especially, involve great difficulties. But experience soon brought him back to his former method of operating, and the process of Hunter was reserved for the very rare cases in which the abovementioned circumstances (61) occurred. Although my object in this memoir is only to make known the process of Desault, I will however relate a case in which this has been used, both because few authors in France have spoken of it, and because Manoury, then first pupil of Desault, has added to it a modification useful for those who may wish to perform it.

CASE III. *Recorded by Jadelot.*

Madeleine Benard, aged 11 years, entered the Hotel Dieu on the 25th of June, 1792, to be there operated upon for a fistula lachrymalis, which she had had for five years. At that period she had a mild smallpox, which was confined almost exclusively to the face, and in consequence of which there supervened, in the great angle of the right eye, a small, round, fluctuating tumour about the size of a button. This tumour burst at the end of fifteen days and occasioned a fistula, that was kept open by the habitual passage of the tears. They collected during the night in the lachrymal sac, which

they distended until morning, when a slight compression sufficed to procure their discharge through the fistulous opening. During the day a troublesome weeping continually distressed the patient.

Some diluting drinks, administered during the first days after the patient's admission into the hospital, with the use of the emetic tartar to keep the body free, were the preparatives for the operation, which Manoury performed in the following manner:

1st. Having seated the patient upon a high chair, with her head supported against the breast of an assistant, whose hands were crossed upon the forehead, he first made an incision in the sac, commencing immediately under the straight tendon of the orbicularis and prolonging it to the extent of four lines, according to the direction of the base of the orbit.

2d. The sac being opened, he divided by a second longitudinal incision, the internal part of the membrane of the sac, and laid the os unguis bare.

3d. To hold the edges of those two incisions separate, and to facilitate the introduction of the boring piece, he made use of a kind of forceps, whose anterior branches being bent to a right angle at their end, were each hollowed within by a groove, so that when united they offered a canal, which might be increased at pleasure by separating the branches. The extremity of this instrument was applied to the denuded portion of the os unguis, between the borders of the incision of the sac and that of the internal part of its membrane. An assistant secured it firmly.

4th. At the same time a shell of horn introduced into the nasal fossa, was applied against the external side, and fixed opposite to the os unguis to serve as a point of support to the boring piece.

5th. The surgeon, grasping this last instrument, in-

serted its cutting extremity into the canal formed by the curved branches of the forceps, which preserved from its action the soft parts that might otherwise be wounded, or whose approximation would at least have formed an obstacle to it, pierced the os unguis by a rotatory motion impressed upon the boring piece, removed a portion of that bone about a line in diameter, withdrew the forceps, and at the same time the shell of horn and afterwards the boring piece.

6th. A small canula was introduced into the opening so as to keep up, and at the same time give a passage to the tears.

7th. The dressing consisted in the application of a little lint between the lips of the opening, and sustained by two small compresses which were secured by a simple bandage.

The weeping, already less considerable the day after the operation, diminished manifestly on the following days. The cicatrization of the wound was completed by the twenty-fifth day; at this period there only existed an oozing of tears almost insensible. On the thirty-third a purulent collection being formed in the sac, distended it in such manner as to present a new tumour; a slight compression served to prevent the stagnation of the matter which flowed through the artificial opening; this compression, continued until the fortieth day, caused the swelling of the sac to disappear entirely. On the fiftieth the oozing had almost ceased, and two months after the operation the patient was dismissed, perfectly cured.

REMARKS AND OBSERVATIONS

ON THE

Diseases of the Maxillary Sinus.

SECTION I.

1. **T**HE mucous membrane of the maxillary sinus, like that of the nasal fossæ, often becomes the seat of different affections, which external medicine alone can attack with efficacy. Among these affections ozena and fungus must especially engage the attention of practitioners, both because they are more frequent and because, being of a more severe nature, they demand more active and more difficult succours. To treat them here in their whole extent, would be to repeat in part what is to be found every where, especially in the memoirs of the Academy of Surgery. Let us only trace in the following cases and reflections, the operative details with which Desault has enriched their treatment.

§ II. *Of Ozenas.*

CASE I. *Recorded by Baratte.*

Joseph Henry, aged 32 years, entered the Hotel Dieu on the 3d of October, 1792, having in the left cheek a tumour, that extended from its prominence to the lower part of the canine fossa. Hard, without any change in the colour of the skin, and accompanied with pain not augmented by pressure, this tumour presented above the second molar tooth, a small fistulous opening, from which a considerable quantity of pus flowed habitually. This discharge had ceased for six days, and from that

time the pains had become very severe. From these symptoms the seat of the disease was easily presumed, and confirmed by its history. The whole of the left side of the face had been violently bruised by a fall a year before. Some general means, and the external use of some emollients dissipated the first affection, and the patient thought himself cured; but at the end of two months, pains at first obtuse, in a little time more sharp, began to be felt deeply under the malar eminence. Some time after a tumour arose in this place; its slow but constant progress soon brought it to a considerable size; the pains increased with it, but were one day suddenly calmed by the spontaneous bursting of the tumour. The patient's mouth was immediately filled with a fetid pus; the fistulous opening appeared at the place mentioned, and from that time the oozing was habitual. Sometimes it was suppressed, and then the pains became severe until it re-appeared. Such was the state of the patient when he presented himself to Desault.

The indication was evident, viz. to enlarge the fistulous opening, to make a large vent for the pus, and then to cleanse the diseased sinus by injections. Some general means prepared Henry for the operation, and on the third day of his arrival he was conducted to the clinical amphitheatre.

1st. Being seated upon a high chair he was held by an assistant, upon whose breast his head was turned back and secured by the hands crossed on the forehead.

2d. The mouth being opened wide, Desault with a sharp perforator enlarged the fistulous opening, which was situated, as we have seen, above the second molar tooth, and extracted that tooth, which having been carious for a long time, was nothing more than a shell.

3d. In the enlarged opening he inserted a second perforator, with the point cut off that it might not wound

the opposite side of the sinus; and with this he destroyed by rotatory motions, that portion of the jaw which was comprised between the alveolus and the opening.

4th. From thence resulted a large opening capable of receiving the little finger, which gave vent to a great quantity of purulent matter, and by which a fluid thrown into the sinus might clean it completely.

5th. The patient was directed to wash his mouth frequently with barley water and honey of roses, and occasionally to introduce his finger into the opening to prevent too speedy cicatrization. The success of this treatment was soon manifest; at the end of a few days the tumour began to diminish, the pus at first sanious, to acquire gradually a more laudable character, and the opening made with the perforator to contract sensibly.

A month after the operation the discharge had ceased entirely, without any affection being the result as formerly. The tumour had disappeared, and the opening scarcely permitted the introduction of the most slender probe. The patient was dismissed in this state, and later information was received of his perfect cure.

2. The treatment of ozenas of the maxillary sinus may be referred to two general methods: 1st. Injections through the natural opening. 2. The perforation of this cavity in some point of its extent. The first method proposed by Jourdain, often impossible, always very difficult in its execution, constantly insufficient in its results, died almost in the birth, in the opinion of men of information; the second can alone fulfil the indications efficaciously, but the degree of its advantages is relative to the operative mode that is adopted, which varies according to the place where the sinus is opened.

3. As Lamoirier has judiciously remarked, there is a place of necessity and a place of choice in the opening of this cavity. The first is indicated by the affection or

absence of one or more of the molar teeth, and the second is permitted by the soundness of the dental range.

4. In general, if one of the molares appears to be rotten, if it vacillates in its alveolus, if a purulent oozing is established between it and the gum, extract it, as Meibomius first advised. But the opening, which results from this extraction is always insufficient. Whether it has any communication with the sinus or not, the bone must always be included in a greater extent, and the preceding case shows the process then indicated. Let us resume some of the operative details.

5. The instruments, that are necessary in this case, are limited, as has been seen, to two perforators, one of which (fig. 1.) sharp at its extremity (*b*), does not differ from that of the common trepan, except that it is mounted upon a handle cut in diamonds, that it may the less easily slip in the hand; this form is more easily handled than if the stalk of the trepan was employed. The second (fig. 2.) mounted like the preceding, is cut off at the extremity (*c*). The use of the one is to open a route for the other into the cavity of the sinus, and it is essential to enlarge the opening with the latter, which, from its being too short, cannot reach the opposite side, and if it did, cannot pierce it. The fragility of the superior or orbital, internal or nasal sides of the sinus, attaches a great importance to this precept.

6. The opening should always be at least sufficiently extensive for the introduction of the little finger. A fragment more removed from the jaw is nothing in the cure, and it is always of much importance that there should be a free vent to the pus, whose continuance kept up the disease.

7. It may be supposed that the inconvenience of closing very late would be found in large orifices; but on

the contrary, experience proves that this objection is applicable only to small ones.

CASE II.

While Desault directed the surgery of the Hotel Dieu, a child was brought to him with an ozena of the right maxillary sinus, for which two teeth had been extracted a year before. A probe, passed through the alveolus into the cavity, had discharged a considerable quantity of purulent matter; but the orifice, remaining fistulous from that time, furnished a continual oozing and showed no appearance of a cure. Desault, judging that the non-obliteration of the passage was owing to its narrowness, enlarged it in the manner above mentioned, and in a little while after it was closed and the ozena cured. The same process had the same result, in the case of another patient.

8. When the opening is sufficiently dilated, it is a prudent practice and recommended by Desault, to cut off the corresponding portion of the gums which had been detached to lay the bone bare, lest, by becoming engorged after the operation, it should prove an obstacle to the discharge of the pus.

9. On the first days there is often much swelling, which is calmed by emollient fomentations. In a little time it is dissipated, and then detergent injections and gargles, with the occasional introduction of the finger into the orifice, lest it should close too speedily, compose the whole of the treatment.

10. Some practitioners have multiplied the necessary places of opening the sinus, beyond the caries of the molares. For example, if a fistula is formed on the face below the orbit, they have proposed to enlarge it, and to pass through it the injections proper for cleansing; but the inevitable deformity of the cicatrix, the inconvenient

situation of the orifice towards the superior part of the cavity, the stagnation of the pus below and consequently the difficulty of healing, proscribe this method. In this case, a counter opening made, either in the alveolar range, if the circumstances mentioned (4) exist, or at a place of choice, which will be pointed out, is always sufficient to cure the ozena and to cicatrize the fistula, which will close as soon as the pus ceases to ooze between the borders, an advantage that will evidently be obtained by piercing the sinus below it. Let us proceed to the opening this cavity at a place of choice.

11. In general, when the teeth are sound, and the circumstances stated (4) do not exist, another place than the alveoli is to be chosen for opening the sinus. The necessity of the molares for mastication imposes this as a law. Lamoirier fixed this place below the malar eminence, in that hollow concave from above downwards, convex from before backwards, which separates the canine from the zygomatic fossa. Bordenave also adopts it, and when the opening of the alveolus is counter indicated, it is the common method. But the place where Desault perforated the sides of the sinus claims the preference in general: That is the inferior part of the canine fossa. 1st. There less thickness of the bony substance is found. 2d. The operation there is more easy, because it is necessary to carry the instrument to a less depth in the interior of the mouth. 3d. The hook, employed by Lamoirier to retract the commissure of the lips, becomes useless, and therefore the process is simplified. 4th. After the operation, the treatment is more easy; the orifice being more exposed, the state of the parts can be distinguished better. The following case, recorded by B——, offers an example of the operative process then employed by Desault.

CASE III.

Joseph Maugra, entered the great hospital of Humanity, in 1791, to be treated there for an ozena of the maxillary sinus, that had supervened a year before, in consequence of a violent inflammation, which had itself been produced by a sudden change from a warm to a very cold air. The pus, accumulated in the bony cavity, had soon affected its sides; a spontaneous opening, formed in the superior part of the canine fossa, had transmitted into the cellular membrane of the cheek a considerable quantity of purulent matter, which made a prominence outwards. From thence, a fistula was formed in the face, through which a sanious and yellowish fluid had oozed for seven months; and as soon as this oozing was suppressed, sharp pains ensued. The sides of the sinus had already begun to swell. The superior dental range, being sound in its whole extent, offered no point for penetrating into its cavity. Still the indication was evident; an opening must be made below the fistula to prevent the pus from passing through it, and to furnish a free vent. The place mentioned (10) was favourable. Desault operated in the following manner, after having employed some general means as preparatives.

1st. The patient being seated upon a high chair, with his head supported against the breast of an assistant, he began by separating the cheek of the diseased side from the corresponding gums; then he cut with a scalpel the internal membrane of the mouth, and the other parts which unite the internal part of the cheeks to the maxillary bone.

2d. The bone being exposed, he drew back the commissure of the lips with the fingers of his left hand, and took in the right hand a sharp perforator, whose point,

being applied to the inferior part of the canine fossa, penetrated by rotatory motions into the sinus.

3d. The opening was enlarged by a blunt perforator, especially above, where it was prolonged to the fistulous opening. A portion behind, affected with caries, was removed.

4th. He cut off the flaps of the gums, corresponding to the opening, which was filled by a plug of lint, supported by others, that were placed between the jaw and the cheek.

The next day a considerable swelling appearing over the whole face, an emollient cataplasm was applied upon this part; there were sharp pains on all that side. On the second day the symptoms diminished, and on the third the dressing was removed, when the swelling was found to have disappeared almost entirely. From that time the patient used the simple precaution of gargling the mouth frequently with an emollient decoction, and introducing the finger into the orifice to prevent its closing too speedily. On the fifteenth day, the exterior fistula was cicatrized and the swelling of the sinus diminished. On the twentieth, the cure had progressed very sensibly, and was completely finished six weeks after the operation.

§ III. *Of Fungi.*

CASE IV.

J. Gaillard, having a good constitution, experienced in 1790, severe pains in the maxillary sinus, in consequence of the introduction of a piece of wood into the nasal fossæ, which, according to his relation, appeared to have bruised the opposite side. These pains continued of the same degree for a certain time, at length were dissipated and alternately returned and disappeared, without any exterior symptom, for six months. At this

period the patient had a fall, in which the cheek-bone was violently bruised against a beam; from that time the pains increased, became habitual, and about fifteen days after the accident, this bone was sensibly elevated, the maxillary bone acquired more size, especially outwards; at the end of some time the tears ceased to flow into the nasal fossæ, and spread over the cheek. Five months after, the tumour, always increasing, began to raise up the inferior side of the orbit; and the eye, more prominent than ordinary, was already pushed forwards; the pains still small, did not become severe but at certain periods. Two of the molares had fallen out; the external side of the sinus, being worn through, was open and suffered a small portion of fungus to pass, that was easy to be seen and especially to be felt with the finger. Such was the condition of the patient when he entered the Hotel Dieu, to seek more skilful aid than what he had received from several surgeons, who had confined themselves to general means. In this case, the only resource of art was to open the sinus and then to destroy the enclosed tumour, either by excision or by caustic. Desault determined upon it immediately, and on the seventh day from his admission, Gaillard, being conducted to the amphitheatre, was there operated upon in the following manner.

1st. This patient being placed like the preceding, the cheek was previously detached from the maxillary bone, by the incision of the internal membrane of the mouth, at the place where it is reflected upon that bone, which was accurately denuded of all the soft parts on its external surface.

2d. The sharp perforator, applied to the middle of this surface, served to make there an opening before that which already existed.

5d. The bony lamina, comprised between the two,

was removed by means of a cutting instrument, curved in the form of a vine knife, (fig. 3.) which, being directed from behind forwards, made the section without difficulty.

4th. The opening not being sufficient, Desault attempted to enlarge it inferiorly at the expense of the alveolar range and with the same instrument; but meeting with too much resistance, he had recourse to the gouge and mallet. A considerable portion of the arch was separated by their means, without the preliminary precaution of drawing the corresponding teeth, three of which were carried away by the same blow.

5th. From thence there resulted in the external and inferior side of the maxillary sinus, a hole sufficient to receive a large nut.

6th. Through this hole a considerable portion of the tumour was removed by a scalpel curved on its flat side and fixed on its handle. A frightful hemorrhagy prevented any further researches at that time. The spectators were alarmed by the quantity of blood, which the patient discharged by mouthfuls. But enlightened by experience, which had taught him how easily this accident might be stopped in these kinds of tumours, Desault was content to push into the sinus a plug of lint, which he kept there for a moment.

7th. This plug being withdrawn, the actual cautery, of a white heat, was applied to the remainder of the fungus, and reiterated several times.

8th. For the dressing, plugs of lint, sprinkled with colophony, filled the cavity of the sinus, and to sustain them the lower jaw was made to approach the upper; a sling serving to prevent its falling down.

In the evening, a little fever supervened, and augmented during the night; a considerable swelling appeared on the cheek, and made the application of an

emollient cataplasm necessary, which was from that time renewed twice a day. On the third day, a part of the plugs was removed and replaced by soft lint, which again was changed the next day, without, however, touching that at the bottom for fear of renewing the hemorrhage. On the eighth, this was detached spontaneously by the suppuration, as also the eschars arising from the application of the cautery. Frequent garglings were prescribed for the patient. On the eighteenth day, the tumour was sensibly diminished, the eye less prominent and the epiphora less sensible; but a portion of fungus appeared again at this period. The iron, of a red heat, being applied twice to it, destroyed it almost entirely; it re-appeared about the twenty-fifth day, and rendered a third and last application necessary. From that time the cure progressed rapidly; instead of fungosities, healthy granulations arose from the bottom of the sinus, whose sides, gradually approximating, effaced the large opening made in the operation, and reduced it to a small hole hardly capable of admitting a probe, which was itself obliterated by the fourth month, a period at which there remained no other traces of the disease than the absence of the teeth that were removed, and a sensible depression, corresponding to their natural place.

12. In the preceding article, reason and experience have established the necessity of large openings, to give vent to the pus that is contained in the maxillary sinus. This precept is not of less importance here; indeed, if we neglect to put it in practice, how can we ascertain the size, form and extent of the tumour? How shall we be able to remove the whole of it through an opening, which will permit only a small portion to be seen;—can we ever be certain that the evil is radically destroyed? This certainty can scarcely be procured when the sinus is laid open to a considerable extent; how then can it

be, when there is only a small part exposed to view? yet it is an essential article of the treatment. If any portion remains, it soon becomes the germ of a new tumour, whose progress is more rapid and its character often more unfavourable, on account of the subsequent irritation and inflammation produced by the cutting instruments and the actual cautery. Desault often had occasion to observe this, particularly in two cases, which he was accustomed to relate in his courses, that occurred, one in the hospital of St. Sulpice, the other at La Charité, and both which issued most deplorably for the patients; one only will be cited.

CASE V.

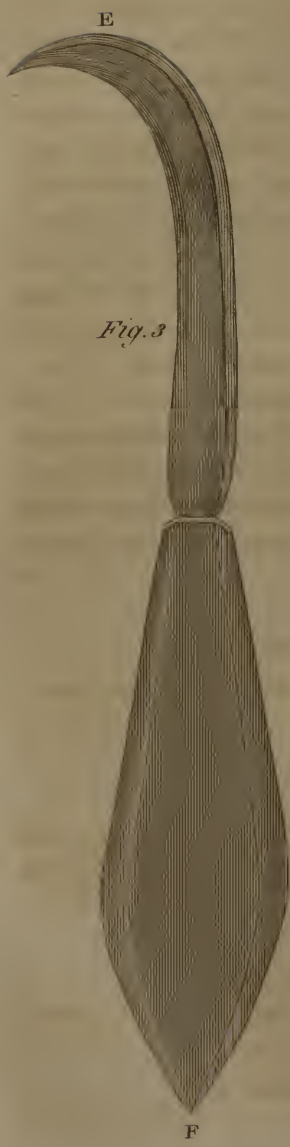
A man came one day to La Charité, having upon the external surface of the alveolar border, a fistula that extended into the maxillary sinus. Desault introduced a probe and ascertained the presence of a polypus, for the treatment of which he proposed the ordinary means to the patient. He refused, and went to consult a dentist, who, by means of a small orifice, applied fire to the polypus. A very great inflammation and a considerable increase of the tumour were the result of this imprudent operation. Then the patient came to the school of surgery, where, in a consultation called on his case, Desault advised to open the sinus freely below and then to amputate the whole of the fungus. This advice was rejected, and it was agreed to make an inconsiderable opening in the cheek, through which only a small portion could be removed. The remainder, being irritated and inflamed, soon acquired an excessive size, raised up the bones of the face, made them carious, and caused a hideous prominence forwards, and at the end of a month was beyond the reach of art.

13. It may then be established as a principle that the

success of the treatment is immediately connected with the extent of the opening, intended to expose the fungus to view. Be not afraid of removing a considerable portion of the superior alveolar arch, or of making three or four of the teeth fall out with it; do not make the delay of previously drawing them; a single blow is sufficient to extract them as well as the piece that sustains them. In a little time the opening, however large it may be, will close, and scarcely a trace will be left behind. Finally, if more tediousness and difficulty in the treatment, and more deformity after the cure were to be the result, what are these inconveniences compared to those (12) which would arise from a different practice?

14. To return to some of the operative details. The instruments necessary to expose the sinus to view, are first the perforators, intended to open the passage, as in the *ozena* (5). In enlarging this passage, the instrument in the form of a vine knife (fig. 3.) presents great advantages; its blade should be thick and its temper strong, so as to cut the bony pieces more easily, which in this case do not often present a great resistance. If however the resistance should be very considerable, the gouge and mallet must be employed as in the preceding case, but in general the preceding instrument is sufficient. Its use is not confined to the maxillary sinus; in the hands of Desault, it was usefully applied to fungi, *spina ventosa*, necrosis of the lower jaw, and other diseases of the hard parts of the mouth, in which it was necessary to remove bony pieces. It may be perceived that its employment cannot be directed by any general principle; all is relative to the state of the disease, and it is well known that its variations are such, that hardly two cases are alike.

15. The section of the fungus also sometimes requires scalpels differently curved upon their edges and their



blades, so as to reach it with more facility in its extreme ramifications; but commonly the ordinary scalpel is sufficient, and the simplicity of operations imposes the law of extending its use to as many cases as possible.

16. The actual cautery has here a double advantage: 1st. Of stopping the hemorrhage, which it does so much the more efficaciously, as the blood does not escape from any considerable vessel, but flows, as may be said, in a sheet from the excised tumour. 2d. Of destroying all that escapes the cutting instrument, and thus preventing any chance of its regeneration. The precaution of making it of a white heat is essential, both because by the sudden disorganization of the part, the pain of the patient is less, and because burning deeper, it accomplishes better the object proposed. Be not fearful of repeating the application frequently, if new fungosities are formed; on the contrary watch their development. It is easy to destroy them in the beginning; but, if they are suffered to attain any growth, the greatest difficulties will be experienced.

Explanation of the Second Plate.

Fig. 1. A sharp perforator, intended to open the maxillary sinus.

A. The handle cut in diamonds.

B. The point.

Fig. 2. A blunt perforator, proper to enlarge the opening of the sinus, without danger of wounding the opposite side.

C. Its extremity cut off.

D. The handle also cut in diamonds.

Fig. 3. An instrument in the form of a vine-knife, to remove the bony parts of the sinus.

E. Its thick blade, strongly tempered.

F. Its handle.

MEMOIR
UPON THE
OPERATION OF THE HARELIP.

SECTION I.

General Reflections.

1. NATURE does not in the organization of animals always follow invariably the laws that direct their economy. Sometimes she departs from the circle that circumscribes them, seems to play around it, and then produces different deformities, which are very common in the human species—less frequent in others. To these, surgery can often oppose but impotent means; but in certain cases they can be combated with success. Of this nature is the deformity so frequent and so well known under the common name of the Harelip. Here, at least, art corrects and beautifies nature. Alas! how many times does she disfigure it!

2. All authors have spoken of the harelip, and many of them have endeavoured to improve its treatment. Who would not suppose, said a celebrated man, on comparing their efforts with the simplicity of the disease, that in this respect a sound practice must be invariably fixed? Yet opinions are still divided, and in the sentiment of many skilful persons much obscurity remains. Let us attempt to throw some light on the subject, by presenting the doctrine of Desault on this particular point; not that art is indebted to him in this case

for any very acute improvement; but because a great experience had acquired for him the right of deciding upon the question, so much agitated latterly, respecting the inconveniencies or advantages of the processes employed in the operation.

3. It is known that the harelip borrows its name from its resemblance to the natural disposition of the upper lip of the hare; that it has in general a great number of modifications; that, sometimes simple, it presents only a single division, easy to be united; sometimes double, it offers, in the middle of that division, a fleshy appendix, more or less elongated, that divides it equally; that, finally, it is sometimes complicated with the separation of the maxillary and palate bones, with the projection of a portion of the first into the middle of the cleft, with the division of the membranes of the palate, also of the pituitary and of the uvula, and also with a troublesome communication between the nostrils and mouth.

4. To trace the view of the different kinds of harelip, and the unfavourable results, either in sucking or in other functions, would be only to add to the annals of the art, descriptions repeated a thousand times since Celsus, who first transmitted to us a methodical description of this affection. Therefore, without further delay, we will proceed to the surgical treatment that the disease demands.

5. We are indebted to the ancient physicians for the ingenious idea of applying, to the cure of the harelip, that property of living animal parts, by virtue of which a recent division, whose edges are brought in contact, unites and disappears at the end of a certain time. From this general principle, the treatment of all simple wounds proceeds; upon it also rests the operation now to be examined. In this operation, two great consequences result

from it; the one, that the cleft must be reduced to the state of a recent division; the other, that the bloody edges of this division must be brought together and kept in contact.

6. All surgeons have agreed upon this double indication; but they have not all pursued the same route to accomplish it. Some have had recourse to cauteries of different kinds, and to active stimulants, to reduce the edges to a state of rawness. Others, and by far the greatest number have employed cutting instruments; but among those, the form of the instruments has varied; the reciprocal priority of the scissars and the knife has been disputed; and, as will soon be mentioned, too much importance has perhaps been attached to this point, which is of little consequence in practice. In the approximation of the raw edges of the division, dry or bloody sutures, alternately employed and rejected, have also, but with more reason, engaged the attention of practitioners, as to the respective preference which is due to them.

7. Let us enter into some details of the practice of Desault, in both parts of the operation, and of the reasons that supported it. Let us describe in the second place, his operative process, supposing the harelip to be simple; and finally, let us trace the particular modifications which the process must undergo in the different complications that this deformity presents.

§ II. *Of the Excision of the Borders of the Division.*

8. At the present day all practitioners have agreed upon the exclusive preference claimed by cutting instruments in this first part of the operation, over all other means. The danger of the actual and potential cauteries, which were sometimes used by the ancients, the slowness, the difficulty of the treatment accompanying their use, and the deformed cicatrix resulting

from it, all concur to proscribe them from a rational practice. The action of the most active stimulants, such as blistering plasters, proposed and employed by some, is almost always insufficient; and in the use of these means the probability of some cures cannot compensate the certainty of an habitual ill success. A surgeon employed this process at the hospital of the schools, at a time when the memoirs of Louis had excited attention on this point of practice. The blistering was suffered to remain twelve hours, and then the borders of the division were approximated by means of adhesive plasters; but their union took place only in a few points, and the ordinary operation became the only resource.

9. Most practitioners seem to have attached very little interest, until lately, to the exclusive choice of the instrument intended for the excision of the borders of the divided lip. The scissars or the scalpel are advised indifferently by Franco, Heister, and Ledran, and did not appear to possess any decided advantages over each other. However, the greatest number had adopted the scissars, and this choice, justified by great success, found few to contradict it, until Louis exerted himself strongly against their use, and with an exaggerated importance, proclaimed their inconveniencies and the advantages of the scalpel. The authority of this celebrated man caused the opinion of Desault, who was then timid, to be wavering for some time; but in a little while, experience and accurate researches fixed his practice on this point, and brought him back to the ancient manner of proceeding.

10. Let us trace, in the parallel of these two instruments, the reasons which determined his preference;—not that this preference is exclusive; since, in skilful hands equal success often crowns both means; but, because where there is a best, we must even abandon that which is good.

11. The knife acts by cutting, and does not bruise the parts. The pressure of scissars upon bodies which they divide, is almost nothing; because the action of their blades is always very oblique with regard to those bodies. Experience also proves, that the part cut by them never shows any contusion. The same sensation of pain is attached to the two instruments;* but the first augments the sum of it more than the second, by prolonging the process. The latter scarcely ever requires the separation of the lip, which often adheres to the upper jaw; the former commonly necessitates this painful preliminary, in order to introduce the card upon which the incision is to be made. The use of this card or of other means, as conductors of the knife, is very painful in certain cases. The use of the scissars is not attended with this difficulty: in employing the one, the parts being violently drawn downwards to facilitate its action, are often unequally divided; in making use of the other, the flesh (being fixed without tension between their double blades) is always cut even. Many celebrated practitioners at this time, both in France and England, employ the knife exclusively. Almost all the great masters of the art have used the scissars, which still have illustrious partizans in Europe. It is objected to them, that they render the alternate use of both hands necessary, and that they seldom divide with a single stroke the border which they make raw; but the history of the operative process will reply to the first

* The experience of Bell leaves no doubt upon this subject. He cut off in the same operation, one of the borders of the division with the knife, and the other with the scissars; and the patient affirmed, that the first was more painful to him than the second incision. If this result is not always constant, we may at least conclude, contrary to the assertion of Louis, that a painful impression is not more peculiar to the one instrument than to the other.

objection (36), and the second is as common to the knife. Frequently the angle of the division and the borders, which terminate there, may be divided in two strokes. Finally, it is a general principle, that whenever a part is loose, slender and as it were floating, the scissars which fix it, are better for dividing than the knife, which previously demands a mean of securing it.

12. From this parallel, which is perhaps too minute, it follows: 1st. That if equal advantages are attached under some views to the scissars and to the knife, the second never has a real priority over the first. 2d. That, on the contrary, in the greater number of cases, the scissars present to the practitioner a facility which he would seek to no purpose in the other. Upon this double motive Desault grounded his preference of the scissars to accomplish the first part of the operation. In describing the operative process, we shall perceive his manner of employing them.

13. At the present day there is a general consent respecting the angular form of the incision of the borders. The facility which it offers to the union; the certainty which it affords of avoiding—above, the inconvenient hole that results from the deficiency of contact—below, the deformed hollow that is produced by the non-division of the rounded angle that terminates their borders; the faculty possessed by the lip of yielding to extension more considerably below than above;—all concur in justifying the practice universally adopted on this point, and in banishing that which, first presented by Celsus, then modified by different authors, recommended by Guillemeau and Thevenin, consisted in giving the form of a crescent to the two lateral incisions. The general rules of the excision of the borders, are, 1st. To remove all the red pellicle that covers them, and consequently to cut upon the skin. 2d. To give them an equal size,

so that when they approximate they may be adapted with accuracy, and may not make, as may be said, a fowl's rump; so that if one, being more oblique, is longer than the other, the former must be cut in such manner as to remove more towards the loose than towards the adhering extremity; whilst, on the contrary, in the former method, as much would be removed above as below, from whence would result an equal obliquity and length. 3d. The incisions must not be made sloping, but discover as much of the anterior as of the posterior part of the lips; however, if needles are employed, perhaps it would not be improper to include a little more of the borders at the expense of the second; and on the contrary to cut away a little more at the expense of the first, if recourse is had to adhesive plasters. 4th. The border to be first cut should be that in which most difficulty is experienced in fixing it between the fingers, because being bloodied by the first incision, they would slip upon the parts, and could not secure them so efficaciously.

§ III. *Of the means of Contact between the Raw Borders of the Division.*

14. The union of the borders of the division in the harelip is never attended with difficulties that can delay the practitioner. Here the loss of substance is almost nothing. The lips being loose and easily extended, yield without resistance to the smallest effort that approximates them; only muscular contraction is to be overcome, and it is well known how easily this power may be surmounted. But if the contact of the borders of the lip is always easy to be procured, we do not experience the same facility in maintaining it with accuracy during all the time that is necessary for the reciprocal adhesion of the raw surfaces. In this case it is

not, as in most other wounds, that only a simple union is required; it is an union precise and regular, which will scarcely leave a trace of its existence upon the parts. If the first object of art be to correct a defect of conformation that is injurious to the functions, the second not less interesting to some persons, is to add to the figure those charms which nature had refused.

15. It must then be perceived, that the choice of the means suitable for maintaining in contact the borders of the division, cannot be indifferent to the surgeon, who is anxious to improve the processes that he employs; and the parallel of these means claims without doubt a more serious attention than that of the cutting instruments intended for the division of the parts (11).

16. In the harelip, as in most longitudinal wounds, the uniting bandage and sutures are the two only means of union; the situation, which is another mean of contact between the borders of a wound, not being capable in this case of being profitably used. Sutures have always been and still are universally employed, and the exclusive use of the uniting bandage is attended with inconveniencies too obvious to find judicious partizans. But, what sutures should be employed? May the dry or bloody be used indifferently? The one or the other must possess particular advantages which ought to assign the preference.

17. If the history of the art is consulted to decide this question, we behold the bloody suture almost generally used by the great masters, whose practice was always in favour of this process, a prejudice at least advantageous. Celsus practised or rather saw it practised by the physicians of his time. The Arabians borrowed this practice, and Guy de Chauliac, their copyist, employed it with advantage. Van Horne did not seem to know any other. Paré has caused it to be engraved. Guille-

meau recommended it. Fabricius de Aquapendente always used it. All our modern treatises of operations propose and describe it as exclusively proper. Garengeot, Ledran, Heister, Petit, &c. indicate this as the only mean of contact between the raw edges.

18. But, in the midst of this practice, almost generally adopted, several distinguished men quitted the common track; and the dry suture or adhesive plasters also counted their partisans. Franco describes two processes, one of which is performed with needles; the other, confined to adhesive plasters, is followed, according to him, by less deformity. According to Muys, Silvius has cured a great number of harelips by this latter method. G. Wolf Wedel hoped, by its use, not to prolong the cure of a child beyond the eighth day. Wounds of the face in general and the harelip in particular, according to George Purman, never require any but the dry suture.

19. At length Louis, considering on the one hand, that most authors do not prescribe the bloody suture, but from the supposition of a loss of substance, and persuading himself on the other hand, that this supposition is almost always erroneous in the case under consideration, and that muscular action is the only power to be surmounted, establishes as a principle, 1st. That the power which approximates the lips ought to be exercised, not upon their borders, but upon the muscles which separate these borders. 2d. That the uniting may alone represent that power. 3d. That the suture is a mean of contact, and not of approximation between the lips of the division. 4th. That adhesive plasters, being sufficient to maintain this contact, and not determining to another part, like the bloody suture, an irritation favourable to muscular contraction, ought always to induce the practitioner to give them the preference.

20. The bases upon which this doctrine rests are in general true, as well as the three first principles laid down by the author (19), and under this point of view, art is indebted to him for a step towards its improvement. But the last principle does not bear the same stamp as the others; and it is easy to demonstrate that if we even consider the bloody suture as a mean of contact and not of approximation, it offers always advantages superior to those of adhesive plasters. The parallel of the mode of action of these two means will suffice for conviction; only the twisted suture, which is the most generally received, will be first considered, some observations upon the interrupted being reserved to another time.

21. 1st. The dry suture is always exempt from pain, both before and after the operation. The use of the needles causes little during the operation, because their passage into the flesh is hardly sensible, and only the skin is painfully affected by the small wounds resulting from their entrance and exit. Experience proves that after the operation their presence is not painful. 2d. The adhesive plasters do not produce an irritation capable of increasing muscular action. If this irritation should result from the bloody suture, its effect is always of no importance, either from the action of the bandage being opposed to that of the muscles, or from the resistance which itself opposes to their efforts. 3d. By recurring to the first mean, the lacerations sometimes caused by the second are avoided; but, when the latter is methodically employed, the practitioner never experiences this accident. 4th. In the dry suture there are no new wounds, from which too great inflammation and too long suppuration might result; but experience proves that this double accident is not attached to the bloody suture.

22. It follows from these first considerations, that the so much talked of inconveniences of the twisted suture scarcely merit entering into the balance in the choice of a process; but, if we place there its advantages, it will be easy to perceive its value.

23. The adhesive plasters do not unite the borders of the division accurately except at their anterior part. Posteriorly there remains a cleft, from whence the blood may escape, and into which the saliva may be introduced. From thence, in the first case, the possibility of a hemorrhage, which I have seen supervene five hours after an operation performed by a celebrated surgeon; in the second, the defect of the agglutination of the borders; this double inconvenience cannot be attributed to the use of the needles. Being carried considerably backwards into the thickness of the lip, they unite the edges posteriorly, while the threads, that are twisted around them, secure them anteriorly; from thence there will always be an accurate contact in the whole thickness of these borders. 2d. If one of the maxillary bones is more prominent than the other, the two united portions of the lip, having an unequal point of support and not being sufficiently retained by the adhesive plasters, will lose their level and be displaced, according to their thickness. The one will remain forward, being sustained by the projecting maxillary bone, the other will be depressed backwards, and then there will happen what Desault experienced one day, in a case in which he employed the process of Louis. The anterior part of the left border of the division united to the posterior part of the right border; so that both before and behind there remained two surfaces not united, which became the seat of a long suppuration and the cause of a deformed union. I have seen, in another case, the same inconvenience result from the same method. The solidity of

the bloody suture, and the point of support given by the needles to the lips through which they pass always prevent this unfavourable displacement. 3d. In employing the dry suture, the two borders, being always more strongly retracted inferiorly by the muscular powers, form there, on uniting, a small hollow instead of the button more or less prominent, that is presented in the natural state by the middle and inferior part of the upper lip. In describing the operative process it will be demonstrated, that it is always easy, by directing the lower needle properly, if not to form the button, at least to avoid the hollow. 4th. If the cleft is prolonged into the nose, especially if the maxillary bones are not on a level, it will be difficult to unite the superior angle of the division by adhesive plasters, and then there will remain an inconvenient hole above the union; it is very seldom that the use of the needle, with proper precautions, involves this inconvenience. I believe the practice of Desault never furnished him but one case, which was of a patient entrusted to my care after the operation, with whom, being then but little instructed, I left off the bandage too soon. 5th. However perfect this bandage may be, it is never so solid as to be in no case subject to derangement; if it should be displaced, could the adhesive plasters supply the deficiency of its action more efficaciously than the needles? 6th. Besides, does not a part of the twisted act like the dry suture? Do not the threads, adhering intimately to the skin through the medium of the gluten of the blood, represent adhesive plasters? By keeping the two borders of the division in contact, do they not prevent the laceration of the needles? 7th. Let us terminate these comparisons between the dry and bloody suture, by the result of experience, and we will perceive that this last method has been constantly followed by the most happy success, during ten years

in which Desault employed it at the Hotel Dieu. Moreau, who preceded him, used it, as well as many others, and the same success crowned his operations.

24. We must then conclude that if, under certain points of view, adhesive plasters have some advantages over the bloody suture (22), they are always attended with an infinitely greater sum of inconveniences; that perhaps they might answer in some unions, but that in general they are insufficient to procure that precise contact, necessary for the accurate and regular union that is desired in the harelip (14). In the operation of the harelip then, theory and experience unite in justifying the use of the twisted suture, which was proscribed in France, in these latter times, until Desault first maintained and then re-established it.

25. But is not this preference, which the twisted obtains over the dry suture, also applicable to the interrupted? This has had its partizans, and in general, compared to the adhesive plasters, it presents very great advantages; but, if compared with the twisted suture, the same result does not ensue: 1st. The soft parts are never so solidly fixed as in this, when the needles behind, and the threads before, invariably secure it. 2d. If, as frequently happens in the separation of the maxillary bones, the dental range offers to the united lip an unequal point of support, the interrupted threads cannot like the needles, sustain the two borders at the same level; and here it may be observed, that the objection made to the interrupted suture, of leaving in the flesh solid bars, offers precisely one of its advantages in the cases, where the support furnished by the jaw is not uniform. 3d. It is difficult, with the threads alone left in the parts, to avoid the small inferior hollow of which we have spoken, and which it is always easy to prevent by the needles. We must allow, however, that if the

harelip is simple, and if the dental range offers no inequality, the interrupted suture may in general be attended with a success upon which it would be imprudent to reckon in a complicated case.

26. I have attempted to establish (23, 25), the always real priority of the twisted suture; let us now proceed to the manner of making it and to the choice of instruments which it requires. The needles necessary for that kind of suture have varied both in their form and composition; alternately flexible or inflexible, they have, under this view, divided the opinion of practitioners. The greater number of them, however, do not use those of the first form, although they are admitted by some.

27. The ancients employed only those of steel, whose extremities being easily rusted, irritate the passage of the wound, when they are withdrawn. Sharp in England, and Houstet in France, substituted those of silver, terminated by a steel point; at length those of gold were adopted, proposed by Ledran, and which on the one hand, have not, like those of iron, the inconvenience of rusting, and on the other, possess solidity enough to form a cutting edge proper for opening a passage to them. Desault adopted their use: Bell employs them indifferently.

28. The form as well as the composition of the needles has varied. The ancients did not flatten one of their extremities like the head of a spear, and we are indebted to the moderns for this point of improvement. To the other extremity are adapted, sometimes heads similar to those of pins, and sometimes holes to pass the threads through. But, in the first case, the cutting point, obliged again to pass through the wound, when the needle is withdrawn, cuts the parts a second time. In the second, the hole is useless, since the threads are always suffi-

ciently fixed around the needles by their intercrossing. From these considerations Desault had given to the needles the form expressed (fig. 5, and 6.); he varied them according to the size of the lip, and in introducing them he never employed the *porte nœud*, adopted by a great number of practitioners, but an instrument always useless and easily replaced by the fingers*.

29. The English commonly suffer the blood to flow for some time, before they unite the borders, hoping by this local discharge to prevent the inflammation of the lips; but experience demonstrates the uselessness of this precaution.

30. At this day it is a practice generally adopted in France, to assist, by the uniting bandage, the effect of the sutures in the harelip; and it may be said, in order to give a just idea of these two means, that the first is particularly intended to procure the approximation, and the second, to maintain with accuracy the contact of the two borders of the division (19). Most of the English, however, reject the bandages proper to overcome muscular action. Sharp finds them inconvenient to the patient; Bell adds to this inconvenience, that of compressing the extremity of the needles, and cites, besides, various examples of ill success, occasioned by their assistance. But at the end of some hours the inconvenience

* Is the round form used in our needles for the harelip the most advantageous? Would it not be better to flatten them in the body, and thus prolong to their whole extent, the figure of their cutting extremity, only a little less wide? By this mean the borders of the small wounds, which their passage forms, would be less distant from each other, since their separation is in the direct ratio of the thickness of the bodies left in this passage. Less irritation would result, consequently less suppuration and a more speedy cicatrization of these small wounds. The form proposed would be, in fact, only a slight advantage, since the other is attended with but a slight inconvenience.

is trifling. When the cushions have a sufficient thickness, the bandage never exercises the compression that Bell objects to it. Finally, to the success, which he relates, may be opposed a multitude of the reverse on which he is silent, and which would not have been experienced if the bandage had been employed.

31. The form of these bandages varies, according to the inventive genius of the practitioners who employ them. In general they are founded upon a common principle: almost all make them with a bandage rolled into two balls, whose ends, after having passed over the two cushions placed upon the cheek and intended to push the parts forward, cross under the nose; whether, in this place, several threads, passing one into the other, have been adapted to the bandage; whether one of the ends being divided into two, passes through two openings made in the other; or whether, finally, that on one side is reversed upon that of the opposite side.

32. From thence it follows that the bandage of the harelip is in general the same as that for long wounds, modified in different ways. Desault did not depart from this principle in the invention of that which he made use of. His bandage (*bb*) was rolled in a single ball: on the one side it brought forwards one of the compresses as in other bandages; on the other, only passing over the opposite compress it fixed it at the place to which the hands of an assistant had first brought it. From thence it resulted that only a single turn passed over the united division, and in this place there were never any folds or reverses, which are always inconvenient to the patient and injurious to the operation. Frequently in the ordinary bandages, the compresses being fixed transversely, are displaced from above downwards. Two small bands of linen (*ii*) crossing the principal bandage (*bb*) at right angles over the compresses, served to avoid

this inconvenience. These advantages will be again considered in the description of the bandage.

§ IV. *Operative process in cases of simple division of the Lip.*

33. In the present case the harelip is supposed to be simple, in order to facilitate the description of the process, whose variations in complicated harelips will then be examined. Desault seldom used preparatives, which according to him, are rarely useful and often unfavourable to patients. In this species more than in the others he pursued this practice, and almost always limited himself to some precautions, minute in appearance, but often more advantageous to the success of the operation, than certain points that have been long disputed; as for example, to comb carefully the head of the child who was to be operated upon; to put in his hair a little gray ointment lest, being troubled with vermin, he might derange his dressing; to place some lint behind the ear, to fill with it the cartilage of the concha, so as to avoid the pain of compression being made upon the ear and to absorb the matter of perspiration, which becoming acrid by its long stay, irritates and sometimes even excoriates the parts; to fix firmly by means of a band the cap which is to serve as a point of support to the bandage.

34. The pieces that compose the apparatus are: 1st. For the operation, a pair of very strong scissars, cutting keenly and whose blades must be carefully sloped on both sides; some needles of gold, of a size proportioned to the lip of the patient, a noose of simple thread, a cord formed of two threads waxed and parallel to each other, two small compresses of the height of the upper lip, a pledget and compress, of an equal length with the needles. 2d. For the bandage, two cushions of a size proportioned to the cheek of the patient; a bandage of three

ells, rolled into a ball and of the same width as the lip; two small bandages, two feet long, and nearly as wide as the cushions, a sling and a common band.

35. The situation of the patient, most favourable for the surgeon, is as follows. He must be seated upon a high chair, with his head supported against the breast of an assistant, whose hands, being applied to the cheeks, push them forwards, at the same time that the middle fingers keep up an exact compression on the external maxillary at its passage before the masseter. Every thing being thus disposed, the operation is to be proceeded to and it may be considered in three very distinct parts: that of the excision of the borders; that of their union, and that of the application of the bandage.

36. In the first period:

1st. The surgeon, standing before and a little to the right of the patient, so that the hand of the side which is to act may correspond directly with the part affected, seizes and pinches, with the thumb and index of the other hand, the left border of the division,* cuts from below upwards and a little from without inwards all the red part of this border (13), observing to hold the blades of the instrument always perpendicular to the lip and to remove inferiorly a larger portion of flesh, where it is necessary to take away all the rounded border, rather than superiorly where it is sufficient to make that border raw.

2d. He seizes between the fingers of the left hand, the right portion of the lip, not upon the border itself as in the opposite side, but a little beyond it. He draws it downwards and with the scissars removes, by an oblique

* In this process of Desault, there is not the inconvenience of changing the instrument from the hand during the operation, and thus the objection (11), made by Louis, to the scissars, falls of itself.

incision corresponding to the preceding, all the red border of that side.

37. From this double incision, for which a single stroke of the scissars on each side is commonly sufficient, a triangular wound results, to the union of which we must proceed immediately. This is the second part of the operation, and to be executed in the following manner:

3d. The raw edge of the left portion is seized anew, and in the same manner as for its excision; then a needle held in the right hand like a writing pen, and previously smeared with cerate, is to be inserted into the lip, at the distance of one line from its loose border and of three lines from the wound, to be directed backwards and upwards in such a manner as to make the point come out two lines above the loose border, between the posterior fourth and the anterior three fourths of the lip.

4th. The assistant upon whose breast the head of the patient is supported, presses the two cheeks very strongly forwards, whilst the surgeon seizing as for excision, the right portion of the lip, approximates it to the other, inserts into the bleeding border the point of the needle, carries it in the same direction, and makes it describe the same course, but in an inverse sense, as the opposite side; so that the point comes out at the place corresponding to that where it entered. From thence in the passage of the needle results the form of a V reversed; a disposition proper to push downwards the quantity of flesh that is necessary to form the button, which in its natural state the middle and inferior part of the lip presents.

5th. The surgeon taking in the left hand the pointed extremity of the needle, constantly retaining in the right hand its other extremity, draws downwards the two

borders of the lip, which stretch, approximate and unite; and while they are thus kept in contact, an assistant passes the noose of thread between the lip and the needle, draws the two ends down, and thus replacing the hands of the surgeon, maintains the contact.

6th. The surgeon fixes upon the noose the middle of the cord of thread, crosses its two ends anteriorly in the form of an 8 upon the union of the two borders, brings them back between the lip and the needle, passes them below the latter, returns above and recommencing the figure of 8, he covers with it the inferior portion of the lip, with the precaution of placing them crossed above each other; the two ends of the cord are then trusted to an assistant, who holds them on the side opposite the noose.

7th. A second needle is placed three lines below the first, at the same distance from the bleeding edges, with the same precaution of leaving more parts before and less behind, but without giving to the course of the needle the angular form of the first.

8th. The surgeon takes the two ends of the cord of thread, crosses them between the needles, fixes them on each side behind the superior, makes some figures of 8 before it, then re-descending to the inferior and re-mounting alternately to the superior, crossing always in the middle, he covers the lip with figures of 8, as may be seen (fig. 2).

9th. If a third needle was necessary, the process of its introduction would be the same as that of the second; as to the threads they must perform with the second and third what was done with the first and second.

10th. The noose of thread intended to stretch the lip is cut. Small compresses are placed under the needles to support their extremities. A pledget moistened with

lead water is laid upon the lip, and this is covered by a compress analogous to the form of the parts.

38. The approximation of the borders and the direct means of their contact, are the object of the partial processes of the second part of the operation. The third has for its object the indirect means of this contact, or the application of the bandage. It consists in the following:

11th. To place upon the cheeks two cushions (*dd, dd*, fig. 3.) in the space circumscribed behind by the masseter, before by the commissure, above by the malar eminence, below by the sides of the lower jaw. An assistant fixes them by pressing them against the cheek and pushing them forwards.

12th. To fix around the head by some circular turns, the narrow bandage rolled into a single ball, attaching the end behind the right ear, conducting it over the cushion (*dd*) on the cheek of the same side, then under the nose to the place of the intercrossing of the threads (*cc*), then over the cushion of the other side (*dd*), taking care at the same time to bring that strongly forwards, then behind the ear, where it is fixed, and terminating its application by circular turns round the head.

13th. To place the two small bands (*ii, ii*), which, passing over each cushion, there cross the bandage, and are fastened to it by a pin, and are then carried obliquely to the superior part of the head, where they cross each other and are fixed.

14th. The application of a sling, intended to prevent the motions of the jaw, terminates the bandage, whose different pieces are secured by a band, enveloping with its circular turns (*aa, aa*) the superior part of the head.

§ V. *Of the Subsequent Treatment.*

39. The subsequent treatment of this operation is always simple. The most celebrated practitioners confine themselves to avoiding every thing that may produce motion of the lips, and to renewing the dressing every day. There are, however, some precautions in the renewing of the dressing, in the management of the child, and finally in withdrawing the needles, which are essential to the success of the operation, and will be traced in detail in the following case; referring to it the practice of Desault in the particular case of which this is the subject.

CASE I.

Jeanne Debol entered the Hotel Dieu on the 7th of July, 1787, to be there operated upon for a simple harelip, which dividing the lip unequally, crossed it at the level of the dens caninus of the left side. This child having been hitherto exempt from any infirmity, there was nothing to forbid the operation, which was the only mean of remedying a deformity that gave her but little pain, but marred the budding charms of her physiognomy.

The operation being performed after the process that has been described, was attended with nothing particular, and appeared to occasion only a slight pain. In the evening a little swelling, the ordinary effect of the pressure of the dressing, occupied the whole face; no pain supervened: the patient being tranquil enough, took some broth by means of a flattened pap-boat, placed in the interval of two molares. The swelling was dissipated by morning, and gave place to a slight itching. The dressing was removed and the pledget renewed, after being moistened with lead-water; three drinks of broth

were given with the same precaution as the day before. On the third day the same treatment as on the second; the fourth a light panada was allowed. In the dressing, the needles were withdrawn, with the precaution of carefully cleaning the extremity that was to pass through the course of the wound, of previously smearing it with cerate, of making each needle perform a rotatory motion in order to disengage it with more facility; finally, of resting two fingers upon the border of the lip answering to the point, so as to sustain it while the instrument was withdrawing. The threads adhering to the parts were left in their place; the fifth day there was nothing particular; the sixth the threads fell, and some solid aliment was allowed to the patient; the ninth day the bandage was suppressed; a slight suppuration appeared on the tenth at the orifice of the passage of the needles. There remained no trace of it on the twelfth, and the child being perfectly cured, distinctly articulated sounds which before it uttered with difficulty.

40. The treatment described in this case was such as Desault constantly employed after the operation of the harelip; in general he never left the needles in the wounds more than three or four days, experience having taught him that their longer abode often occasions those lacerations that have been so much objected to the needles. The evident property which the lead water possesses of retarding suppuration in penetrating wounds, in this case affords more time to the raw surfaces to unite, and under this point of view is a very advantageous medicament. The manner of withdrawing the needles is always the same; no pain accompanies and no new irritation results from it. Finally, it is the province of those who attend the patient and give him food, to favour the success of the operation. There is no particular rule to be laid down for them; they must

only be guided by one general principle, which is to avoid every thing that may produce the least motion of the lips.

§ VI. *Particulars of the Operative Process in the Complicated Harelip.*

41. The operation of the harelip, always easy in the case of a simple cleft of the upper lip, presents under certain circumstances difficulties which necessitate, in the operative process, particular modifications of which it will be useful to take a cursory view.

42. It is not rare to see a double fissure, or rather a middle button, separating the division of the lip into two parts. The size of this button varies; if it is inconsiderable, it is comprised in the excision. The angle of the wound is found at the place which it occupied, and then there is no change in the operative process. But if it occupies more space, if it descends to the middle, to two thirds, and even to the level of the inferior border of the upper lip, it will be necessary to make the borders raw on each side, with the precaution already indicated, of leaving more flesh superiorly than inferiorly, where the button must be angular. From this form results the facility of adapting it to the interval between the two borders. Being then penetrated by the needles, which also pass through the borders, it unites accurately with them. If it descends only to the middle of the division, before making the edges raw, it will be necessary to disengage it from its adhesions to the frænum of the upper lip that corresponds to it, and then to bring it down as low as possible.

43. Some practitioners have questioned, whether it would not be more advantageous in this case, to perform the operation at two different times; first uniting one of the edges of the flap to the corresponding edge

of the lip, and when that union was complete, then to repeat the same operation. Bell supports this mode of operating, from the danger of inflammation to which a very delicate flap is exposed when the needles pass through it. But experience proves that this danger is never real; that a success always equal to that of the operation for the simple harelip, crowns that of the double harelip methodically performed at one time. Why then seek by repeating the pain, to obtain that which may be had by occasioning it only once? Desault constantly performed the operation upon this principle, and always in his hands it has been followed with success, of which the following case, recorded by Gavard, offers an example.

CASE II.

Marie Delone, aged eight years, entered the Hotel Dieu with a double harelip, on the 8th of June, 1789. From each ala of the nose there proceeded a division prolonged into the whole lip; in the middle there was a separate portion about four lines wide. It required a double operation at the same time to remedy a double deformity. After the ordinary precautions, Desault proceeded to it according to the rules indicated (42); by oblique incisions he made raw the four borders that were to be united, then placed inferiorly a needle, which, entering three lines from the wound, came out between the posterior fourth and the anterior three fourths of the left border, was carried into the flap whose thickness it passed through at the same level, entered into the right border, which it passed through in an inverse sense, and came out three lines from this border. The noose being placed, as in ordinary cases, a second needle was passed like the first; around both the cord of thread was

twisted in the figure of 8, and the application of the ordinary bandage terminated the operative process.

The little patient, who during the operation had scarcely uttered a cry, appeared tranquil in the evening, and only complained a little of the confinement of the bandage. In the night this pain was dissipated, and no swelling supervened. The treatment was the same as that of the preceding case, only the union, being more tardy, made it necessary to prolong it a little more. The double cleft not appearing to have adhered on the third day, the needles were not removed until the sixth. The bandage was still continued, and at the end of fifteen days, Marie Delone was perfectly cured, without the pain of two operations, performed in succession.

44. The fleshy portion which separates the division into two parts, is not always, as in the preceding case, of the same size with the lip. Frequently it terminates at the middle of the fissure, and then the operation is again modified.

CASE III.

Joseph Delarue, aged nine years, entered the Hotel Dieu with a double harelip, whose middle button, of a round form, terminated about the middle of the division.

The operation was performed on the third day after his arrival. The excision of the left border of the lip having been made, Desault seized the button, disengaged it from its adhesion with the frænum of the upper lip, removed its left border obliquely, so as to give it a triangular form. The right border of the lip having then been made raw, he placed inferiorly a needle, which united the two borders of the lip, as in the simple harelip, and was secured by the noose of thread. A second needle being introduced three lines above, traversed the

button in its middle point, and fixed it firmly between the two borders that were already united below, and with which it was accurately kept in contact by the threads twisted in figures of 8. A slight hemorrhage supervened in the evening; the dressing was renewed and applied a little more tightly. On the third day there was no pain, but a little swelling appeared on that day, which was dissipated in a little time. The needles were taken away on the fourth day, and the patient was dismissed, cured, twelve days after the operation.

45. In the harelip a double fissure is not the most unfavourable complication which art has to overcome. Frequently to the division of the soft parts is added that of the bony palate. An inconvenient projection often appears between the borders that are to be united, and in this latter case new modifications must be added to the operation that is to be examined. The fissure of the palatine arch varies in extent and in size. Sometimes limited to the maxillary bones, it always unites after the operation; but frequently occupying the palate bones, it crosses the velum palati, and then examples of union are not so commonly observed. In general, Desault has observed, whatever was the form of the fissure, that as a consequence of the operation, there was constantly, if not an exact union, at least a very sensible approximation. If the direct cause of this phenomenon escapes our researches, we are at least certain that the re-establishment of the lip in its natural state is the disposing cause. From thence this consequence may be drawn, that the operation should be more speedily performed, in proportion as the symptoms resulting from the fissure of the palate are more pressing.

46. The approximation of this fissure is more or less slow. It is only by degrees that nature re-establishes the regular conformation which she had originally neg-

lected. Still there are cases in which she departs from this rule, and where, more rapid in her progress, she effects speedily the union of the bones. The following example is a proof of it.

CASE IV.

A child was brought to the Hotel Dieu, having a harelip complicated with a separation of the palatine arch of half an inch. Deglutition was very much confined, and pronunciation so difficult, that he scarcely uttered articulate sounds. The operation was attended with nothing peculiar, and at the end of ten days the lip was completely united. At this period, the palatine fissure, being examined for the first time, was found to be diminished one half. The child was less embarrassed in speaking and also swallowed almost without difficulty. On the fifteenth day the borders, being more sensibly approximated, scarcely allowed liquid aliments to pass into the nose. On the nineteenth day the fissure was hardly to be seen. On the twenty-seventh the edges were so united, that scarcely a trace of their separation was left. The entire facility of speaking was a little longer in returning than the cause which prevented it had been in dissipating.

47. The separation of the bones of the palatine arch, which is seldom a direct cause of any modification in the operation, is frequently accompanied with a projection of a portion of the upper jaw, which always requires a particular process. The varieties of this complication are very numerous. Sometimes one of the maxillary bones, exceeding the level of the other, forms the projection by its nasal spine; sometimes, in cases of double fissure, a separated portion of the jaw pushes forwards the middle button of the lip, as may be seen (fig. 1.); sometimes one of the maxillary bones, inclining back-

wards, presents in front the dental margin, which prevents the union; and frequently, one tooth surpassing the level of the others, produces an obstacle. It may be perceived, that, in this last circumstance, it will always be easy to overcome the difficulty by extracting the projecting tooth. But, if the maxillary bone itself projects, this more embarrassing case has given origin to different processes.

48. Most of the moderns (for in this case the ancients did not presume to operate) have proposed and performed the previous excision of the prominent bony portion. Daniel Ludovic performed this operation only to facilitate sucking. Franco and Van Horne recommend it. We find in the memoirs of the academy of surgery different cases, in which it was practised by Gerard, Lafaye, &c. But this excision is seldom necessary, and is always very painful. If an interval of time is left between it and the union of the lips a double operation is necessary. If they are both operated upon at the same time, sometimes an inflammation, injurious to the adhesion of the wound, is the consequence. A cavity more or less considerable, constantly results, and then the two united portions of the lip are in want of a favourable point of support at the place of their contact.

49. Finally, an inconvenience still remains to be apprehended, supposing the union of the lip to be completely finished. Desault experienced it at the time, when he still followed the practice that is now to be analysed.

CASE V.

He was one day consulted respecting a child who had a deformity similar to that represented (fig. 1.); a bony eminence, separated by a double fissure of the maxillary bones, made a projection forwards, that rendered the

operation impossible. Experience had not yet instructed Desault, who removed, according to the ordinary method, all the projecting bony portion. From thence a very large fissure resulted, which the approximation of the maxillary bones diminished gradually after the operation. At the end of three months it had disappeared, leaving only a slight trace of its existence; but the transverse diameter of the upper jaw, diminished by the whole width of the projecting button, did not correspond any more to the lower jaw, and as is often observed in old persons, there supervened a setting of the upper in the lower jaw, which is extremely inconvenient for mastication. This inconvenience, being the obvious result of a loss of substance in the superior maxillary bone, changed the practice of Desault on this point; and from that time he conceived that if he could by a previous compression re-establish the lost plane of the projecting portion, he would obtain the double advantage of avoiding a pain always unfavourable, and an inconvenience still more so.

50. The maxillary bones being separated from each other, and consequently always less firmly fixed, yield without difficulty to the force which pushes them back; and the projecting portion being frequently almost isolated, opposes little resistance. Acting on these considerations, Desault made trial of this method, which has since succeeded constantly. A simple bandage passing over the portion to be depressed and drawn strongly backwards, and there fixed on each side, was sufficient for this compression, which he prolonged more or less, according to the resistance of the parts, and for which more efficacious means might no doubt be used.

CASE VI. *Recorded by Chorin.*

Marie Dehannes, aged five years, was received into the Hotel Dieu, on the 7th of September, 1790, to be there operated upon for a double harelip with a projection of the middle button, represented (fig. 1.), and the description of which will be found in the explanation of the plate.

Mastication was difficult, and during deglutition a part of the aliment passing into the nostrils, incommoded the patient much; but experience had accustomed him to lessen this inconvenience by taking only a small quantity of food at one time. His vowels were sufficiently distinct, but custom alone could render the consonants intelligible.

In order to reduce the button to the plane of the lip, and to depress the projecting portion of the maxillary bones, recourse was had to the method indicated above, which from the first day had a very sensible effect. It was continued during eighteen days, when the parts, being exactly on a level, permitted the operation to be performed, which was attended with nothing particular in its execution; and as to its consequences, showed a perfect union on the tenth day, and an almost complete approximation of the palatine arch at the end of a certain time. The difficulty of deglutition and pronunciation was dissipated with the cause that kept it up.

Explanation of the Third Plate.

Fig. 1. This figure represents the complicated harelip of the patient, mentioned in Case VI.

a. The projecting portion of the jaw, six lines wide.

b. A button, rounded and continued to the end of the nose, forming the middle part of the lip.

Fig. 1.

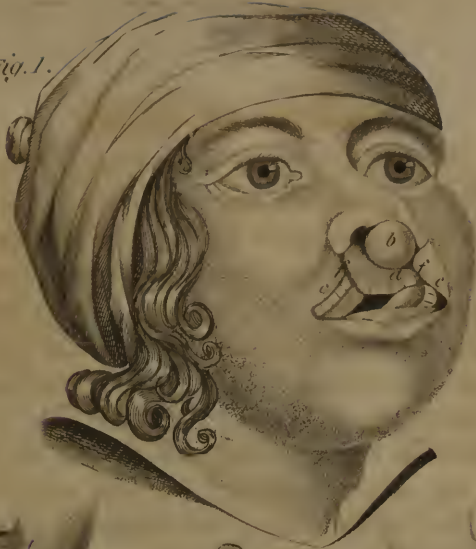


Fig. 2.

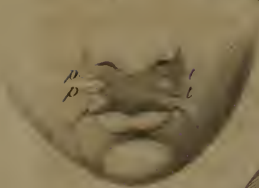


Fig. 4.

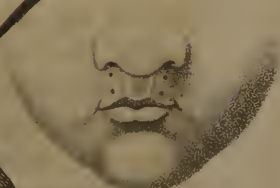


Fig. 3.

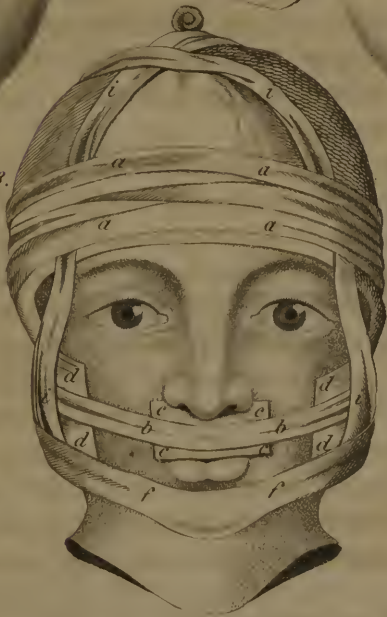


Fig. 5.



Fig. 6.



Lawson sc.

ff. A fissure, three lines wide, separating the button on each side from the corresponding portions of the lip.

cc. Rounded angles of the division.

Fig. 2. The twisted suture, seen without the bandage. The intercrossing of the waxed thread around the needles, in figures of 8.

pp. Points of the needles.

tt. Their heel.

Fig. 3. The bandage which Desault employed, applied upon the suture.

cc, cc. Small compresses placed upon the wound.

dd, dd. Thick compresses, intended to push the cheeks forwards. (In this figure they are too high and too much behind.)

bb. A portion of the uniting bandage, passing over the compress of the lips and upon those of the cheeks.

ii, ii. Small bands, sustaining the compresses of the cheeks.

ff. The sling.

aa. Turns of the bandage, fixing all the dressing.

Fig. 4. State of the lip after union.

Fig. 5. and 6. Different form and size of the needles.

REMARKS AND OBSERVATIONS

UPON THE

DISEASES OF THE MOUTH.

§ 1. *Diseases of the Lower Jaw.*

CASE I. *Recorded by Seignette.*

Fungus of the Lower Jaw.

FRANCES METON, aged thirty-four years, of a strong and robust temperament, but habitually subject to defluxions and pains of the teeth, was attacked, in 1790, with violent pains of the head, which lasted for some time, then dissipated, and at length fixed on the right arm, where they were accompanied with a troublesome sensation of cold. The use of warm baths and of diluting and slightly diaphoretic ptisans, seemed for two months to calm the pains, when they were suddenly translated to the right side of the lower jaw, became fixed there and tormented the patient much. At the same time a tumour, indolent and insensible to the touch (although there were continual shootings from its centre), arose before the branch of this side, and extended gradually inwards and outwards. The teeth, being almost all carious, began to vacillate and were successively extracted, accordingly as the pain which they occasioned rendered their remaining insupportable. The gums swelled, the tumour increased, occu-

piated the half of the bone, impeded deglutition and the articulation of sounds, and made it painful to open the mouth; at length it burst, discharged a little sanious pus and became the seat of two fistulæ, the one above, the other without; fungous flesh arose upon their orifices. At the same time the bone was carious below and in the middle of the tumour. Many of its detached portions caused small abscesses to be formed under the internal membrane of the mouth, which being opened, gave them a passage. The breath became fetid and frequently insupportable. For two months such had been the state of the patient, when she came to the Hotel Dieu to consult Desault. Until then some acidulated drinks and the external use of cataplasms had composed all her treatment. The examination of the parts discovered a fungus rising above the right side of the jaw, extending from the place occupied by the last molaris to that where the canine is found, in the natural state, enlarging from behind forwards, showing near three inches in this dimension, and complicating itself with a necrosis of the subjacent portion of bone, which was found to be bare, by means of a probe passed through the fistulous openings. Here extirpation was indicated under a double view; 1st, to remove the tumour; 2d, to extract the dead portions of bone, and favour the formation of a new substance. It would have been proceeded to immediately, had it not been for some local causes, which then made common erysipelas and even the hospital fever, species of affection so unfavourable to the after treatment of great operations. A month was therefore suffered to elapse, during which two of the portions, affected with necrosis, were detached. The constant use of cataplasms without, of diluents within, and at intervals of evacuants, were the

preparatives of the patient, who was operated upon on the 19th of Fructidor, in the following manner:

1st. On a fair day she was seated upon a high chair, with her head supported against the breast of an assistant, whose hands being crossed upon the forehead, held her firmly. Desault caused the mouth to be opened very wide, and kept it so, by means of a body placed between the two jaws, on the sound side.

2d. He made, with a knife concave upon its cutting edge and fixed on the handle, a semi-lunar incision, which, extending from the branch of the jaw to the incisores, exactly circumscribed the tumour without.

3d. In order to separate it within, the tongue was pushed back to the opposite side, the point of the instrument inserted in the superior angle of the first division, and directed forwards to reach the spot where the first had finished.

4th. By this double incision the soft parts were cut round exactly. To remove the bony portions, Desault made use of a strong and thick instrument, curved in the form of a vine-knife, (whose description may be found in the article of the diseases of the maxillary sinus), which being inserted deeply into both incisions and following their direction, completely separated the tumour.

5th. A considerable hemorrhage supervened; plugs of lint were, for an instant, applied to the parts so as to suspend it; being then withdrawn, they gave place to the actual cautery, which was repeatedly applied over the whole extent of the wound, with the double view of stopping the blood, and of destroying all that remained of the tumour, either in the bone or the soft parts.

6th. Cooling gargles were administered in abundance, for fear of too great heat in the parts.

7th. The cavity, resulting from the extirpation, was

filled with lint, and care was taken that the head of the patient should be placed in such a manner, as that the saliva and the oozing from the wound should flow through the mouth and should not fall into the primæ viæ.

The next day there was no pain and little swelling—prospect of a fortunate issue; but on the fifth day, there was pain in the loins and looseness; at the same time, swelling of the amygdalæ—deglutition impeded—fever—lint taken from the mouth. On the sixth, the symptoms were the same. On the seventh, the looseness was augmented—a fixed pain, manifested on the left side of the breast—respiration impeded—emetic given in lavage, without success. On the eighth, fever augmented—erysipelas over all the face. The ninth, shiverings, sweats, general weakness. The tenth, death.

CASE II. *Recorded by Cagnion.*

Necrosis of the Lower Jaw.

Francis Gray, aged twenty-five years, was attacked in the month of June, 1792, with sharp pains in the lower jaw. A surgeon who was consulted, in attempting to extract the next to the last molaris, broke it and then abandoned the patient, who from that time was tormented with sharper and more frequent pains. The spontaneous opening of a small abscess near the dens caninus appeared to dissipate them a little, but in a short time they were renewed. A purulent oozing proceeded through the opening of the tumour, which remained fistulous: a considerable swelling occupied all the left side of the jaw. At the end of three weeks, a new abscess formed upon the border of the maxillary bone, at about an inch from the tuft of the chin; it was opened by a cutting instrument, and like the preceding, the

opening remained fistulous. The surgeon being again consulted, prescribed strong emollient, suppurative applications, &c.; useless means—the fistulæ remained; the swelling increased without the skin's participating in it, impeded mastication and deglutition, and in a little while did not permit the jaws to separate more than six lines.

Such was the state of this patient, when he came to the Hotel Dieu, to be there treated. The progress of the disease, the existence of the two fistulæ constantly kept up, the swelling of the bone, without the skin itself being swelled, and the shaking of the corresponding teeth, already gave strong presumptions of the existence of a necrosis. Desault became certain of it, by introducing a probe through the openings, by means of which he immediately felt the bare sequestra. To remove it, by cutting the soft parts, was the speediest route to arrive at the cure—no danger would be incurred. Desault determined upon it, and without further preparation, performed the operation in the following manner, on the third day after his entrance into the Hotel Dieu.

1st. The patient being seated upon a chair of small height, with the head slightly inclined backwards, an assistant separated the commissure of the lips, whilst the surgeon made upon the gums, with a knife fixed on its handle and concave on its cutting edge, two semi-lunar incisions, united at their angles, and whose flap being removed, exposed to view the external side of the portion of bone that was affected with necrosis.

2d. The teeth, corresponding to the sequestra, and already moveable (as has been said) were removed by a steel blade in the form of a buckler.

3d. The fingers, applied upon the portion affected with necrosis, extracted it with ease, after a small por-

tion of the soft parts had been separated from it on the internal side. It was of the size of a very large nut.

4th. By again applying the fingers to the place from which the affected portion was removed, the surgeon informed himself if others were not still to be extracted; a small one was taken out.

5th. The operation had not been impeded, either by the cries of the patient (little pain having been the result), or by the effusion of blood, which flowed in very small quantity. It was then useless to stuff plugs of lint into the bony cavity. All dressing was abstained from, and the patient was only advised to gargle his mouth with a mixture of vinegar and water.

The next day the cavity resulting from the extraction of the sequestra had diminished nearly one half; the opening of the mouth, become more easy, rendered mastication less difficult. No accident supervened, only a slight puffing occupied the corresponding part of the cheeks. On the following days the purulent oozing from the fistulous openings dried up gradually; from the diminished cavity there escaped a pus, at first bloody, in a little time white and of a good quality; the borders approximated; a new substance replaced the portion of the gums that was removed; the surrounding teeth, which vacillated a little, became firm. The patient was debarred from his usual diet a few days; in a little while he returned to it, and a month after the operation he was discharged, perfectly cured.

§ II. *Diseases of the Salivary Passages.*

CASE III. *Recorded by Hernu.*

Operation for the Ranula by Excision.

Julienne Regley, aged twenty-four years, had under the tongue, from infancy, a soft tumour, almost indo-

lent, which kept in the same state until 1790, when it acquired suddenly so considerable a size, that a negligent surgeon would have taken it for the tongue, which it pushed upwards and backwards, and impeded its motions very much. Such was the state of this patient when she came to the Hotel Dieu, in 1791. It was easy to recognize a ranula, which the operation alone could efficaciously destroy. Desault performed it thus:

1st. The patient being seated upon a high chair, and secured by assistants, she was directed to open her mouth very wide, which was kept so by means of a body placed between the molares.

2d. The surgeon cut with a scalpel from behind forwards, the right side of the tumour, along the frænum of the tongue.

3d. All the superior part of the cyst was cut off with the scissars introduced through the first opening; the sides were removed as accurately as possible.

4th. A matter, whitish, grumous, and of an insupportable odour, escaped from the sac thus laid open.

5th. A slight hemorrhage, that supervened during the operation, was stopped by plugging the wound with lint. The next day a considerable swelling appeared in the cheeks and at the edge of the wound. The external application of an emollient cataplasm, and a gargle of barley water and honey of roses were prescribed. On the following days there was a sensible diminution in the engorgement: suppuration, at first sanious, soon laudable. The sixth day, the pus again became sanious—heat, and dryness of the skin—loathing—bitterness of the mouth—appearance of gastric symptoms;—emetic drink, repeated twice—speedy disappearance of the symptoms. From that time, cicatrization progressed rapidly. On the fifteenth day, only a small opening remained in the upper part of the wound, for the excre-

tion of the saliva. The patient dismissed, perfectly cured.

CASE IV. (*Extracted from Desault's Lectures.*)

*Salivary Fistula of the Duct of Stenonius, cured by
Compression.*

In fighting, a man was struck by a fragment of a bottle, which caused a longitudinal wound about an inch and a half deep, at the level of the origin of the salivary duct. Much blood escaped at the moment of the blow; it was stopped by a compressing bandage, and the patient came the same day to the Hotel Dieu. At his evening visit Desault removed the dressing which had been applied, and, by making a ligature on the small arteries that had been divided, replaced the compression exercised upon them, so as to avoid irritation and inflammation of the parts, consequently their abundant suppuration, and the deformity of the cicatrix, to which this latter method of stopping hemorrhagies often gives origin. A superficial and dry dressing was then employed. It was renewed regularly on the following days; the ligatures fell gradually; the first on the fifth, and the last on the twelfth day. At this period, the cicatrix, which was considerably advanced at the extremities of the wound, left in the centre a small opening, through which a serous fluid escaped whenever any motions were impressed upon the upper jaw.

The patient was directed to abstain from speaking, and permitted to use only liquid aliments. From that time the oozing ceased, and the cicatrix seemed to be completed; but at the end of fifteen days, some solid food having been given him, the oozing returned, raised up a pellicle that was formed in the centre of the cicatrix, and established a fistula, for which the constant

rest of the jaws, and compression upon the duct of Stenonius, were used in vain during a month. The opening of this duct being certain, the only means of closing it consisted in preventing the passage of the saliva. Desault, in order to accomplish this more efficaciously than by the mode of compression heretofore adopted, had recourse to compression exercised upon the gland. Several graduated compresses were laid in the space comprised, from above downwards, between the ear and the angle of the lower jaw, from before backwards, between the anterior border of the masseter and the mastoid apophysis. They were sustained by a bandage, whose perpendicular turns, passing first under the chin and to the top of the head, were crossed by others, directed horizontally from the forehead to the nape of the neck. All motion of the jaw was prohibited. The bandage, being relaxed every day, was applied anew with a greater constriction. This method, continued for a month, caused the gland to wither, and prevented its functions. The saliva having ceased to flow through the opening of the duct, the fistula closed; a solid cicatrix occupied the whole part, and at the end of three months there remained only a slight trace, joined to an inconsiderable depression, corresponding to the plane of the gland that was withered by the compression.

REMARKS.

The method of compression in the treatment of salivary fistulæ of the duct of Stenonius is divided into two processes relative to the place in which that compression is exercised. In fact, recourse is had to it, 1st. With the view of suspending, only for a time, the passage of the saliva through the canal, so that its flowing may not prevent the cicatrization. 2d. To prevent the secretion in the

gland, which is thus withered and for ever deprived of its functions. In the first case, the means of compression must be applied between the fistula and the gland. In the second they must be applied upon the gland itself. In general, this last mode of compression, of which the preceding case offers an example, has greater advantages over the other; its effect is more certain, less difficulty accompanies it—no danger results from it: do not be afraid that the saliva, being in consequence less abundantly separated, should disturb the digestion. The parotid of the opposite side and the other salivary glands supply the functions of that which has perished, by augmenting their secretion. Perhaps also nature may herself reject a part of the saliva that commonly moistens the mouth, and this is proved by a part of it being thrown out; from thence the place which this fluid occupies among those termed recrementitious excrements; besides, in the animals who are deprived of these glands in our experiments, does digestion proceed less favourably? Finally, experience, the sole arbiter of our operative processes, is evidently favourable to this; it suits exclusively, when the canal is obstructed; when it is free, the other mode of compression may be previously employed, and recourse had to this when that fails of success, which almost constantly happens; from thence the practice of Desault, who, even in cases where he was sure of the liberty of the canal, often recurred immediately to the withering of the gland. Let us proceed to the other methods of curing salivary fistulæ, in which surgery is indebted to him for some progress.

CASE V.

Salivary Fistula, cured by an artificial Duct.

Marguerite D— aged 37 years, had, for five years, upon the course of the duct of Stenonius, a tumour of

the size of a small nut, pierced anteriorly with a fistulous opening from which a serous and limpid fluid flowed at intervals. This tumour had succeeded a blow of a club received upon the cheek, where a large ecchymosis first appeared, and then gradually disappeared, leaving after it this tumour and a constant pain. When the patient remained, for some time, without any considerable motions of the jaw, a crust formed over the fistulous orifice, closed it, and the oozing ceased; but in a little while it appeared anew, as soon as solid food was taken in a larger quantity than usual.

Such was the state of the patient when she came to Paris, in 1793, to be treated there. The surgeon, to whom she applied, cut the tumour according to the direction of the canal, gave vent to the matter which it contained, scarified the sac in its whole extent, applied the potential cautery to it and then made a gradual compression along the duct. This mode of treatment for some days appeared to have a happy result; but in a little while the oozing recommenced, and even preceded the complete fall of the eschar; the compression became painful and the patient could not support it. He then sought to establish the natural passage; a probe was introduced into the portion that corresponded to the mouth, which, being too much contracted, refused to admit it, even when of the most slender form; then only two means remained: 1st. To make the compression, not upon the course of the passage, as had been done before, but upon the gland itself, so as to wither it, prevent the secretion of the saliva and consequently its flow. 2d. To open an artificial passage for this fluid into the mouth. Desault, being called into consultation, advised the former method to be tried first: a bandage, analogous to that described in the preceding case, was employed with this view; but the extreme sensibility of the patient, and

still more her impatience, did not permit the use of it to be continued long, and it was necessary to have recourse to the second process, which Desault executed in the following manner.

1st. The patient being seated upon a high chair, with the head supported against the breast of an assistant, he introduced into the mouth two fingers of the left hand, which, being placed opposite to the fistula, between the dental range and the cheek, served at the same time to stretch the integuments and to preserve the gums from the point of the instrument.

2d. He took in his hand the ordinary trocar for the hydrocele, armed with its canula, applied the point of it before the opening of the superior portion of the duct, which the oozing made sensible, and inserted it into this place, directing it a little forwards.

3d. An assistant was directed to secure the canula, while the surgeon withdrew the stylet, and then to pass a thread through it into the interior of the mouth.

4th. The canula was withdrawn. To the thread passed into the mouth was attached a seton, which it drew from within outwards in such a manner as not to bring it between the borders of the external opening, where the thread alone passed, and was then secured upon the cheek by an adhesive plaster.

5th. The external wound was dressed with lint, surmounted by some compresses moistened with lead water.

The next day there was a little swelling, probably the effect of the operation, which however had not been at all painful. It was soon dissipated; red flesh arose from the wound, and being too prominent, was cauterized. On the twelfth day the cicatrix, being closed at the circumference, left only a small hole in the middle for the passage of the thread. Every day the precaution was observed of changing the seton, increasing it a little, and

with the essential precaution of not bringing it between the borders of the wound, which was covered with an adhesive plaster to prevent the passage of the saliva. Any considerable motion of the jaws was prohibited; for a long time only liquid aliments were permitted. On the thirtieth day there was nothing externally but an oozing hardly sensible; the forty-fourth, the seton was suppressed; the thread was left until the fiftieth, at which period it was taken away, with the precaution of cauterizing the small external opening that remained for its passage. It was soon cicatrized, and three months after the operation the patient left Paris, perfectly cured.

REMARKS.

The opening of an artificial duct is one of the means most anciently used to cure salivary fistulæ. Every author has had his method of performing it, and a number of variations are met with, both in the instrument employed to pierce the cheek, and in the body intended to keep up the opening.

For the first part of the operation, sometimes we behold surgeons employing an iron made red in the fire, as Saviard has preserved an example of. Sometimes an awl, as was done by Monro; sometimes a simple knife or lancet; sometimes a straight needle, which draws a thread after it;—but the trocar, employed by Desault, in general claims the preference; because the canula remaining in the wound, serves, after the stylet is withdrawn, to pass the thread, which by the other processes is either very difficult to be introduced, or requires the employment of different instruments which complicate the operation.

For the second part of the operation, or to keep the opening dilated, canulæ were used by Duphenix, who made a point of suture upon them—a method in general

defective, because, besides the inconvenience of leaving a solid body in the parts, it is attended with that of not being able suitably to secure the instrument, which is incessantly disposed to slip into the mouth. The seton, a kind of filter for the salivary humour, then claims the preference. Monro discovered it; but, although this celebrated surgeon saw the benefit, he erred in the manner of obtaining it. His seton, equally thick in its whole extent, passing through the two internal and external openings, and tying upon the cheek, was either so large as to dilate the artificial duct sufficiently, and then separating the borders of the external wound, it retarded the cicatrization; or so small as to procure only a slight separation, and then the dilatation was not sufficient. The manner in which the seton was placed in the preceding case, avoids this double inconvenience. A simple thread without, it suffers the wound to cicatrize, while thick within, it keeps open the natural duct; and when this is sufficiently formed, and the saliva accustomed to pass through it, only a single point on the cheek is to be cicatrized, and there will not be a long time lost in the cure. Thus, in the fistula lachrymalis, according to the process of Desault, the outward wound is almost cured when the dilatation of the canal is completed.

§ III. *Of the Excision and Ligature of the Amygdalæ and Uvula.*

The amygdalæ become, like all the other neighbouring organs of the posterior fauces, the frequent seat of different engorgement, as variable in their nature as in their results. Some, rapid in their progress, and particularly observed in persons of a sanguine temperament, in young persons and in those who are compelled to hard labour, partake essentially of the inflammatory character. Others, slower in their progress, appear in moist

and cold weather, are attached to phlegmatic temperaments, and partake more or less of catarrhal affections. Finally, others that are commonly contagious, pass speedily into the gangrenous state, sometimes extend to the neighbouring organs, and are generally more or less fatal to the patient. From thence the different kinds of angina, inflammatory, catarrhal and gangrenous. The two first often terminate in resolution, but they are frequently succeeded by a scirrhus of the tumefied gland which impedes respiration and deglutition and requires their ligature or excision, the only resource in the last species of angina. Let us examine this double operation. The excision of the enlarged amygdala was performed by the ancients in different ways; sometimes they lacerated with the fingers the membrane that covers it, and then plucked it from the place which it occupies between the columns of the velum palati. Sometimes, when there was great resistance, they seized it with an instrument curved like a hook, and then removed it with a knife, which Paul of Egina says should be concave on the side corresponding to the tongue.

The moderns, for a long time timid in the employment of these two processes, substituted more cruel ones for them. The actual cautery was proposed, and some success obtained by its means accredited its use for a while; caustics replaced it, but the inconvenience of not being able to limit their effect, and the danger of their falling into the œsophagus, soon banished them from a rational practice.

Then excision was resumed, and sometimes performed after the manner of the ancients, sometimes with scissars curved on their flat side, with a knife equally curved on its surface, and sometimes by means of the concave scissars of Levret. A forceps with double hooks was substituted for the simple hook of the ancients.

Each varied the choice of his instruments at the pleasure of his genius; this operation, at one time simple and easy, was divided into several. Finally, at the present day, the ordinary manner of performing it is as follows: The patient being properly seated, the surgeon causes his mouth to be opened very wide, depresses the tongue with a shell of horn, which he then trusts to an assistant, takes a hook, seizes the amygdala, applies to it a common knife fixed on the handle, by means of a small bandage which leaves only a part of the blade exposed, cuts off the quantity to be retrenched, (this is ordinarily at the plane of the columns of the velum palati), re-applies the instrument if all has not been removed, and when the operation is finished, he prescribes to the patient to gargle his mouth frequently with an appropriate wash.

This process was simple and easy. It was used by Desault a long time, but is liable to an objection. The extremity of the instrument, being inserted deeply into the mouth, may wound some parts—not the carotid, as has been said, which its remote situation puts out of danger, but the palatine membrane, in some other place than where it corresponds to the amygdalæ—a fear which is much better founded, especially when the instrument is held in the left hand, as when the operation is performed on the right. At the instant the gland is seized with the hook, all the throat is put in commotion; a general spasm seems to affect all the parts of the mouth. It was to avoid this inconvenience, that Desault thought of applying to the excision of these glands, an instrument first invented to divide the cysts of the bladder, and the figure of which is shown in plate IV. It is a cutting blade, concealed in a silver sheath, which, being hollowed at its extremity, there receives and fixes the gland to be extirpated. The instruments for the opera-

tion, which are added to this, are the same as in the preceding case. The proceeding is as follows:

1st. The patient being seated upon a high chair, with the head supported upon the breast of an assistant, the surgeon caused him to open the mouth wide, and to keep it so, placed some solid substance between the teeth, which was secured by an assistant.

2d. The tongue was depressed by a metal spoon, which was held by another assistant.

3d. With a double hook the surgeon seized the gland, which he drew towards him, raising it up a little, took the kiotome, engaging the index and middle finger in the rings (*vv*), the thumb in the ring (*c*), made it slide under it, sought to engage it in the rounded hollow (*y*), at the level of the spot to which the section should correspond.

4th. When the portion to be excised is fixed, he draws it more to him, in order to stretch it, presses the instrument against it from below upwards, and pushes the blade, which, in passing through the hollow, performs the section. If it is not complete, which especially happens when the size of the tumour is considerable, the blade is withdrawn, and the kiotome being reapplied in the same wound that it had made, completes the section. If it is not yet finished, a third attempt must be repeated.

5th. The patient was directed to wash his mouth, and a gargle was prescribed for him. The operation thus performed, is as simple, as easy, and more certain than in the preceding case. Such is the disposition of the blade of the kiotome, that when it traverses the hollow, it pushes and fixes solidly the parts to be divided; an advantage that is not possessed either by the scissars or the knife, before which these parts recede when they are moveable. From thence the difficulty of their

section. If the introduction of the instrument is difficult below, let it be withdrawn and applied above, turning the hollow in an opposite direction; but in general, the first manner of cutting is preferable, because the gland being half divided, cannot then be inverted, and menace with a speedy suffocation by the obliteration of the glottis, as Wiseman and Moscati have experienced. Louis has attempted to prevent this inconvenience, in advising the use of the common knife in the same manner as that of the kiotome just described, that is to say, with the cutting edge directed upwards; but the kiotome, more sure and easy, should be preferred. To the advantage of fixing the soft parts, in cutting them, it adds that of not bruising them, as the most part of the instruments of this nature, for example, the scissars; the oblique disposition of its blade causes it to divide them in a sawing manner.

It is true, that this is an instrument added to the arsenal of surgery, but it is not exclusively applicable to a particular operation. It comprises, with the excision of the amygdala, that of the uvula, the section of the fræna of the rectum, of the vagina, of the bladder, the amputation of fungous excrescencies, of polypi of the nose; for example, if that mode of removing them was preferred to extirpation; and in general, of the different tumours which are deeply seated in cavities, where our instruments, guided by chance, may include parts that should be respected; where, the base of the tumour, liable to recede from the knife, should be fixed while the section is performing—an use which the scissars cannot fulfil without danger. If the tumour to be removed is too bulky for its base to be contained in the hollow, after having cut one portion, let the other be engaged in it, and let the same process be reiterated until the section is complete. In the after part of this

work, there will be occasion to state these different applications of the kiotome; but, at present, its use relative to the uvula is to be considered.

When any affection has increased the size of this appendix so as to impede deglutition, to occasion at the base of the tongue, an inconvenient and painful tickling, and to place an obstacle to the pronunciation of the sounds, the only resource of art is to remove its superfluous portion. To accomplish this, Celsus recommends to seize it with forceps, and then to cut it off inferiorly,—a process in use for a long time, then replaced by cauterization, then by the ligature, renewed and executed by means of different mechanical instruments, too tedious to be related here. At length resumed, such as Celsus had proposed, and thus adopted with some corrections by Sabatier, who employed the concave scissars of Levret for the section; but their edges being horizontally approximated to each other, bruise the parts in cutting—an inconvenience that is avoided, as has been observed, by the obliquity of the blade of the kiotome. With this last instrument the operation is always easy. 1. To seize the uvula at its inferior extremity with a forceps, and to stretch it by drawing it forwards. 2d. To engage this appendix in the hollow of the instrument, in a line with the place where the section is to be made. 3d. When it is engaged, to push the blade which fixes and cuts the superfluous portion. Such are the details of the operative process.

It is seldom that a troublesome hemorrhage results from the excision of the amygdalæ or uvula. There is only an oozing, which is useful to the disgorgement of the parts, and nothing should be employed to check it, as it will soon cease. The patient should gargle his

mouth, and in a little time the consolidation will be completed.

The ligature of the engorged amygdalæ is not proper in general, except for such pusillanimous patients as refuse to submit to excision, or upon whom the fear of the operation might produce unfavourable subsequent effects. This method is longer and not less painful than the first, and always occasions more irritation. Moscati having employed it once, a sharp pain and a considerable inflammation supervened; the difficulty of swallowing and of breathing compelled him to cut off the tumour at the place of the ligature, when all the symptoms immediately disappeared. On the other hand, in employing this process, there is none of that bloody oozing, furnished by the extremities of the divided vessels, which is so favourable to the disorgement of the part. Besides, the base of the tumour being most commonly larger than its apex, cannot be embraced by the noose of thread. If it be sustained by a narrow pedicle, it is then so easy to remove it, by placing this pedicle in the hollow of the kiotome, and so little pain results, that this method is always preferable. However, the ligature has had its partisans. Heister commends it in certain cases; also, Sharp. Many authors have admitted it, and here the processes have varied like the inventive genius of their authors. Some made use of the double pipe of Levret, carrying a noose of silver thread, in which the tumour was engaged and then constricted by a twisting motion, which by daily repetition intercepts its circulation and life, and occasions its fall. Others, after placing a noose of thread of Brittany upon a hook, seize the amygdala with it, and make the noose slide along the hook up to the enlarged gland, which was strangled without any proper means of augmenting the constriction daily. In order to apply the noose upon the tumour

to be tied, others had recourse to the instrument of Bellocq. Some reject every instrument, and are satisfied with their fingers. Let us pass over more ample historical details, and only remark, that a general double inconvenience is applicable to these different processes. Some do not allow the degree of constriction to be gradually increased, and under this view are generally insufficient. Indeed it seldom attains it, and then a new ligature must be applied to the tumour. The others, although not attended with this advantage, have those of leaving in the mouth a very large substance, whose presence causes pain, and when a silver thread has been employed, as has been stated, of being liable to fail from the breaking of this thread—a rupture which, being often unavoidable in the successive twistings that it receives, requires a new operation, more painful than the first. To obviate these inconveniencies, Desault thought of applying to the ligature of the amygdalæ, his *serre-nœud*, intended for that of the polypi of the nose, vagina, rectum, &c. an instrument which will be described in the article of that ligature, and its figure there found. Being a simple stem of silver, it is not large, and receives a thread of Brittany, which is not liable to break, and which may be tightened at pleasure by means of it. The process is as follows:

1st. The patient being seated upon a high chair, with his head reversed upon the breast of an assistant, the surgeon causes the mouth to be opened wide, depresses the tongue, and catches with a double hook the gland to be tied.

2d. He takes the *serre-nœud* into which the thread of Brittany has passed, so as to form a noose superiorly, engages this noose upon the hook, which he trusts to an assistant, and makes it slide upon the gland, until it embraces it exactly.

3d. He draws the thread forcibly towards him, and at the same time pushes forwards the *serre-nœud*, which strangles the tumour to the degree that is suitable. In general, on the first day it must be tightened but little.

4th. The constriction being sufficient, the hook is withdrawn. The thread is twisted round the inferior hollow of the *serre-nœud*, and the patient is left to himself.

5th. The next day the gland becomes larger than usual, because the venous blood cannot return. The surgeon disengages the thread from the extremity of the *serre-nœud*, draws it towards him to augment the constriction, twists the thread again when it is sufficient, and thus goes on until the fall of the tumour, which commonly happens at the fourth or fifth day. If, to re-trench the superfluous portion of the uvula, become scirrhus, the ligature should be preferred to excision, which is a method always more easy, more simple, less painful, and more speedy, the same instrument may still be used, and here the manner of employing it would still be the same.

The noose of the *serre-nœud* must be slipped upon the hook which is to catch the extremity of that appendix, and being applied to it, will effect the constriction, which should be gradually augmented every day until the separation. This method is more simple than those described in Paré, Fabricius de Hilden, Scultetus, &c.; but in general, as has been said, when it is possible, prefer excision to the ligature.

Explanation of the Fourth Plate.

Fig. 1. The kiotome seen entire.

AB. Sheath of silver, that receives the blade.

vv. Rings soldered to the sheath.

y. Portion of the blade seen naked in the hollow.

ATC. Stalk of steel terminated by a ring, and serving as a handle to the blade.

BC. Total length of the instrument, nine inches.

Fig. 2. Sheath of the kiotome, seen separate from the blade.

xyz. Semi-circular hollow, nine lines in diameter.

AB. Total length of the blade; six inches, four lines; width, near the rings, eight lines; near the hollow, seven lines.

Bx. Distance from the extremity to the hollow, seven lines.

Fig. 3. Blade of the kiotome, seen without its sheath.

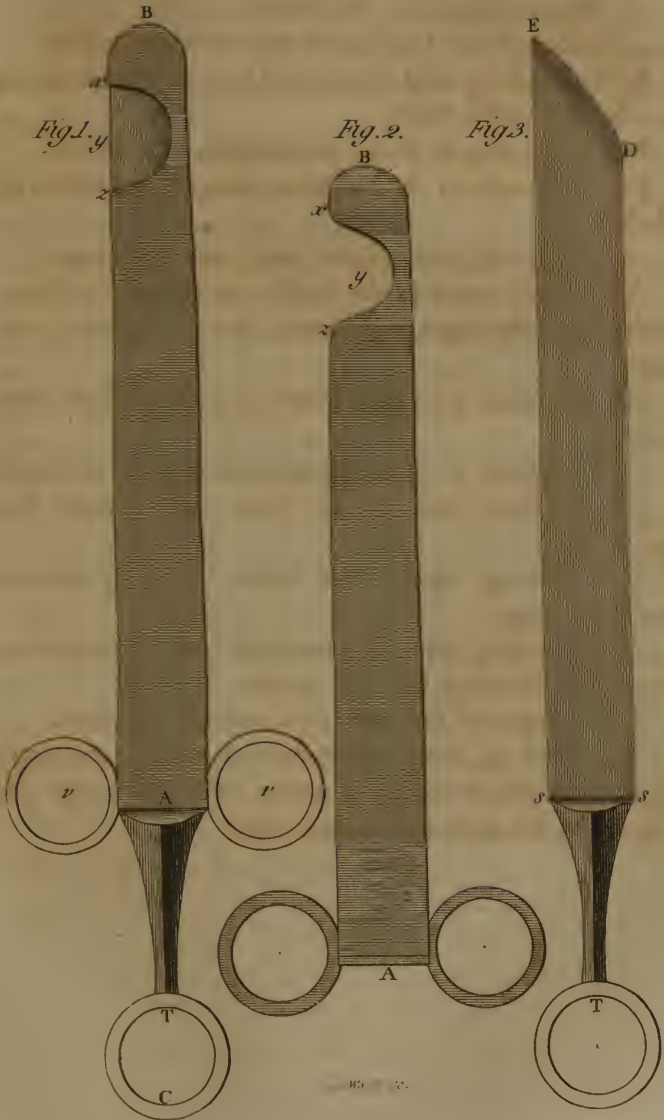
Es, Ds. Blunt sides of the blade more slender than the middle.

DE. Cutting edge of the blade, obliquely directed, ten lines long.

ss. Projecting edge to prevent the blade from entering too much forwards into the sheath.

Ess. Length of the blade, six inches, four lines.

Tss. Stalk of steel terminated by a ring, sustaining the blade, whose width is seven lines and a half near the stalk, six near the cutting edge.



SECTION SECOND.

DISEASES OF THE NECK.

Memoir on Bronchotomy, and on the means of remedying it in certain cases.

1. **LIFE**, which is a kind of slow combustion of the vital principle, receives the double aliment that prevents it from being extinguished, through two tubes placed with their backs to each other; the one membranous and cartilaginous, a continual conductor of a fluid that is constantly necessary; the other purely membranous, a conductor at intervals, of solids and liquids, that are to undergo digestion. Death is the certain result of the obliteration of both; but more speedy in the first, it demands the most active succours. These succours consist, in general, in establishing an artificial passage, to supply the deficiency of the natural. Now this passage may be of two sorts: 1st, an opening made in the trachea arteria, with a cutting instrument; 2d, the introduction of a tube into this passage, through which the air may escape. The first of these methods, universally employed, is not always the most favourable; the second, as yet little known, is supported only by some success obtained by Desault in the last years of his practice, and by some of his pupils.

2. My object, then, in this memoir is, 1st. To determine the cases that require bronchotomy, and those in

which this operation may be supplied by the use of elastic tubes. 2d. Supposing the use of these tubes to be indicated, to demonstrate both the manner of introducing them, and the possibility of their remaining in the trachea arteria. 3d. To indicate the most advantageous method of opening the aerial canal, in cases where bronchotomy is unavoidable.

ARTICLE I.

Of the Cases which require Bronchotomy, and of those in which it may be supplied by Elastic Tubes.

3. The cases in which bronchotomy has been proposed by authors, may be reduced into two general classes: 1st. Those where the only indication is to afford a passage to the air. 2d. Those in which, to this indication, is added that of extracting some substance from the trachea arteria, or from the larynx, or only of laying open the sides.

4. The first class comprehends drowning, and the different species of angina; the development of a tumour between the œsophagus and the trachea arteria, or before this last; the presence of an extraneous body in the first of these ducts, and deep wounds of the neck. To the second, may be referred the introduction of an extraneous substance into the aerial passages, either through a wound or through the glottis, the development of certain tumours in the same passages, and the caries of the cartilages of the larynx. Let us take a cursory view of each of these cases, not to go deeply into the history of the affections which they present, but only to consider them with regard to the operation or the introduction of tubes.

§ I. *First Class of the Cases of Bronchotomy.*

DROWNING.

5. The researches of the moderns, and particularly of Louis, have proved that drowned persons do not perish, as Detharding had asserted, by the depression of the epiglottis upon the glottis, which would prevent all communication of the external air with the lungs; that, on the contrary, the opening of their trachea arteria being constantly free, suffers the water that penetrates into the bronchiæ, and fills them, to mix with the mucosity with which their membrane is covered, and with the air which they still contain, and thus opposes the functions of the organ. From whence it follows, that bronchotomy cannot be here indicated to give vent to the air, as Detharding supposed. But it may be asked, if it would not be advantageous to favour the flowing out of the water? Never for there must be one of two things: Either the action of the lungs and of the intercostals must be still strong enough, and then the liquid will be expelled by it through the natural orifice, which is constantly open; or, as is most common, this action is too feeble, and in this case it would be as incompetent to expel the water through an artificial passage as through the natural. Besides the frothy state in which this water is then found, its mixture with the air and mucus would present another obstacle, to which again would be added the unnecessary hazard of the blood flowing into the wind-pipe.

6. Some have advised the blowing in of different aeri-form fluids to reanimate the tone and strength of the lungs; but it is doubtful if the result would be advantageous. Finally, supposing that it was agreed to run the chance, the previous opening of the trachea arteria, re-

commended by authors to introduce the canula, would be useless: the natural passages through the nasal fossæ being always sufficient, as will be stated (47, 53).

ANGINA.

7. In general, angina is attended with many varieties relative to its nature; inflammatory, bilious, serous, catarrhal, &c.—varieties foreign to my object. Here it is sufficient to know that they are almost all accompanied with a tumefaction, more or less considerable, of the parts which they affect; a tumefaction, whose increase more or less rapid, often intercepts the passage of the air and requires bronchotomy. But would it not then be possible to supply this operation? In order to decide the question, let us recollect that inflammation may have its seat, 1st. In the membrane of the larynx or of the trachea arteria, which constitutes angina laryngea or trachealis. 2d. In the amygdalæ, the columns of the arch of the palate, the uvula, the surrounding mucous glands, a kind designated under the general name of angina gutturalis.

8. If the inflammation is of the first kind (7), it is evident that the passages, then almost entirely obliterated, will not permit, but with much difficulty, the introduction of the canula, whose presence would besides augment the irritation and inflammation, and perhaps excite a suppuration, which otherwise would not have taken place. Still in an analogous circumstance, Desault obtained a kind of success which should encourage us not to despair of the employment of this method.

CASE I. *Recorded by Giraud.*

Desault was one day requested by the physician of the hall of the Rosary, to see a patient affected with angina trachealis, with symptoms of suffocation so immi-

ment, that bronchotomy was judged indispensable and urgent. Desault was about to proceed to it, when recollecting that he had seen elastic tubes employed with advantage in a wound of the neck, he thought of trying their use in this case. He therefore introduced one in the manner that will be described. At first, a quick cough, pain, and considerable difficulty, and at the same time a freer respiration, were the result. In a little while the cough and pain were allayed, but the freedom of respiration remained. There was a sensible alteration for the better all day; but in the evening the fever redoubled, all the symptoms increased, and although the air escaped without difficulty through the canal, the patient died in the night. More haste in the employment of this method would perhaps have saved his life. The opening of the body showed an engorgement in the membrane of the larynx, and in the superior part of the trachea arteria.

9. It may be seen that in this case the tube procured a real change for the better, notwithstanding its contact with engorged and inflamed parts, and consequently with an increased sensibility. Still the success was not complete enough; if it had been, it was not sufficiently grounded to authorize practitioners to substitute in the cynanche trachealis, the employment of this method for bronchotomy. Besides, as has been said, if the contraction, the effect of the engorgement, was very considerable, the passage of the tube would be too difficult and too painful.

10. If the inflammation is of the second kind (7), and all communication is almost entirely or even completely intercepted between the glottis, which is sound, and the opening of the mouth; if it is apprehended that the progress of the evil will soon prevent the air from penetrating, which still passes through the nostrils, the case

is more favourable to the introduction of tubes. Then indeed what should prevent the attempting this introduction, as Desault proposed in his journal, and as he has since executed? No irritation of the laryngeal membrane (8) could be apprehended, since it is exempt from inflammation. The passages, still remaining open behind the engorged parts, will permit the introduction of the instrument. Besides, if it should become too difficult for the surgeon, or too painful for the patient, if the inflammation, being propagated to the larynx, should render it insupportable and dangerous, would not the resource of the operation always remain?

11. Besides, we may observe that this introduction presents so much the less difficulty, as in order to attempt it, we should never wait till the tumefaction is very considerable or suffocation imminent. What Louis said of bronchotomy, must be applied to it; that it is not an extreme resource to which we must have recourse, when the obliteration being complete, every other abandons us; but truly a salutary method of preventing the engorgement of the lungs, which is the inevitable result of respiration impeded too long a time; a truth so much the more striking here, where there is no danger incurred on the part of the effused blood, as in the opening of the trachea arteria—no wound remains to heal—no aerial fistula to be apprehended.

CASE II.

A short time after Desault first used elastic tubes, introduced into the trachea arteria, to give vent to the air, a distinguished surgeon of Toulouse, on the recital of this discovery, employed the same method in a scirrhus angina of the parts surrounding the glottis. I borrow the expressions of his letter, communicated to Desault by one of his pupils. "A young man, aged thirteen

years, without apparent disease, had a great difficulty of respiration, and a considerable noise was heard, produced by the passage of air through the glottis. Nothing appeared in the nose; the mouth could be only half opened, because the anterior columns were horny and callous. I made a section of them, and from that time the mouth was sufficiently opened. I saw the base of the tongue, the uvula, the amygdalæ, and the top of the pharynx, constricted, hard and covered with tubercles and polypous excrescences. I removed many portions by ligatures, but the patient derived no benefit; the principal distress was at the glottis. The observation of M. Desault, communicated by you, occurred to me. I thought that the ligaments of the glottis might be made to suppurate and relax. This indication was accomplished by taking a tube of elastic gum, which was introduced into the glottis through the mouth (the patient not being able to bear its passage through the nose). As soon as it entered the trachea arteria, the noise and difficulty of respiration diminished considerably; but some time after, the patient not being able to breathe, the tube was withdrawn. I soon perceived that the extraneous substance did not impede by its presence; the opposition to the passage of the air was occasioned by the glair which was pushed into the orifices. I repeated the operation six times, and was convinced of the necessity of having a tube larger and open at the mouth, as stated by M. Desault. I prepared one myself; but, being attacked some time after with intermittent fever, I was obliged to neglect my patient, who, no doubt, would have been much relieved and perhaps cured, as the presence of the tube occasioned no more difficulty."

12. With regard to this case, I shall not enter into any detail, nor examine if the ligaments of the glottis

would be relaxed by making them suppurate. What is of importance here, is the long continued abode of the tube in the aerial passages without producing any impediment, the sensibly greater ease of respiration, the real alteration for the better, which was the effect. The author says that tubes, introduced through the nasal fossæ, cannot be borne by the patient; the contrary results from several cases of Desault.

CASE III.

M. A. I., living in the street of Richelieu, was attacked with cynanche gutturalis, the effect of a sudden transition from cold to heat. All the symptoms appeared with violence on the second day. The uvula, the amygdalæ, the columns, acquired a considerable size. Deglutition became extremely difficult and respiration very painful. The pains were severe, and extended to the ears and along the neck; the fever high with ardent thirst; the tongue swelled. On the fifth day the symptoms became more intense; the swelling increased; the smallest drop of liquid that was introduced returned through the nostrils, instead of descending through the œsophagus; suffocation appeared to be imminent. Desault was then called; he first proposed to overcome the double obstacle to deglutition and respiration, by a double pipe passed into the œsophagus and trachea arteria; but the latter, being the most wanted, was introduced first: at the moment a small cough and a slight pain distressed the patient; but respiration became free, and at the end of an hour, a sensible alteration for the better was perceived; the red colour of the face and the swelling of the veins of the neck were less apparent; the cough soon ceased. Content with this success, Desault delayed passing a tube into the œsophagus, hoping that the speedy disgorgement of the parts would soon restore

to the patient the possibility of swallowing some drops of broth, and thus dispense with adding a new irritation to that which already existed. Indeed in the evening the symptoms were abated, and some drops of nourishing broth were added; but the next day the difficulty of respiration returned, and Desault found the patient in extreme pain. He suspected there was glair in the tube; he therefore withdrew it, cleansed it and introduced it again, and this time the cough was scarcely sensible the moment that it reached the trachea arteria; the breathing also became free; the instrument was still left in its place for a day and a half, after which, being useless, it was withdrawn. The usual treatment, being then employed, was crowned with the most happy success, and the patient now enjoys good health. He asserted that the first moments of the presence of the tube were alone painful.

13. From what has been said (8, 12) it results, 1st. That in the angina laryngea or trachealis, the introduction of elastic canulæ, sometimes possible, is rarely indicated, and that then bronchotomy is preferable. 2d. That, on the contrary, in the angina gutturalis, tonsillaris, &c. the use of this method is often sufficient to afford to the air its ordinary passage, and thus dispense with the operation.

Swelling of the Tongue.

14. Under the relation of bronchotomy, the swelling of the tongue may be considered in the same view with the swelling of the amygdalæ. Sometimes it is the effect of the sting of a venomous animal; sometimes a symptom or critical abscess of some fever; sometimes an affection arising spontaneously, and at others the consequence of an improper administration of mercury. If then respiration becomes difficult, and the swelling of

the face, redness, &c. announce a subsequent embarrassment of the circulation, if no success has been obtained from large and deep scarifications, always previously indicated; if the symptoms continue to increase, then introduce a canula through the nose. If this is delayed the engorgement will extend backwards, the tongue will partly fill up the pharynx, close the glottis, and then the operation alone will be possible. Flegel, Job à Merkren, Lamalle, Louis, Richter, relate many examples of these kinds of swellings, which however seldom proceed to the extent that has been mentioned.

Extraneous Substances in the Œsophagus.

15. An extraneous substance, inserted into the pharynx or the œsophagus, pushes forwards the anterior membrane of the trachea arteria, contracts and even obliterates the diameter of this pipe, so as to threaten a speedy suffocation. In the collections of Desault's operations we find the example of a woman, who swallowed a bone with such voracity that it stuck in the middle of the pharynx. At the instant all the symptoms of suffocation supervened, and at the end of three minutes the patient no longer existed. Bell cites two analogous examples. In such cases the pressing indication is to give vent to the air, so that we may afterwards have time to act with method and precaution in extracting the substance. Now, what method must be chosen? Bronchotomy was practised by Habicot upon a young man, who, from dread of thieves, had swallowed nine pistoles wrapped up in a piece of cloth. Practitioners have all followed his example in such cases. But would it not be better to have recourse first to the use of the canula? Carried into the larynx and trachea arteria beyond the obstacle, it would give vent to the air. If it is apprehended that this obstacle cannot be overcome, let

the tube be first introduced empty on account of greater facility, and when its extremity has arrived at the place where the trachea arteria is compressed, let a probe of whalebone be pushed into it. Being then more solid it will penetrate. When it has produced the effect, withdraw the probe and the air will escape. This method is so much the more advantageous here, as the extraneous substance, being frequently very low down in the œsophagus, would, from its deep situation, require tracheotomy, an operation that is always dangerous, and that must be constantly avoided, as shall be stated (60, 64). Frequently such is the depth at which this substance is found, that tracheotomy would be as insufficient as laryngotomy, and the use of the elastic tube remains as the only resource. In the case under consideration, this method is not supported by the experience of Desault, who would have attempted it, if his practice had furnished an occasion.

16. It has often happened, even to skilful practitioners, to suppose a body was in the larynx that was introduced into the œsophagus, and reciprocally to be desirous of removing from the larynx a substance that was found in the œsophagus; the symptoms of suffocation being nearly the same. In order to avoid an error that might have so great an influence upon the treatment, a tube must always be previously passed into the last pipe to ascertain its state.

Tumours in the neighbourhood of the Trachea Arteria.

17. Suffocation, occasioned by the presence of some tumour between the œsophagus and trachea arteria, enters under the view of the indications in the preceding case. Attempt first to overcome the obstacle with a canula, before resorting to bronchotomy. Indeed why not previously have recourse to this method, as well as to

the use of the catheter, in retention of urine, which arises from a tumour that compresses the urethra, or from the swelling of the prostate gland? In this last case would a puncture be made of the bladder, or would *la boutonnière** be performed, without knowing whether the catheter cannot pass beyond the internal projection formed by the tumour! No, without doubt. Why then act upon different principles in similar cases.

18. The indications are the same in large abscesses of the pharynx or larynx, at least of this last cavity, where the view is, not only to re-establish a passage for the air, but also to evacuate the pus, by opening the tumour; then prefer bronchotomy. In general, it is seldom that tumours, situated before the cartilaginous rings, can compress the aerial canal sufficiently, to require artificial means proper for giving vent to the air; either because the deficiency of resistance anteriorly permits these tumours to expand on that side, or because the trachea arteria, being more solid before, yields less easily than behind. However, if such cases occur, the indication is the same and also the means of accomplishing it.

Wounds of the Neck.

19. Wounds of the anterior part of the neck have appeared to many practitioners to require bronchotomy, either when the inclined position, which it is necessary to give the head to unite these wounds and keep their edges in contact, impedes respiration and even threatens a speedy suffocation; or when the same effect results from a considerable engorgement, supervening in their neighbourhood, as may especially be remarked in gunshot wounds. Then, it is said, by opening the trachea

* *La boutonnière* (*Fr.*), the name of an operation; it consists in an incision into the urethra.

arteria, below the place where it is affected, the surgeon, freed from all apprehension on account of respiration, may proceed to a methodical treatment. Habicot relates, that being called to a young man, who had received twenty-two wounds on the head, face, neck, hands, arms, breast, back, penis and thighs, he found him in imminent danger of suffocation, from the engorgement and inflammation that had supervened in the throat. The symptoms continuing to increase, he determined to open the trachea arteria below the wound, which was situated at the superior part of the larynx. Respiration was immediately re-established; the orifice was kept open until the swelling was dissipated, and at the end of three months the cure was complete.

20. Many authors relate similar examples. Now in such cases, does bronchotomy or the introduction of an elastic canula claim the preference? The one occasions a wound, always unfavourable, added to one still more so; the other leaves the parts sound and causes only a momentary irritation. In the first, the edges of the division may swell, and occasion suffocation like the superior wound; there is no fear on this account in the second: this is always practicable; that is often retarded by a hemorrhage, resulting from the section of the venous vessels that are situated in the form of a plexus at the anterior part of the neck; so that then the practitioner remains uncertain between the probability of seeing the blood effused into the trachea arteria, and the danger of a mortal embarrassment of the lungs from the long continued obstacles to respiration. Those who attended the lectures of Desault, in 1794, will recollect having seen a child, into whose trachea arteria a kidney bean had fallen, and in whom the first incision was followed by such an effusion of blood, that it was necessary to defer opening the trachea arteria for two hours. The-

child died in the interim. If the operation had been prosecuted, the blood falling into the aerial passages would perhaps have suffocated the patient more quickly. If the wound, whose approximation or engorgement causes the suffocation, is situated too low, a second opening is evidently impossible. On the contrary, the use of the tubes is applicable to all the cases that can occur.

21. The obstacle experienced by the air in its passage, may perhaps be remedied sometimes by introducing a canula between the edges of the wound, as Habicot did in a case where a ball, after breaking the larynx and particularly the left part of the thyroid cartilage, came out below the inferior angle of the scapula. But the irritation that results from the contact of an extraneous substance with the wounded surfaces, the impossibility of cicatrization while those surfaces are kept apart, (an inconvenience especially remarkable in wounds from a cutting instrument, which unite in a few days if nothing prevents) all should induce a preference of the introduction of the canula through the natural passages.

22. If to these different considerations the experience of Desault is added, the success obtained by him from this last method, will, no doubt, rest upon more than the exclusive preference which it claims in the case under consideration. The surgeons who employed it, after him, have obtained the same results. At the hospital of Lyons, a soldier, who attempted to destroy himself in a fit of chagrin, received nourishment and air, for fifteen days, by the aid of two tubes, introduced, one into the larynx, the other into the œsophagus.

CASE IV. *Communicated by Giraud.*

A man, who in a paroxysm of madness had cut his throat, was brought to the mad-house, on the 23d of

June, 1793. The trachea arteria was divided in the anterior three-fourths of its circumference, about an inch below the cricoid cartilage. The sharpest anguish and an extreme difficulty of breathing were the sudden effect of the inclined position which it was desired to give the head in order to unite the edges of the wound. Then Desault introduced through the nose a canula of gum elastic, whose presence in the trachea arteria at first occasioned a violent cough; but in a little while it was calmed, the respiration became easy, and the edges of the wound were placed in exact contact without any pain to the patient. Two hours after, the patient being again examined, was found in a good state; the presence of the instrument seemed to distress him but little. In the evening there was no impediment in the breathing; but at the end of some hours, he was seized with a new paroxysm of madness. He broke the bands with which he was tied, pulled off the pieces of the dressing, tore open the wound, and occasioned a hemorrhage that destroyed him.

23. I have not before me the more curious details of another case, where, in a similar wound, the cure was completed by the use of canulæ.

24. Sometimes the wounds of the anterior part of the neck penetrate to the œsophagus, after passing through the trachea arteria. The food passes into the aerial passages and the patient is in imminent danger of suffocation; a tube, carried into the œsophagus beyond the wound, remedies this accident, which may be complicated with the interception of air by the causes mentioned above (19). Then pass a canula through each nostril; let the first penetrate into the alimentary canal, and the other into the trachea arteria.

§ II. *Second Class of the Cases of Bronchotomy.*

25. To the second class of cases, that appear to demand bronchotomy, may be referred the presence of some substance in the trachea arteria or the larynx, the caries of its cartilages, &c. (4). Here the opening of the aerial passages is alone applicable, since the indication is, not only to give passage to the air, but also to extract the substance which obstructs this passage; at least, as Desault did in one case, the tube should be introduced only to change the position of the body, to turn it in such a manner as that its flat surface (which, being horizontally situated, entirely closed the opening) may become perpendicular, leave on its sides a space through which the air may escape and thus afford the surgeon time to perform bronchotomy at his ease.

26. The substances, whose presence in the trachea arteria may require this operation, arise internally or proceed from without. From thence, in this second class, there are two kinds essentially different. To the one may be referred the lymphatic congestions and polypi; to the other, extraneous substances introduced either through a wound or through the glottis.

Extraneous Substances, formed in the Aerial Passages.

27. Mucous congestions, the product of different inflammations, with which the tracheal membrane may be affected, commonly adhere to its sides, but are sometimes free and floating; they contract the canal, make respiration difficult, which is accompanied with rattling, hissing, confinement and local pains; the voice feeble and hoarse; habitual cough, often attended with hawking of blood and the expectoration of lymphatic shreds. If this expectoration cannot take place, if the shreds cannot be softened by fumigations, if the symptoms of

suffocation are present, then recur to bronchotomy, whose effect, it is true, will here always be uncertain, and which can only retard the death that will inevitably result from the affection of the lungs, which is almost constantly added to that of the membrane.

28. Polypi of the larynx or of the trachea arteria, a kind of excrescence that is very rare, some examples of which are however cited by some authors, have been twice observed by Desault, one in a subject brought to his amphitheatre, the other in a patient who perished from suffocation, after having been frequently threatened with it. A surgeon of his acquaintance communicated another example to him. In all three the tumour was of a pyriform figure, having its pedicle inserted into one of the ventricles. A sensation of pain in the part; respiration free at some moments, confined at others; sometimes an imminent danger of suffocation, arising suddenly in an expiration, dissipated soon after in an inspiration;—such are the principal phenomena, occasioned by the presence of these tumours; phenomena that are easily explained by their mobility and the consequent faculty they possess of obeying the air which enters into or proceeds from the aerial passages. Being pushed with too much violence between the edges of the glottis, they are there arrested and cause the patient to perish from suffocation, as happened in the case observed by Desault, unless inspiration or an effort of the patient disengages them speedily. Then the double indication of their extirpation or of their ligature, and of the re-establishment of the passage of the air, requires the operation of bronchotomy. In fact it is seldom that these excrescences project into the mouth, so that they can be seized, and extirpated or tied through this natural passage.

Extraneous Substances from without.

29. Pointed substances, that penetrate into the trachea arteria by a wound, sometimes leave externally no mark but a red spot, under which they are felt. They may cause symptoms of suffocation, and should be extracted speedily, after laying them open by a methodical incision. If they are blunt, and have entered through a large wound, they will be expelled in expiration, or may be extracted with suitable instruments.

30. Extraneous substances, which are introduced into the larynx or the trachea arteria, in consequence of bad deglutition, present a crowd of varieties, relative, 1st. To their greater diameter, which may extend from one line to eleven or twelve. 2d. To their figure, round, flat, angular, &c. 3d. To their nature, hard, soft, and susceptible or not of swelling by moisture. 4th. To their external surface, smooth, polished, unequal, full of asperities, &c. These varieties are essential to be known, on account of the symptoms that may supervene.

31. Whatever may be their varieties, these bodies, when they reach the aerial passages, produce a series of phenomena, more or less alarming, and whose assemblage is of importance to be known, to be able to give a diagnosis at the bed of the patient. A man puts into his mouth some solid substance, (30), it disappears there—immediately a convulsive cough takes place, with hissing and rattling—a local pain, which the patient points out with the finger—a greater or less difficulty in deglutition, which is sometimes very painful—a sensible alteration in the voice, which is commonly hoarse, and which may even be completely stopped—a very great difficulty of respiration—in a little while redness of countenance, prominence of the eyes, swell-

ing of the jugulars, and all the signs of a considerable embarrassment in the circulation of the superior vessels—sometimes an emphysema, more or less extensive, above the clavicle. The patient makes great efforts, and is much agitated—the pulse is irregular and intermitting.

32. This series of phenomena exhibits only rational signs; in general it is very difficult to procure sensible ones. If the patient is made to open his mouth as much as possible, the tongue is found inverted, the epiglottis depressed, and nothing is visible. The introduction of the tube may diffuse more light, but this is not always easy. Finally, there can be uncertainty only when the assistants cannot give any information, and when the patient is unable to furnish any; and even in this case, by assuring ourselves on the one hand, that the œsophagus is free, by the tube that is made to penetrate there, (16), and by reflecting, on the other, on the nature of the symptoms stated (31), and on their sudden appearance, the diagnosis will be less difficult.

33. The symptoms do not always observe the same progress; they are sometimes seen to continue uninterruptedly, and of the same violence; sometimes to cease, by degrees, entirely, and then return more intense; sometimes to be dissipated only in part; to leave local pain, impediment and difficulty of deglutition; in a word, to draw the patient on, by a way longer or shorter, more or less painful, to a death that is generally unavoidable, if art does not come to the aid of nature.

34. This difference in the progress observed by the symptoms, holds especially with regard to the situation which the substance affects in the aerial passages. It may be found in four different states. 1st. It may be stopped between the edges of the glottis. 2d. It may be engaged in the ventricles of the larynx. 3d. It may be

free and floating in the trachea arteria, where it obeys inspiration and expiration. 4th. It may be fixed in some point of this passage.

35. In the first case, (34), if the opening of the glottis is entirely closed, the symptoms of suffocation manifest themselves suddenly, and the patient perishes, unless he receives prompt succour. But if some small passages still remain for the air, then there will be a convulsive cough, local pain, motion of the patient, who applies his finger to his throat, and other phenomena stated (31). In this case, if the extraneous substance projects in the internal part of the mouth, extract it immediately, either with the fingers or by means of forceps with a ring. But if it is too much sunk between the edges of the glottis, bronchotomy alone can be attempted, not to give issue to the substance through the artificial opening, but to push it back into the mouth from below upwards, through this opening.

36. The second case (34) in which the extraneous substance is engaged in the ventricles, does not happen but when the size is inconsiderable, and then the symptoms are less severe at first; but its long continued presence may at length become fatal. In his lectures, Desault related the following case every year.

CASE V.

A Provençal breakfasted on cherries. During the repast a dispute arose between him and one of his friends. He grew warm and spoke loud, continuing to eat. Suddenly he perceived that a nut had got into his glottis, which occasioned a convulsive cough, a difficulty of respiration, and a sharp pain in the throat. He could not speak; the jugulars swelled, &c. Some hours after, the symptoms abated, and then recurred at different times, but less intensely. At length the patient be-

came habituated to the contact of the extraneous substance, which was indicated only by a sensation of confinement, corresponding to the left side of the larynx, and exactly on a level with the ventricle of that side. In certain motions, this body, escaping from the place where it was lodged, was carried against the glottis, where the cough, difficulty of breathing, confinement and pain announced its presence. But the symptoms soon dissipated, remained a longer or shorter time without re-appearing, recurred, and again ceased. In this state the patient came to Paris to consult the most skillful surgeons. Desault was called in, and advised the operation. The others who were consulted, rejected it, on account of the danger of hemorrhagy, of the difficulty of dividing the thyroid cartilage, of the possibility of an aerial fistula after the operation; illusory apprehensions, as will be stated (72); and which, supposing they had some foundation, should yield to the more real fear of the symptoms, the inevitable consequence of the long continued abode of the extraneous substance in the trachea arteria. In fact this patient died two years after of a laryngeal phthisis, and the opening of his body demonstrated the nut of the cherry to be the cause of his death.

37. We may conclude from this example, that, although a substance engaged in the ventricles does not often cause the symptoms except at intervals, yet if we are sure of its existence in the aerial passages; if the pain, and impediment, constantly corresponding to one of the ventricles, point it out there, we must open the larynx as speedily as possible, by dividing the thyroid cartilage, in order to extract it.

38. In the third case (54), the body, free and floating in the trachea arteria, obeys the motions of inspiration and expiration, descends in the one and ascends in the

other. The general signs (31) appear in greater or less number at the beginning; the pain is sharp; it changes its place every moment; the cough is frequent, often convulsive; sometimes such, that on its access the substance escapes through the glottis, and in this case, being sometimes swallowed by the patient without his being sensible of it, he is astonished to see the symptoms diminish suddenly, soon cease, and return no more. But if it cannot be expelled, if it is smooth and polished, the canal habituates itself to its presence; the pain, the impediment, the cough and suffocation return only at intervals, according to the place which it occupies. The works of Louis and Heister, the practice of Kau and of Bonnet, furnish us with a number of analogous examples. They speak of patients who have borne for many years substances thus fallen into the larynx.

39. It would seem that their weight would naturally carry them into the bronchiæ, but they are seldom found there; and generally, when the trachea arteria or larynx is opened, they are seen at the level of the orifice, from which they often escape of themselves, being expelled by the air.

40. Circumstances are not so favourable, if the bodies are unequal and rough. Then the internal membrane is excoriated and irritated; sometimes it swells, contracts the canal, adheres to the body, and thus, as well as it, opposes an obstacle to the air, and makes the operation immediately necessary. The body, first floating, is then fixed, a circumstance which may also depend on its soft and spongy nature. Not very large when it enters, it soon dilates by absorbing the moisture, fills all the aerial tube, and the symptoms of suffocation are imminent. In all these cases bronchotomy is the pressing indication.

41. The fourth case (34) is that, in which the extraneous substance, being fixed in some point of the trachea arteria, or of the larynx, adheres to it either by a point, an inequality fixed in its membrane, or because it is, as it were, wedged there according to one of its diameters. Then the pain is constantly seated in the same place, and the patient, if he cannot speak, points it out with his finger. The other signs, which are the same as those stated (31) are modified, accordingly as the passage of the air is entirely closed, or as more or less freedom of access still remains. In this case avoid the error which was committed by a surgeon, who was otherwise skilful. All the signs of suffocation were apparent, in consequence of bad deglutition; bronchotomy was performed, and nothing was found in the trachea arteria. The extraneous substance was supposed to be in the bronchiæ; the patient died, and to his great astonishment it was discovered in the œsophagus. The means indicated (16) should then always be previously employed.

42. Extraneous fluid substances introduced into the trachea arteria, never require bronchotomy. As has been said (5) of what service could it be, if the organic strength was insufficient to expel the fluid through the natural opening? If the strength is not too much exhausted, is not this passage as easy for the issue of the fluid, as an opening made in the trachea arteria? This general precept cannot be invalidated by the case of Virgili, who, in an operation for bronchotomy, where the blood fell through the incision into the wind-pipe, enlarged that incision, and, by a proper position, procured the discharge of the effused blood. Finally, tubes would not have a happier effect here. When the fluid is mixed with mucus and air, and is diffused into the bronchiæ and their ramifications, could it escape through

artificial tubes? Besides, is not the preceding remark applicable to their use?

43. Caries of the cartilages of the larynx very commonly succeeds to laryngeal phthisis, which disposes to it. I shall not dwell upon this last affection, with which physicians have not been well acquainted until lately, and against which art is almost impotent. We may only remark, that the contact of the pus soon affects the cartilages, and even partly destroys them. In the body of a man, who died at La Charité, the cricoid was found entirely eaten through in its posterior part, and the ligaments of the glottis no longer existed. We must then attempt to prevent the progress of the evil by laying the parts open. Perform bronchotomy as soon as the affection of the cartilages is evident; not that a great hope of success then remains to the practitioner, but because, on the one hand, the disease being mortal, and on the other, the operation being attended with very little danger of itself, it is allowable to try an uncertain method, in order to prevent a result that will certainly be fatal.

§ III. *General Recapitulation.*

44. From the examination that has been made of the cases requiring bronchotomy, it results, 1st. That when it is only desired to give a passage to the air, the introduction of elastic tubes may most commonly supply the opening of the wind-pipe, and that we should always first attempt this introduction in the circumstances indicated (10, 25), bronchotomy being then but a last resource. 2d. That if, to the indication of giving issue to the air, is added that of extracting an extraneous substance, the operation should be exclusively performed when this substance is solid (25, 42); that it would be useless, on the contrary, as well as the intro-

duction of tubes, if it is fluid (42). Finally, that it is an uncertain resource, but one that should not be neglected, in the caries of the cartilages of the larynx (43).

45. Whichever of these two means, whether bronchotomy or the introduction of tubes, may be employed, it is always necessary to have recourse to them as soon as they are indicated, although the symptoms may not yet threaten a speedy suffocation, as in the case (35). At that period the effect of this method would be hardly of any account. The lungs, being engorged by the blood, which cannot circulate in them, lose their organic action, cannot expel the air which is shut up in them, disembarass themselves of the fluids that choke them, or dilate to receive fresh supplies, and the patient perishes, notwithstanding the re-establishment of the communication with the external air. Drowned persons die in this manner, even after showing signs of life when they were taken out of the water. The lungs, being engorged, could yield no more to circulation nor respiration.

46. As Louis observes, a passage for the air should be re-established early, in order to prevent this engorgement of the lungs. To the cases which he relates in support of this doctrine, but one will be added, taken from Desault's practice.

CASE VI.

A child four years old, eating greedily, swallowed a large piece of bone, which passed into the trachea arteria, and produced immediately all the alarming symptoms indicated (31). The parents called a surgeon directly, who, when he arrived, found all the symptoms abated, and the child asleep. He made no investigation. In the evening, the patient awoke with startings, and all the signs of suffocation returned; but in a little while

they again ceased, and were renewed only at intervals. A physician being consulted, prescribed a potion for the cough. The whole of the next day was passed in tranquillity; but in the night there was a new attack of the symptoms, to such a degree that the child was dead when it was brought to Desault.

The history of the disease soon indicated its nature to this celebrated surgeon; the operation was now the only resource; but the extremities already cold, and the laborious motions of the thorax, gave but small presage of success. Desault, however, attempted it at the entreaty of the father. A momentary alteration for the better was the result; the child revived; but at the end of an hour all the symptoms that are precursors of death were manifested, and it took place the same evening.

47. A number of other examples, added to this, could prove the inconvenience of delay, where every minute adds to the progress of the evil, and the impotency of our means. Indeed, the one is always in an inverse ratio to the others. Besides, what should arrest the practitioner? The fear of the operation or of the introduction of a tube? The two following articles will answer the objections which could arise from these motives, by demonstrating—the one, that the presence of tubes in the trachea arteria is not followed by greater inconveniences than in other passages; the other, that if the great practitioners of our day have set little account on the dangers of tracheotomy, compared with those incurred by not performing it, we should, with much greater reason, have but little regard to it in laryngotomy, such as it is performed almost exclusively at this day, since Desault accredited its use.

ARTICLE II.

Of the introduction and abode of Elastic Tubes in the Larynx, and the Trachea Arteria.

48. Experience has incontestably established in cases 1, 2, 3, &c. the possibility of the abode of elastic tubes in the trachea arteria. The grounding the use of this method upon reasoning, might then be dispensed with here; but as this point of practice is too far removed from that which is commonly adopted, not to become the subject of doubt to many, it is thought that it will not be useless to confirm by the one what the other has demonstrated. But first let us see what was the conduct of Desault in this case.

49. In cases of inflammatory cynanche, Hippocrates recommended the introduction of a canula into the throat, for the purpose of the patient's respiration. This practice had many followers among the ancients, until abolished by Asclepiades and Paul of Egina, who proposed bronchotomy. The remembrance of it was almost lost to the moderns, and some have recalled it lately only to find its execution impossible, on account of the extreme sensibility of the tracheal membrane. Desault, who for a long time had suspected that this sensibility was capable of being blunted by the presence of a smooth body, and thus of habituating itself to that presence, obtained, one day, a convincing proof by accident. He introduced an elastic tube into the œsophagus of a patient, who had received a transverse wound in the neck, for the purpose of passing some fluid aliment into the stomach. A sudden cough appeared on the entrance of the tube; the patient attempted to vomit; he was suffered to rest a little, and in a little while tranquillity was restored, and lasted for an hour. At the

end of that time he attempted to inject through the tube a small quantity of broth, and immediately the cough re-appeared with more violence, and even became convulsive. He ceased, and postponed the introduction of the fluid for two hours; the patient was tranquil during that time; but as soon as he again attempted to introduce some drops, there was a renewal of cough, agitation, and extreme anxiety. Desault, then suspecting the tube to be in the larynx, brought the flame of a candle to its extremity, which was immediately caused to vacillate by the air that escaped. The tube being then withdrawn, and placed in the œsophagus, conducted into the stomach nearly a glass of broth, without any sign of pain.

50. This mistake, which had continued three hours without any mark of pain on the part of the patient, became a luminous trait, that immediately removed, in the opinion of Desault, all difficulties respecting the sensibility of the tracheal membrane; difficulties which vanished still more on the following considerations. There is no property that custom modifies in a more decided manner, than the sensibility of mucous membranes. Behold a man whose urethra receives a catheter for the first time; he experiences a painful sensation; the bladder contracts; he wishes to pass his water: let the catheter remain; in a little time its presence is no longer painful; the next day it is hardly inconvenient; the third day it is no longer sensible. Let a *serre-nœud* be introduced into the nasal fossæ to tie a polypus; there will be a sudden irritation of the pituitary membrane, an unpleasant tickling and a sneezing. If the instrument is left in the place, in a little time the patient no longer perceives it. The introduction of tubes into other passages would furnish the same analogy. But why recur to them, when the trachea arteria itself presents similar

phenomena? When a substance falls into its cavity, if it is small, smooth, polished, and fixed in a point, it may remain there a long time without producing any affection (36). The patient himself has no sensation of its existence. Who does not know that Louis was prevented from performing bronchotomy, in a case where a bean, introduced into the wind-pipe, produced there none of the effects announced (31). Tulpius, Bartholin, &c. relate similar examples; so that it may be established as a certain principle, that it is not by their contact with the membrane extraneous substances produce affections there; but rather by their asperities, which irritate and lacerate it, by the interruption which they cause to the passage of the air, and sometimes by their chemical action. Behold the canulæ which are introduced and kept in the trachea arteria after bronchotomy; their use is no way distressing; the patients bear them for ten, twelve, fifteen, and even twenty days, without difficulty and without pain.

51. We may conclude from all this, that the sensibility of the tracheal membrane, so manifest at the moment it is touched by a substance to which it is not accustomed, is gradually blunted, and becomes of no account, when the presence of this substance is continued for some time.

52. But what cause can here, as well as in other passages, habituate the membranes to the contact of substances which are foreign to them? Examine what passes in the urethra, where a tube remains. The internal membrane, irritated by its presence, furnishes in greater quantity the humour that commonly lubricates the canal, and which thus preserves it from the impression of the substance. The same effect is observed in the trachea arteria. I have been convinced of it by many experiments on animals killed after having caused tubes to

remain in their trachea arteria. The bronchiæ were always more or less filled with the mucus that lubricates them; a phenomenon that is also observed in those who die with an extraneous substance in the trachea arteria. Perhaps this may even be an inconvenience of the tubes, on account of the irritation which may result from it, and the obstruction of the tube.

53. It results from thence, that the difficulty of introducing elastic tubes, on account of the sensibility of the laryngeal or tracheal membrane, is always nothing, and should not arrest the practitioner in the numerous cases where we have seen this introduction is indicated (10, 25). Let us proceed to the manner of executing it.

54. In general, the tube should be more flexible than that of the urethra, in order to bend with less difficulty at the angles which it will be obliged to make; an indication which no substance accomplishes better than the elastic gum. Its length should be double to accommodate the extent of the passages. Its diameter should be equal to that of the largest. In general it is constantly observed, that large tubes fatigue less than those whose caliber is small in proportion to the canal which is to receive them. A thread is attached to one of its extremities, in order to fasten it to the cap of the patient; the other should be pierced on the sides with two large eyes, and open below, so as to present an easy vent for the mucus.

55. The following is the usual manner of introducing it. Being held like a writing pen, it is carried carefully into one of the nasal fossæ, which it traverses without difficulty, unless a deviation of the septum, a polypus, &c. contract the opening, and in this case it must be introduced on the opposite side.

56. Being arrived in the throat, it may then be introduced into the larynx or pharynx. It is ascertained that

it has entered the first cavity: 1st. By the painful tickling which the patient experiences, the sudden cough with which he is attacked, the desire to vomit, and the spasmodic agitation of the whole larynx. 2d. By the vibrations of a candle placed before the external opening of the tube. 3d. By the resistance that is experienced at the place where the bronchiæ divide. On the contrary, if it is introduced into the pharynx and œsophagus, there will be less irritation; the cough does not supervene; the flame of a candle does not vacillate, or at least, if some aeriform fluids produce this phenomenon, it will soon cease. Nothing will arrest the tube from proceeding even to the stomach, and the depth to which it penetrates is alone distinctive. In this last case, withdraw the tube, carry its extremity more forward, and seek to engage it in the glottis; if this cannot be accomplished, introduce a curved probe into the tube, turning its concavity downwards. More solid, it may be better directed towards the opening; let a motion upwards, that is then impressed on its external extremity, direct in an inverse sense the other extremity and compel it to enter. As soon as it is introduced, withdraw the probe while the tube is retained; fix it by a thread to the cap of the patient, with the precaution of covering the orifice with a piece of gauze, to prevent the introduction of particles floating in the air.

57. It is to be left a longer or shorter time in the trachea arteria, accordingly as the cause, which has required its use, is more or less quickly dissipated. If it should become filled with mucus, which is secreted in greater abundance from its presence, let it be withdrawn, cleaned, and then replaced.

ARTICLE III.

Of the Operation of Bronchotomy.

58. If the method, that has been indicated is insufficient, either from the confinement which the tube causes the patient to experience, or from the difficulty of its introduction, or from the mucus, which, being secreted in greater abundance, obstructs the canal incessantly, we must then have recourse to bronchotomy, which is exclusively indicated in the cases (25, 41 and 43), where the tube would evidently be an useless resource.

§ I. *Double manner of Operating.*

59. This operation may be performed in two places: 1st. In the trachea arteria. 2d. In the larynx. In the first case it is called tracheotomy; in the second laryngotomy. The one is generally adopted; it alone is found described in Garengeot, Dionis, Bertrandi, Sharp, Heister, Bell, Louis, in the Encyclopedia, &c. The other, employed recently, is not described except by some authors, who restrain the use of it too much and retrench the process. This consists, either in dividing the crico-thyroidean membrane transversely or in cutting the thyriod cartilage longitudinally; in that, sometimes an incision is made between the two rings of the trachea parallel to their direction, sometimes two or three of these rings are divided longitudinally. In their parallel we may trace the advantages or the inconveniences which should determine the practitioner to choose the one or the other. In this parallel we may consider them under the double view, of the parts affected by the cutting instrument, and of the object to be attained by opening the wind-pipe.

60. With regard to the parts concerned, little difficulty is experienced in laryngotomy. The skin, a small quan-

uity of cellular membrane and the thyro-cricoidean membrane are alone affected by the knife. On the contrary, in tracheotomy, the skin must be cut, much cellular membrane and generally the thyroid gland. The one is seldom accompanied with hemorrhage, some small venous vessels and the superior laryngeal artery alone incurring the risk of being wounded. The other is always more or less followed by this accident, produced by the venous net of the thyroidean vessels being then more swelled than usual, by the arteries of the thyroid gland, and by the thyroidean artery of Neubort, which sometimes exists. This circumstance is the more unfavourable, as we must then either perform the operation at two periods, whose ill success is in proportion to the delay experienced (45 and 46), or be exposed to the falling of the blood into the trachea arteria. In the first, the larynx, being easily fixed, in cutting is not attended with the apprehension of thus affecting the neighbouring parts. In the second, the trachea arteria, deeply situated, moveable and unresisting, escapes under the fingers which hold it, or before the instrument which is to open it, and then if this is inconsiderately pushed, the carotids may be affected.

CASE VII.

A student, in bathing, fell from a precipice: he was taken up in a state of insensibility. To recall him to life one of his comrades performed tracheotomy; the canal not being well secured, the carotid was opened, and the patient fell a victim to the hazard of an operation, useless in all cases, but which, if performed in the larynx, would, no doubt, have avoided this inconvenience.

61. It follows from what has been said (60), that, under the view of the parts affected, laryngotomy is

always preferable to tracheotomy. Is it not also under the view of the object proposed to be attained by the operation?

62. If the simple issue of the air is had in view, of what importance is it at what point of the wind-pipe the opening is made? The parts affected ought alone to determine it. Now, under this view, laryngotomy should be performed (61). If it is proposed to extract an extraneous substance, let us take a view of the advantages of the one or the other operation, according to the four states assigned to these substances in the larynx or the trachea arteria (34). When the substance is stopped between the edges of the glottis (35), or in the ventricles of the larynx (36), then the opening alone of this cavity can evidently be proper. In fact, being then more accessible to our instruments, it will be extracted with less difficulty.

CASE VIII.

While Ferrand was still chief surgeon of the Hotel Dieu, a man was brought there, experiencing imminent danger of suffocation, the effect of a stone passing into the wind-pipe. Tracheotomy was performed, but only blood escaped, and for some time mucus from the trachea arteria. The patient died, and a triangular stone was found, with two of its angles lodged in the ventricles, while the other projected through the glottis; without doubt, laryngotomy would have saved the life of this unfortunate man. The piece was presented to the Academy of Surgery.

63. On the contrary, when the substance is found in the trachea arteria, Sabatier advises the incision of that passage. But there must be one of two things. It will either be free and floating (38), and in this case being generally at the superior part of the passage (39), it

evidently indicates that the incision should be performed there; or it will be fixed in one of its parts, and then the incision should be prolonged below, by comprehending in it the cricoid cartilage, and that will suffice for the extraction by means of curved forceps. If a caries of the cartilages of the larynx demands the operation (43), laryngotomy must of necessity be performed.

64. It results from this, that under the view of the object to be attained, laryngotomy is always as favourable and commonly more advantageous than tracheotomy. Now as it has been demonstrated that it is always preferable with regard to the parts to be incised (61), it must therefore be exclusively employed in all cases. A tumour deeply situated between the trachea arteria and œsophagus, a substance very low down in the last passage, or a transverse wound, seem to make exceptions to this rule; but as elastic tubes offer here a more certain and less dangerous resource, these exceptions vanish.

§ II. *Operative Process.*

65. In proceeding to the manner of performing the operation, laryngotomy alone will occupy our attention, as tracheotomy may be found described by all authors.

66. The situation of the patient is not always easily determined. As he is confined and breathes with difficulty in some positions, and is less fatigued in others, he should always be placed in the latter. In general the neck must not be too horizontal, as the blood then flowing with difficulty may fall into the wound; if it is too perpendicular, a great confinement will be the result. The middle posture is preferable; the head should be supported, the breast covered with cloth, and the limbs held by assistants.

Cases in which issue must be given to the Air.

67. If the indication is only to give passage to the air, the transverse incision of the crico-thyroid membrane is sufficient, and in this case a common knife, a flat canula of silver, about an inch long, having on its sides two rings furnished with cords, open at both extremities and pierced with two eyes laterally at one of its extremities, so that if it should be applied against the opposite side of the trachea arteria the passage of the air may not be obliterated; if this canula is wanting, a quill cut sloping on one side and having on the other threads intended to fasten it; a piece of gauze to prevent the introduction of particles into the artificial tube; lint, compresses—such are the instruments necessary for the operation.

68. Every thing being arranged:

1st. The surgeon, standing before the patient, ascertains the interval that separates the thyroid and cricoid cartilages, secures the larynx with the thumb and middle finger placed laterally and with the index, which must correspond to the superior part of that cavity, and thus stretches the skin, at the same time, in a direction transverse and parallel to the incision.

2d. The skin and cellular membrane are divided at one incision, for the space of an inch, from the inferior part of the thyroid cartilage to the cricoid, between the sterno-thyroid and hyoid.

3d. The thumb and index separate the edges of the division, whilst the nail of the index, placed upon the membrane, serves as a conductor to the knife, which should penetrate into it more inferiorly than superiorly, in order to avoid an arterial branch, which almost constantly runs along the lower edge of the thyroid cartilage. The instrument, being then withdrawn and pres-

sing a little at the same time, enlarges the incision. If an artery is opened, it must be secured, either by the immediate application of a ligature, or by the actual cautery.

4th. The canula or the quill are introduced between the separated edges of the division, sunk sufficiently, and then secured by a bandage passing round the neck.

5th. The two angles of the wound must be covered with lint, and a piece of gauze must be placed over the extremity of the canula, which is also embraced by a compress with a slit in the middle. The whole is maintained by a rolled bandage.

69. While the obstacle to the escape of the air continues, the canula is constantly kept in the trachea arteria, with the precaution of examining frequently if the mucus does not fill it; if it does, of withdrawing it and cleaning it in order to re-introduce it. If the internal extremity, not being pierced with eyes, is applied against the opposite side of the canal, and cannot afford a passage to the air, it must be withdrawn and fixed less deeply.

70. To abridge the operation, the use of the bronchotome is recommended. This instrument is a kind of trocar of different forms, commonly flat, first proposed by Deckers or Sanctorius, adopted by Dionis and Verduc, and improved by Bauchot, Richter, &c. But this instrument is attended with an inconvenience; the canula and the blade, being too wide, are difficult to be introduced. The canula, being too flat, is soon filled with mucus and the air cannot escape. Besides, why add a new complicated instrument, where a simple knife will answer? The simplicity of an operation is the standard of its improvement. In tracheotomy the use of the bronchotome may be justified by the apprehension of

hemorrhage; but this apprehension is imaginary in the operation now proposed.

Cases in which an Extraneous Substance is to be extracted.

71. Laryngotomy is different in cases where an extraneous substance is to be extracted from the wind-pipe. A knife, a grooved director, a forceps with a straight handle, another with a curved one, compose the apparatus of instruments. The canula is useful only in cases of polypus or in caries of the cartilages of the larynx.

72. Every thing being arranged:

1st. The surgeon, being placed in the same situation as in the preceding case, (1st) secures the larynx, as has been said, (3d) stretches the integuments, which he divides at the same time with the cellular membrane, from the superior part of the thyroid cartilage to the base of the cricoid.

2d. The edges of the incision being separated with the thumb and middle finger, he seeks with the index for the crico-thyroidean membrane, places transversely the nail that serves as a conductor to the knife, which, being held like a writing pen, is used for opening this membrane.

3d. Through the opening, which it is then useless to enlarge, the director is introduced in such a manner that the notch is placed anteriorly, and its extremity is pushed to the superior part of the larynx.

4th. Whilst an assistant separates the borders of the division, the knife, being carried along the groove, will cut the cartilage in its whole extent, the length of the projecting angle which it forms anteriorly.

5th. The surgeon introduces the straight forceps between its divided borders, so as to separate them; and

at that moment, if the body is free, it escapes, being expelled by the air which proceeds from the trachea arteria.

6th. If the substance is fixed in some part of the canal, it must be extracted with the curved forceps, whose curvature must be directed above or below, according to the place it occupies.

7th. If it is fixed between the borders of the glottis, it is more easy to push it upwards, so that the patient may void it by the mouth.

8th. If it is sunk too much forwards in the trachea arteria, frequently it cannot be extracted without cutting the cricoid cartilage by means of the director and knife, a section by no means dangerous and always sufficient for the object proposed.

9th. If it is a polypus that is to be extracted, after the section of the cartilage, it is pulled away with the forceps, by twisting motions.

10th. The caries, when exposed by the opening of the larynx, is treated in the usual manner.

11th. In the case of extraneous substances, the wound is united immediately, unless blood, introduced into the trachea arteria, requires an opening there to give it vent. But in the cases of polypus and caries a canula remains between the edges of the wound, lest the laryngeal membrane, being engorged by the tension which it has suffered, may close the passage of the air; and at the same time this canula gives vent to the pus, which, no doubt, will be formed.

73. This simple and easy process, for the extraction of extraneous substances from the trachea arteria, evidently claims the preference over the longitudinal section of the rings of this canal, which all authors recommend. The opening, being always large enough,

never opposes any obstacle to the escape of these substances. No danger is incurred; although perhaps there may be some difficulty with old men, in whom the thyroid cartilage is often partly ossified. This is even one of the objections that has been made to this method. But then a coarser knife, of the temper of those which in amputation are used to cut the periosteum, will always overcome the resistance, and this mode of operation may be employed in all cases.

It has been apprehended that the cartilage would not unite, and consequently, that there would be a habitual passage of air between its borders; but who does not know that in cartilages, if the cicatrization is slower than in other organs, it is not the less sure. Besides, it will here be favoured by the exact contact of the edges of the opening, which the elasticity of the part compels to approximate.

MEMOIR

UPON THE

*Means of nourishing patients, whose Deglutition
is Obstructed.*

§ I. *Of the cases in which Deglutition is obstructed.*

1. **T**HE food, before its arrival in the stomach, passes through an assemblage of cavities, that are naturally free, but which, being sometimes obliterated, require artificial means to supply the important function they can no longer perform. A number of causes may occasion their obliteration; some, resulting from the action of external bodies, comprehend the different cutting or bruising wounds, that have affected the alimentary passages. Others, produced by internal affections, include the different tumours that appear in these passages, paralysis, convulsion of the muscles situated there, &c. Let us examine both kinds of causes.

2. Most of those who attempt to destroy themselves, are persuaded that a speedy and certain death will ensue from shooting themselves in the mouth. However, experience proves that their attempt is most commonly abortive. It is true, that enormous lacerations result from the wound, but the patient survives; and if he perish, it is only after a certain time. Now, one of the causes which may then destroy him, is the impossibility of deglutition. The soft parts of the mouth, being

bruised and torn, are puffed up, swell, and close all passage to the food. In 1789, Desault was called to a young man, who, in consequence of a wound from a pistol loaded with three balls, had a part of the tongue carried away, the jaw fractured, and the palatine arch broken. In a little time a considerable tumefaction succeeded; on the third day all access to the stomach was closed, and without the assistance of an elastic tube, death would have been inevitable. The patient was perfectly cured by the use of this method, in the course of a short time. Several similar examples are found in the practice of Desault: in these kinds of wounds, if the engorgement is not an obstacle to deglutition, the paralysis of the muscles of the pharynx, the effect of the commotion which they have experienced from the violence of the shock, may confine, or even obstruct it.

3. Wounds of the neck, produced by cutting instruments, and which penetrate above the os hyoides, between it and the thyroid cartilage, or even below the larynx, may affect the parietes of the pharynx, after having passed through the organs situated anteriorly, be complicated with engorgement, and under this view produce the same obstacle as in the preceding case: or still, if this affection does not take place, they may open a passage to the food, which falls into the larynx and the trachea arteria, and occasions cough and suffocation; at the same time, by their not reaching the stomach, they give origin to a debility that will soon be mortal to the patient.

4. In the second class of obstacles to deglutition may be arranged: 1st. The unnatural tumefaction of the amygdalæ, which is sometimes the effect of an acute affection and at other times the result of a chronic engorgement: a tumefaction, which, when arrived at its last period, always requires the use of the means to be

now stated previously to recurring to those described in one of the preceding memoirs. 2d. The tongue being so much swelled, that nothing can penetrate into the posterior fauces. 3d. Tumours situated along the œsophagus and exercising an unfavourable compression upon it: such, for example, are certain abscesses, that are formed between this canal and the trachea arteria. In 1788, a man came to the Hotel Dieu, having, in consequence of an angina, a considerable purulent collection between the parietes of the pharynx and of the larynx. For two days no kind of food, either solid or fluid, had been able to pass into the primæ viæ. The tumour, projecting into the posterior fauces, even impeded respiration. Desault began by introducing an elastic canula into the œsophagus and then passing some broth through it; the next day he made a vent for the pus by a suitable incision, and at the end of fifteen days the cure was complete. 4th. The inflammation of the organs of the pharynx, which acts here, either by augmenting the bulk of the parts and thereby stopping up the passages, or more especially by preventing the contraction of the muscles. Thus we see that the inflamed bladder is not able to contract itself to expel the urine: thus also the arm cannot be raised, when the deltoid becomes the seat of an inflammation. 5th. The tetanus, a kind of affection, in which the masseter muscles, being violently contracted, frequently do not permit the slightest separation of the jaws. 6th. The spasmodic contraction of the muscles of the posterior fauces, a contraction which makes this cavity so narrow, that no food can pass. 7th. The atony of the same muscles, a state in which the alimentary bolus, not being pushed by any force, cannot descend into the stomach.

§ II. *Of the means that may be substituted, when Deglutition is obstructed by one of the preceding causes.*

5. Death is the inevitable result of the preceding obstacles (1, 4) continued too long a time. If art cannot destroy them sufficiently, it must then have recourse to palliative means, to sustain life, while it opposes with methodical aid the causes that threaten it: now, these means are of two kinds. 1st. Nourishing injections: 2d. The introduction of fluid aliment, by artificial means, through the nostrils or the mouth.

6. The inutility of nourishing injections is now generally allowed. The absorbent lacteals, being more rare as they advance towards the inferior part of the intestinal canal, can take up only a portion of the injected fluids, insufficient for nourishment; and the patient would soon sink, if he was sustained only by them.

7. The introduction of fluid aliment through the mouth is almost always contra-indicated, whatever may be the artificial method used to transmit it. Indeed in the case under consideration the organs of that cavity are commonly the seat of the obstacle, which it would be either dangerous or impossible to overcome. Thus this passage cannot be chosen in the swelling of the tongue, of the amygdalæ, of the velum palati, in gunshot wounds in the mouth, &c. It would only be possible to make use of it in wounds of the inferior part of the neck, and in tumours situated along the œsophagus.

8. In general the nostrils offer an easier route. Being almost always free, they can transmit fluid aliment into the pharynx, which commonly also is free behind the obstacle; for example, behind the enlarged tongue or amygdala. This remark did not escape a physician celebrated in the commencement of this century, who, in many experiments, attempted to pass different liquids

into the stomach, by pouring them immediately into the nostrils; but his attempts were not attended with success. The liquids fell into the larynx rather than into the œsophagus; suffocation ensued, and this ingenious method, to which since that time so many patients have owed their lives, was mortal to many at the period it was proposed.

9. We are indebted to a surgeon of Arras for the advantageous modification, which, by making it more easy, has also made it less dangerous. He proposed, instead of passing liquids through the pharynx to arrive at the œsophagus, to transmit them immediately into this canal by means of a curved tube introduced through a nostril, so as thereby to avoid their falling into the glottis, which is the more easy, from the epiglottis not being depressed at the moment of deglutition, as in the natural state; a happy idea which was seldom realized before Desault, but which, being reproduced and corrected by this great master, and presented under new forms, is become a method sure, easy, and sanctioned by experience, the invariable arbiter of our methods.

10. The elastic tubes, alternately flexible when they are empty, and solid when filled by the stylet, are attended in this, as well as in a great number of other cases, with great advantages in this double view. Being solid they are easily introduced; and from their flexibility their presence does not occasion any pain. Desault employed them constantly: their length was proportioned to the extent of the passages through which they had to pass, and their diameter was equal to that of the largest used for the urethra. The process of their introduction is as follows.

11. 1st. The patient being properly placed, with the head inclined backwards, the surgeon held, like a writing pen, the tube armed with a curved stylet like that of the

ordinary catheters, introduced it into one of the nostrils by turning its concavity downwards, pushed it slowly, drew it back when arrested by an obstacle, and then sunk it again until it arrived at the middle of the pharynx.

2d. He then withdrew the stylet with one hand, whilst, by an opposite motion, with the other he pushed the tube lower and in such a manner as to make it penetrate into the superior extremity of the œsophagus, and even to fix it considerably forwards in this canal.

3d. Frequently, instead of penetrating there, it goes into the larynx—a deviation, that is indicated by the difficulty of plunging it more forwards, by a kind of peculiar rumbling, by the agitation of the flame of a candle exposed to its orifice, by the pain and cough experienced by the patient, who sometimes, however, scarcely seems to be incommoded, and never so much so as authors have asserted in these kinds of cases: then withdraw the instrument and again attempt to introduce it into the alimentary passages. Some times success is not obtained until after many attempts.

4th. When it is certain that it is engaged, let it be secured externally by a thread, which embraces the extremity with many circular turns, its two ends being twisted on pins, which are fixed on each side to the cap of the patient.

5th. The surgeon fills a syringe, such as that used in the operation for the stone, with some nourishing broth, adapts the tube to the orifice of the canula, at first injects a small quantity, lest the extremity might be engaged in the glottis, and when, from the absence of the signs stated (3d) he finds that it is not, he finishes throwing in the fluid.

12. The canula remaining its place, serves to nourish the patient during all the time the obstacle to deglutition lasts. In those, with whom Desault had occasion to use

this method, in consequence of injuries produced by gunshot wounds, he has observed that the necessity of taking food was not indicated by the common sensation of hunger and thirst, but by a peculiar sensation of debility and tension, manifested in the epigastric region, and which was suddenly succeeded by a marked convalescence, when this need was satisfied.

§ III. *Of the application of the preceding method to practice.*

13. We may rest upon experience the method that has been proposed in the different obstacles to deglutition. An interesting case on this point has been already published in the Surgical Journal; to this will be added some, which are extracted from a thesis maintained on the 30th of June, 1787, at the schools of surgery, and recorded at the Hotel Dieu, under Desault, by the author of that thesis.

CASE I.

On the 29th of January, 1785, a man was brought to the Hotel Dieu, who in a fit of despair had made, with a razor, a deep wound on the anterior part of the neck. The separation of the borders was enormous, and when the head was turned back, the fist could be introduced; on the contrary, by lowering it, the edges were brought into contact, but then deglutition was impossible; it was therefore necessary to substitute an artificial method, to give the wound time to unite. Desault chose that which has been indicated, and by its assistance, he supported the patient, for ten days, with the greatest ease. Already a well grounded hope of a cure appeared, when the patient, always under the influence of his despair, one night plucked off his dressings, tore open the lips of the

wound, renewed the hemorrhage, and in spite of the most speedy assistance died the next day.

14. Although the termination of this case was unfavourable, it does not the less prove the advantages of elastic canulæ to sustain life, which without them would either have been extinct on the second or third day from the accident, or if it had not, would have left the patient an enormous wound on the anterior part of the neck to unite by the second intention.

CASE II.

On the 21st of April, 1786, a young man was brought to the Hotel Dieu, having a considerable laceration in the mouth and pharynx, which was the effect of a pistol wound received on the day before. A sensible swelling began to appear already, and respiration and the pronunciation of sounds were impeded. Bleeding, cataplasms and gargles were employed to no purpose; the next day the smallest drop of fluid could not pass into the stomach. An elastic tube, passed through the nostril and remaining in its place, served to transmit to that organ broth, which was injected regularly every day. On the sixth day, the affection being a little abated, its use was suppressed and the patient swallowed his food in the usual way. From that time the convalescence was gradually more sensible, and in a short time the patient, who would have been the victim of his madness without the use of the tube, was dismissed perfectly cured.

CASE III.

In the month of April, 1786, a patient who lay in the Hall of St. Charles, affected with a putrid fever, was suddenly seized with a difficulty of swallowing, so that nothing could get into the stomach. The steward fearing he had eaten some substance that was too large, went

for the house surgeon, who, perceiving nothing in the pharynx, attempted to make the patient drink some fluids; they were immediately returned through the nostrils and not a drop entered, probably indicating an affection of the muscles of the pharynx, which the disease had paralyzed for a moment. Desault, being called to this patient, immediately had recourse to the method that has been mentioned, which, affording an easy passage to the food, was left in the place, and gave the physician, who was now delivered from all apprehension on the score of deglutition, time to treat the disease and obtain a complete cure.

15. To these examples many other facts might be added, in which the same advantages resulted from the same process, without any danger ensuing. It may be said that there are few cases in surgery, in which its wonders are more striking and the hand more evidently and more speedily beneficial.

16. In general have recourse early to this method, whenever the obstacle to deglutition is an engorgement of the pharynx, of the œsophagus, or of their environs, what ever may be the nature of that engorgement. If it should be employed too early it does not expose to any danger; on the contrary, when used late, the progress of the affection may render it difficult, even impossible, or at least very painful, on account of the contraction having become very considerable in the alimentary passages. Thus in obstacles to respiration, we must in general prevent, by the introduction of elastic canulæ, the complete interception of the passage of the air.

§ IV. *Of cases, where tubes cannot be introduced through the nostrils.*

There are cases, in which the passage of the tube through the nostrils is attended with such difficulties

that we must prefer the mouth for their introduction. Such is the following case, borrowed from the *Journal of Medicine*, which offers an advantageous modification of the preceding process, a modification that is due to M. Boyer.

CASE IV.

Therese Morgalet, aged forty-six years, of a good constitution, formerly robust, but debilitated for some time past by grief and frequent sickness, experienced in the month of Floreal, in the year 5, slight prickings about the inferior part of the pharynx. During fifteen months these prickings were felt only every two or three days; but at the end of that time they changed into a real and constant pain. She then experienced a difficulty of swallowing, especially when the food was solid. Deglutition daily became more difficult, and was entirely suppressed on the 18th of Brumaire, in the year 8. The patient being deprived of food for seven days, and tormented by a devouring thirst, which could not be appeased by the feeble resource of nourishing injections, was sensibly perishing, when it was determined to call several skilful practitioners to her assistance.

The most urgent indication was to nourish the patient, and it was decided that a tube of elastic gum should be introduced into the pharynx. Two of the consulting physicians attempted to pass it into this canal through the nasal fossæ, but the tube could not bend against the posterior side of the pharynx. The pains caused by its presence were insupportable, and augmented in proportion as efforts were made to push it forwards. Seeing it was impossible to introduce it into the pharynx through the nostrils, it was determined to pass it by the mouth, and the mode of proceeding was as follows:

The patient being seated on a chair, with the head bent backwards, M. Boyer introduced through the mouth a tube of elastic gum without a stylet. The tube being stopped at the inferior part of the pharynx, folded on itself in whatever direction it was carried; a silver catheter was substituted, and being inclined a little to the left, penetrated after a considerable resistance. Some warm water was carefully injected, by means of a small syringe adapted to this catheter.

The operator being assured that the water had penetrated into the stomach, from the agreeable sensation which the patient experienced at the moment, and being certain of nourishing her, at least for some time, by this artificial passage, thought only of the means of fixing an elastic tube in a solid manner, which would dispense with the frequent repetition of fatiguing introductions. But when introduced by the mouth, could it be fastened to the commissure of the lips? The action of the teeth, continually applied to the tube, and the mobility of the lower jaw and lips, would not permit it. Must it then be introduced through a nostril, in order to fix it at the opening of the nose? This had been already attempted. Besides, the tube, which it was necessary to introduce with its mandrin, could not have reached the obstacle. M. Boyer immediately invented the following method, which he put in execution some hours after:—The tube which was in the œsophagus was withdrawn, after it had been used to give the patient a sufficient quantity of nourishing broth. The patient being placed as above, the operator introduced into the right nostril the tube of Bellocq. When this instrument reached the posterior opening of the nasal fossæ, an assistant pushed the spring, which, by bending itself, penetrated into the posterior fauces, and was brought back to the anterior opening of that cavity. The extremity of a waxed thread,

which was doubled many times, was attached to the button that terminates the spring. The spring was withdrawn into the tube, which, being itself drawn back anteriorly, drew the thread outwards. The two ends of the thread, one proceeding through the mouth and the other through the right nostril, were retained on the cheek by the hand of an assistant. The operator, depressing the base of the tongue with the index of the left hand, introduced into the pharynx, directing it to the left side, a tube of elastic gum armed with its stylet, of a diameter and length equal to the largest for the urethra, without a handle, and pierced at the upper extremity. This tube, firmly pushed, overcame the contraction; the stylet was withdrawn, and in the opening made at the superior extremity of the tube, the end of the thread, which proceeded through the mouth, was fixed. Being master of the motions of the tube, by means of the superior end constantly held by an assistant, M. Boyer pushed it into the posterior fauces, as far as the isthmus of the throat; then seizing the thread, he drew it gently upwards and outwards, and with it the extremity of the tube, which was placed in such a manner that it projected some lines beyond the nostril, and was secured by means of a thread doubled many times, with which circular turns were made round the head.

The frequent injection of the most nourishing food through the artificial passage, gave a little strength to the patient. The tube caused a little irritation and pain during the first five days; and on the sixth, the patient spat up some puriform matter. This spitting increased on the following days, and on the tenth, the tube beginning to vacillate, there was a natural deglutition of a small quantity of fluid. These vacillations increased to such a degree that they were the sole cause of pain. On the fourteenth day, the patient removed the tube, and

swallowed liquids easily. But the difficulty of swallowing soon returned, and on the twentieth there was almost an absolute impossibility. The patient had recourse to the method which had procured her some relief. According to the process that has been stated, a tube larger than the preceding was introduced; but neither the same advantages nor the least dilatation were obtained. The patient, compelled to use it for five months, always felt it equally compressed. As this obstinate constriction might possibly be the result of a nervous irritation, baths were prescribed, but they produced no effect.

Deprived of solid food, enfeebled by a multitude of internal remedies administered at different periods, she died on the 12th of Germinal, near two years after the commencement of her disease. The body was not opened.

This case, which forms a kind of supplement to those stated above, is sufficient to give an idea of the processes by which the use of elastic tubes may be rendered applicable to all cases of the obstacles to deglutition.

The idea of bringing back a tube, which had been introduced through the mouth into the nasal fossæ, in order to secure it there, did not present itself to M. Boyer six months before the period of its realization. Being called to a lady, affected with laryngeal phthisis, who could not swallow the smallest quantity of fluid without experiencing a convulsive cough, which threatened suffocation, he passed into the pharynx, through the mouth, a tube of elastic gum, by means of which she could appease the devouring thirst that had tormented her for a month past. After many introductions made by the surgeon, the patient was at length able to introduce the tube herself, without much trouble, whenever her thirst required it. It was not determined to pass

the tube through the mouth until every possible attempt to introduce it through the nostrils had been made without success.

The compiler of this article of the Medical Journal, relates the case of a patient who experienced a very great constriction in deglutition. She swallowed with great difficulty the most liquid food, such as broth, cream, rice, &c. MM. Deschamps and Boyer, desirous to know the seat of the obstacle, introduced through the mouth a tube of elastic gum without a stylet. The tube being stopped at the superior part of the œsophagus, folded on itself when an attempt was made to overcome the obstacle. A tube of a size much smaller and like the first was substituted, but it was stopped and could not pass the contraction. Then M. Boyer introduced the tube, armed with its mandrin, and after considerable resistance overcame the obstacle. It was withdrawn, and the same evening deglutition was more difficult. Three days afterwards this patient left the hospital, not being able to swallow fluids except with great difficulty. No information was received of her afterwards.

REMARKS AND OBSERVATIONS

UPON THE

Extirpation of the Thyroid Gland.

CASE I. *Recorded by Giraud.*

JACQUELINE HYOMS experienced in 1784, in a violent extension of the head, a very sharp pain at the middle and anterior part of the neck; which, being soon dissipated, left behind it only a slight difficulty in motion. But, three months after, there appeared on the right side of the trachea arteria, a small tumour, hard, indolent, without heat or change in the colour of the skin, and having sensible motions of pulsation, which indicated that it was seated upon the course of the primitive carotid artery.

The patient being little incommoded by this tumour, neglected it until the month of June, 1788, at which period its progress became very rapid. Internal and external resolvents were applied to it in vain. A point of fluctuation soon showed itself in the centre, and being opened by a cutting instrument, gave vent to a yellow serosity. Three months after, caustics were employed, but their action had no effect upon the cure; and the patient, fatigued by the insufficiency of the means of art, came to the Hotel Dieu on the 21st of May, 1791.

At this period the tumour was two inches in diameter, round, hard, and adhering to the right side and to the middle part of the trachea arteria; it threw the ster-

no-cleido-mastoidean muscle outwards, was sensibly elevated at each pulsation of the arteries, obeyed the motions of deglutition, and even impeded a little the passage of solid food. The patient, strongly desirous to be delivered from this inconvenient deformity, determined immediately to suffer its extirpation, when this was presented to her as the only resource, although neither its danger, length nor pain were disguised. Some general remedies were administered to prepare her for the operation, which was performed in the following manner, a few days after her entrance into the Hotel Dieu.

1st. The patient being laid on her back, with a little inclination to the left side, and the head and neck more elevated than the rest of the body, Desault made upon the middle of the tumour a longitudinal incision, which he began a finger's breadth above, and finished at the same distance below, so as to have more space to continue the operation, included in this first section the skin, the platysma-myoides muscle, some fibres of the sterno-hyoidean and thyroidean, and penetrated to the gland.

2d. Whilst an assistant drew to the left the internal border of the incision, in order to fix the tumour, he separated it from the sterno-cleido-mastoidean muscle, by cutting the cellular membrane that united the parts, and at the same time divided two small arteries, which were taken up with the dissecting forceps and tied immediately.

3d. After having thus disengaged the external side of the tumour, he separated its internal side in the same manner, by causing it to be drawn outwards with a hook by an assistant, so as to have more facility in separating it from the anterior part, and from the side of the trachea arteria. During this kind of dissection, different

branches of the thyroidean arteries were tied in succession, in proportion as they were divided.

4th. The assistant who held the hook, brought back the gland inwards and forwards, and at the same time the surgeon finished dissecting it outwards from above below. This part of the dissection was the most minute and difficult, it being necessary continually to sponge the little blood that still oozed and prevented the parts from being well distinguished. From thence the necessity of cutting very little at a time, and of ascertaining with the finger, before each stroke of the knife, what was to be cut. By dissecting with these precautions, the superior and inferior thyroidean arteries were exposed, without being wounded, and were tied by means of a curved and blunt needle. These arteries were divided transversely, and the detachment of the tumour from the trachea arteria, to which it adhered strongly, was completed.

5th. The wound resulting from this operation was near three inches in depth, and bounded outwards by the sterno-mastoidean muscle, inwards by the trachea arteria and the œsophagus, backwards by the primitive carotid artery and the nerves of the eighth pair, which showed themselves at the bottom. After the wound was washed with warm water, and all the blood it contained absorbed, it was filled with coarse lint, sprinkled with colophony. Square compresses, sustained by turns of the bandages moderately tight, formed the rest of the dressing.

The extirpated tumour was about five inches in circumference, and did not differ from other scirrhus glands, except in having a cartilaginous nut in its centre.

The patient, who had supported with firmness this operation, as tedious as it was painful, passed the rest of the day in tranquillity, and experienced only ordinary

pains. On the ensuing night, she complained of a small degree of heat in the neck, and difficulty in respiration. The dressing was sprinkled with water of guimauve. For a drink, she used dog's tooth acidulated with oxymel. On the third day, the difficulty of swallowing was much increased, although the fever was moderate. At this period the compresses and the external lint were renewed, for the first time, and the dressing was continually moistened as on the preceding days.

The fever ceased on the fourth day, and deglutition became more easy. Suppuration already began to form, and on the next day it had detached all the lint, so that the dressing could be renewed entirely. The wound was in a good state, and was dressed only with soft lint and compresses steeped in the emollient decoction. This was continued during the succeeding days.

Nothing particular happened in the course of the treatment. The wound pursued the usual progress, was cicatrized at the end of a month, and the patient was dismissed from the hospital, perfectly cured, on the thirty-fourth day after the operation.

§ I. *Remarks on the preceding Case.*

Nature, by circumscribing the thyroid gland with numerous vascular limits, seems to have rendered it inaccessible to our cutting instruments. The superior thyroidean arteries above, the inferior below, and sometimes that more or less considerable branch, which Newbort first discovered, alongside of the primitive carotids and internal jugulars; a very extensive venous plexus before, and more over the proximity of the trachea arteria, the œsophagus, the recurrent nerves, the trunk of the par vagum, &c.; form to its extirpation obstacles which deterred all the ancients, and which some moderns have encountered with great apprehension. The

first time Gocch performed this operation, he did not dare to complete it on account of the hemorrhage, and his patient perished on the eighth day. He had better success the second time; but he found it impossible to tie the vessels, and was able to preserve his patient from a mortal hemorrhage, only by causing the dressing to be constantly pressed by the hand of an assistant for eight days. But this difficulty of tying the vessels does not exist with one who has an accurate knowledge of the structure of our organs, and especially of the relations between them.

The small vessels, which are less dangerous than troublesome, must be secured as fast as they are divided. The flow of blood indicates their presence, they are seized with the dissecting forceps, and a noose of thread placed under them. Those whose size is considerable, such as the thyroidean, should be previously exposed. A curved needle, being then passed below them, serves to conduct a thread which makes the constriction before they are divided. By this method we avoid a considerable effusion of blood, which has the double inconvenience of too much embarrassing the operator, and debilitating the strength of the patient.

With these precautions, we may always hope for the success of which the preceding case offers an example; and although yet very seldom practised, the extirpation of the thyroid gland ought never to deter the practitioner, when its presence may be injurious. Theden and Vogel have obtained as fortunate and as speedy results as Desault.

SECTION THIRD.

DISEASES OF THE THORAX.

Cases of Hydrops Pericardii.

CASE I.

A MAN came to the hospital of La Charité, with all the characteristic symptoms of hydrops pericardii. Dry cough; difficulty of respiration; pulse slow, hard and irregular; constriction; anxiety; danger of suffocation on lying down; sensible relief on standing up; frequent syncope; countenance pale and bloated; manifest dilatation in the precordial region; habitual tendency to incline to the left side;—such were the phenomena observed in this patient. Dubois, Sue, Dumangin and Desault, being called into consultation, could not at first agree as to the cause on which these phenomena depended. Some thought it was a disease of the heart; others, a hydrops pectoris; others again, a collection of water in the pericardium. All the opinions at length agreed upon the two last, which divided the consultants. In order to accommodate them, Desault proposed an operation, which suited both cases; this was to open the thorax between the sixth and seventh ribs of the left side, opposite the point of the heart, including the skin, the intersection of the great oblique and great pectoral muscles, and the flat side of the intercostals. This project was adopted and executed next day. The incision

having been made with the requisite precautions, Desault introduced his fingers into the thorax, and perceived a kind of sac, full of water, which he took for the pericardium. The other consultants, having, like him, examined the parts, were of the same opinion. In consequence, he opened the dilated sac with a blunt knife and gave vent to about a pint of water, which escaped with a kind of hissing at each expiration. The flowing being finished, the finger was again introduced into the orifice and perceived a single substance, pointed and conical, against which it struck. All the assistants felt it, and the general opinion was that it was the heart, naked.

The symptoms abated during the first two days after the operation; but they re-appeared on the third, became more intense, and the patient died on the fourth. The opening of the body displayed a membrane, that united the edge of the left lung to the pericardium, and formed the sac which was taken and divided for that membrane. The conical and pointed body, which was supposed to be the heart naked, was indeed that organ, but enveloped with the pericardium to which it mostly adhered, much more dilated than usual and filled with blackish and partly coagulated blood.

CASE II.

A student of medicine had been for a long time troubled with a dry cough, the effect of an imprudent change from heat to cold. Inconsiderable at first, it then increased, and shortly there was added to it an habitual difficulty of breathing, especially when the patient ascended a stair-case; otherwise, there was no dilatation in the precordial region, no pain on lying down, no starting from sleep, as often happens in hydroys pectoris. Several physicians, who were successively consulted,

all thought there was a chronic affection of the lungs, and prescribed a mode of treatment founded upon that idea. In the interim, the young man, who dissected in Desault's amphitheatre, having cut himself with a scalpel which had been used upon a subject who died with putrid fever, experienced in a little while all the symptoms of it. The progress of the disease was rapid, and death took place on the seventh day. It was observed that the difficulty of respiration and the cough increased considerably; an effect which was attributed to the translation of the morbid matter to the lungs.

The opening of the body proved that there was a continual mistake as to the cause of the affection of the thorax, which was nothing else but a hydrops pericardii. This sac, being very much dilated, pushed up the left lobe of the lungs, with which it had formed adhesions and contained near three pints of fluid.

REMARKS.

In the two preceding cases we behold experienced practitioners supposing, on the one hand, a hydrops pericardii, which did not exist; and on the other, not suspecting the existence of that affection, which was well defined. This may throw a great light upon the question of determining, if in these kinds of dropsy the paracentesis of the thorax ought to be performed. Desault answered this question in the following manner: If the disease is very evident and not attended with any complications which may render the operation fruitless, we must decide upon it; because, on the one hand, when the effusion proceeds to a certain degree, it is mortal, and on the other, this method may afford a ray of hope, as is proved by certain wounds where this membrane was affected with impunity. Galen, Harvey, and many others, give us proofs of it in their works.

But how can the existence of the disease be evident, when there are so many signs to impose, and so few that are characteristic; so many other affections, that can assume the form of this, which itself is capable of assuming the form of so many others: so that we may be assured the practitioner can never decide with certainty. Some examples of success, related by certain authors, do not remove the uncertainty. In fact, if Desault had succeeded in the operation of which an example has been related, would it not have been believed that he had opened the pericardium? and yet experience proved the contrary.

Finally, if the paracentesis is hazarded, recourse should never be had to the trocar, as recommended by Senac. Indeed, when there is an uncertainty, 1st, if a collection of water exists in the pericardium; 2d, if it is sufficient to separate the point of the heart from its sides; what risk may not be incurred by making use of this instrument? The incision with the knife is always to be preferred.

OBSERVATIONS

ON THE

Operation for Cancer of the Breast.

FRANCES RAMELAY, aged forty-four years, entered into the Hotel Dieu, in the month of July, 1792, to be there treated for an occult cancer of the left breast. Six months before, there had appeared in the cellular membrane of this part and without any apparent cause, either external or internal, a small tumour, hard, indolent, rolling under the fingers when pressed by them, and occasioning little inconvenience by its presence. Its size remained stationary for two months; but at the end of this period, it made rapid progress, occupied the whole breast, and was accompanied with pains, inconsiderable at first, in a little while more severe, and at length lancinating. The skin became engorged and tuberculous, and its surface was covered with varicose veins. A gland appeared under the arm pit; the nipple, being, as it were, dried up, assumed a horny consistence; below, the tumour contracted adhesions with the pectoralis major; above, it remained moveable; collections of matter were formed and projected under the skin. The pains increased and became insupportable, and such was their degree, that the patient wished the operation performed on the day of her admission into the Hotel Dieu.

The use of diluents and purgatives prepared her, during some time, and fifteen days afterwards the operation was performed in the following manner:

1st. The patient, being stripped of her clothes to the waist, and girded round the body with a piece of cloth, was seated upon a high chair, with the head supported against the breast of an assistant, the arm of the affected side carried outwards and backwards, so as to expose the breast and stretch the pectoralis major; an assistant kept the arm in this direction; others secured that on the opposite side, as also the inferior extremities.

2d. The surgeon, standing before and to the right of the patient, raised up the breast with the left hand, and caused the skin to be stretched below by an assistant. Then holding a common knife in the right hand, as if he were about to cut from left to right, and from within outwards, he carried the point into the hollow of the axilla, under the enlarged gland that appeared there, made a semi-circular incision, directed inwards and a little downwards, which embraced the tumour inferiorly, and then finished it upon the lateral parts of the sternum.

3d. He dissected the tumour from below upwards, by cutting the cellular membrane which united it to the pectoralis major, removed several fibres of that muscle, tied an arterial branch included in the first incision, and separated the gland in its inferior quarter.

4th. Having left the tumour to its own weight, he began a second semi-circular incision at the external angle of the first, terminating at its internal angle, and thus circumscribing the whole of the enlarged gland. As the integuments were sound above, an assistant was charged with the precaution of drawing them strongly upwards so as to preserve them.

5th. After the incision of the skin, the cellular membrane was cut as high as possible, drawing the integu-

ments and the tumour in a contrary direction. The dissection being then continued from above downwards and from without inwards, separated it entirely from the interior surface of the pectoralis major, which was partly removed, because the engorgement had been propagated to it.

6th. Two considerable arterial branches, divided in the second section, were seized with the dissecting forceps and tied immediately, according to the method used by Desault in all operations.

7th. The surgeon, grasping on one side one of the edges of the external angle of the wound, whilst an assistant raised up the other, prolonged the incision, laid bare the enlarged gland, which was about the size of a large nut, made previously a ligature of the pedicle that united it to the axillary artery, and in which were included some considerable arterial branches, cut this pedicle in front of the ligature by conducting the knife on the left index, and thus removed the gland to be extirpated.

8th. The borders of the wound having been washed, the blood on its surface was spunged up with coarse lint, beginning above and placing successively, after the spunging, pledgets of soft lint sprinkled with colophony; upon these were placed layers of coarse lint, which were sustained by long compresses, that were themselves secured by several turns of a bandage.

9th. The patient, being carried back into her bed, was laid down with the head a little elevated, the arm of the affected side placed upon a pillow very near the body, and sufficiently raised to relax the pectoralis major and the corresponding integuments.

During the day the patient complained of a slight pain in the thorax and a numbness in the arm; but they were both dissipated the next day. On the third day the ban-

dage and the compresses were removed, and the lint sprinkled with the decoction of guimauve; new compresses, moistened with the same liquor, were applied, the whole being sustained by a bandage round the body fastened to a scapulary. On the fourth day there was a serous oozing, the precursor of suppuration; the exterior lint was removed and replaced by a fresh application; the compresses were changed and sprinkled with water of guimauve. The seventh day, the lint was totally detached by the suppuration; the wound, when exposed, found to be in a good state; slips of cerate were placed round the edges of the wound, lint laid upon the middle, and the same dressing on the following days. On the fifteenth there was a bilious disposition; the suppuration became glairous; the sixteenth, an emetic was given in a large portion of water; the nineteenth the symptoms disappeared; disorgement of the edges of the wound; an evident progress towards cicatrization. On the thirtieth, the diameter of the wound contracted to three fourths; the thirty-sixth, a new bilious disposition; aspect of the wound again become sanious; emetic again administered in a large portion of water; a sensible alteration for the better on the third day; the forty-fifth the wound almost completely consolidated; the fiftieth day an eruption of reddish pustules in the environs; ptisan of dock and fumitory prescribed; the sixtieth an issue made in the right arm; the sixty-seventh the patient dismissed perfectly cured.

REMARKS.

Although the preceding case exhibits only the frequently repeated details of an operation for ordinary cancer, it has been deemed useful to publish it, in order to give on this point a view of the practice of Desault. Let us resume some of these details.

The direction of the incision, necessary to expose the gland, varies according to each practitioner. Some make it perpendicular, others transverse. In general the figure of the tumour to be extirpated should determine; but whenever it can be done, let the second direction be given to it. The cicatrix will be more speedy, because the skin, being more extensible above and below than upon the ribs and especially towards the sternum, will yield there with less difficulty; besides, there will be no apprehension from the contractions of the pectoralis major, which, when they act perpendicularly on the lips of the wound, have a tendency to separate them. These advantages compensate sufficiently for that which authors attribute to lateral incisions, of giving an easier vent by the inferior angle. In this incision as much skin as possible should be preserved, by causing it to be drawn upwards or downwards, before it is cut, according to the place where it is sound, as in the preceding case. Do not let the edge of the knife, carried perpendicularly, cut *en dédolant*;* the dressings will be the more painful.

The skin being cut below, the gland must first be detached on that side, before the superior incision is made, as some advise; then proceed in the dissection by large strokes of the knife; the operation is more speedy, and not less sure; because, if some engorged spot remains, it may be taken away after the tumour has been removed. If some considerable arterial branch is divided, stop the dissection and secure it immediately. It is a bad method to make a compression on it with the finger of an assistant until the end of the operation, and then to

* *En dédolant* (Fr.), when the incision instead of being perpendicular, runs under the skin—the incision of the skin not being parallel with that of the cellular membrane.

tie it. The contact of the air, the spasm of the part, the retraction of the vessels into the flesh, may prevent the flowing of the blood, the only index of the presence of a vessel, which, after the dressing and when fever supervenes, furnishes an hemorrhage troublesome and even dangerous.

The inferior part of the gland being separated, proceed to the dissection of the superior; the use of hooks and forceps is recommended to fix it, but in all cases the fingers are sufficient. Less pain results to the patient and more ease to the surgeon, who should always simplify his processes.

If there are glands under the axilla, as in the preceding case, it is an essential precaution to tie, before it is cut, the pedicle that sustains it on the side of the axillary artery, especially if the gland is very near. Without that, the ligature would perhaps be impossible on account of the depth of the parts, and the hemorrhage would be the more dangerous, as the artery, that goes to the gland, being more dilated than usual, would furnish a greater quantity of blood.

Every thing being taken away, examine the surface of the wound carefully; remove all the engorged portions that remain, and then proceed to the dressing. In general it is useless to tighten the dressing much, as the ancients used to do and as is still done. The ligature of the vessels, made as has been indicated, removes all apprehension. Compression bruises the parts, hastens the suppuration, renders it more abundant, and in general always retards the cicatrization of the wound. The removal of the first dressing was formerly very painful, because all the lint, being detached in this first dressing, stretched the parts to which it still adhered by its internal layer, and even renewed the hemorrhage of the small vessels. If to avoid this inconvenience, a longer delay

was made, the fetidity of the suppuration incommoded the patient very much. The method of dressing, described above, more simple and commodious, is free from this double disadvantage. By removing successively and by layers the lint of the first dressing, and replacing every day with fresh, what has been detached, no pain is to be apprehended by the patient; the removal of the dressing is made insensibly, and the time of irritation is passed when the last layer is taken away. This observation is applicable to all operations, where large wounds are necessary.

Further details of the operation and dressing are omitted, as, being described in many works, they need not to be mentioned here.

SECTION FOURTH.

DISEASES OF THE ABDOMEN.

Memoir upon the Umbilical Hernia of Children.

§ I. *General Reflections.*

1. **T**O create new operative methods is often to add more to one's own fame, than to the progress of surgery; to revive ancient modes is, on the contrary, to do little for self and much for the art. Too frequently a process has no other defect in the eyes of a celebrated practitioner, than that of having been employed by another. From thence the great number of discoveries, which are born and die every day in our art—that kind of surgical fashion, which, sweeping over all our methods of cure, sacrifices almost indifferently the good as well as the bad to novelty. From thence that multitude of operative processes, which practitioners suffer to languish in unjust oblivion. Thus continual extension in fractures, ligature of umbilical herniæ, and the gorget of Marchettis for the fistula in ano, remained condemned to forgetfulness, until Desault snatched them from it. On the first point his doctrine has been already made known; it will now be exhibited with regard to the second.

2. The umbilicus, which is a kind of cicatrix, formed at the time of the falling of the umbilical cord, by the contraction of the parts with which it was united, attains

but gradually the degree of solidity remarked in the adult. For a long time more feeble than the other parietes of the abdomen, it opposes only a slight resistance to the viscera of this cavity; but this resistance increases with age, and then being provided with a strength superior to that of the surrounding parts, it forms a more impenetrable barrier to the viscera that have a tendency to escape through it.

3. From these anatomical facts flow the following pathological consequences, which are confirmed by experience: 1st. That infancy, more than other periods, is subject to umbilical herniæ, properly so called, and in which the parts escape through the umbilicus. 2d. That other periods, more than infancy, are liable to false umbilical herniæ, or to those which originate in the neighbourhood of the umbilical hole.

4. The first species of herniæ, that of infants, will alone fix our attention; because to it alone belongs, as will be seen, both the radical cure and the method of obtaining it by ligature.

§ II. *Of the causes and the differences of the Umbilical Herniæ of Children.*

5. The umbilical hernia, formed sometimes in the fœtus by a cause which it would be difficult to determine, manifests itself at other times at the very moment of parturition, and then, as Sabatier remarks, being comprised by mistake in the ligature of the cord, it would occasion the death of the individual; but most frequently it does not appear until the second, third or fourth month, and the number of cases recorded by Desault, proves that of ten individuals attacked with this disease, nine were affected at this period.

6. The umbilicus, as yet dilated, then begins gradually to concentrate within itself, in order to close the

ecatrix, which, as has been said (2), in adult age, presents an obstacle to the viscera of the abdomen; an obstacle that will soon be sufficient, when nothing opposes its formation. But the repeated cries of the infant, impressing on these viscera a motion from within outwards, carry them towards the opening. They push it before them, first distending it considerably in front, and thus prevent its contraction. Their continued action dilating it gradually, the intestines are introduced into it, increase its natural dilatation, overcome the peritoneum, pushing it before them, and then a tumour arises, at first hardly sensible, then more considerable, and at length acquiring the size of an egg or of a large nut, and presenting all the characteristic symptoms of herniæ.

7. The presence of the intestine and of the omentum in this tumour kept the umbilicus open, and opposed the continual tendency which it has to contract; a tendency which, however, sometimes superior to the resistance of the parts escaped, forces them to return into the abdomen, obliterates the opening which offered them a passage, closes it up, consolidates it, and thus performs spontaneous cures of the umbilical herniæ of children.

CASE I.

Marie Delcroix, aged two years, was brought to Desault for his advice, as to a tumour of the nature of that now under consideration, arising some months after birth, in consequence of the exertions made by the child in an obstinate hooping-cough; the tumour, of the size of a large nut, retreated when pressed by the finger, and soon returned on the least effort of the abdominal muscles. Until then nothing had been attempted. Desault proposed the ligature; but the parents, not being

willing, carried back their child, leaving the care of its cure to nature. The year following the same child was brought for advice, for a scald head, with which it was afflicted. The umbilicus was then examined and found without any hernial tumour. The finger, being introduced into the opening, perceived there a contraction, which opposed the impulse of the parts. The parents stated that having neglected all external application, the tumour had gradually diminished of its own accord, and that for some months they had not perceived any trace of it.

CASE II.

Jacques Oison, aged five years, had an umbilical hernia from his birth. Desault, being called to him, proposed to his parents the radical cure by ligature, according to the process which will be described hereafter. They consented; but, the evening before the operation, all the symptoms of small-pox appearing on him, it was delayed. The disease was attended with no peculiarity, passed through the usual periods, and when the child was perfectly recovered, Desault, being again consulted, examined the umbilicus; the tumour still subsisted, but was smaller than at the first examination. He remarked besides, by introducing his finger into the opening after the parts had been returned, that it was contracted one half. Struck with this phenomenon, he conceived that nature alone might obliterate this opening, and therefore advised that the child should be left without any remedy. At the end of two months the opening, being again examined, was found to be more contracted and the tumour less bulky. It finally disappeared at the end of the eighth month, at which period no impulse could be felt.

8. But matters do not always progress as in the two

preceding cases. Nature, not fertile in these kinds of spontaneous cures, when the tumour is abandoned to her, not only does not procure the radical cure, but gradually renders it impossible. Indeed, with age, the tendency of the ring to contract is effaced and disappears insensibly. In the adult it is nothing, and then it is not the presence of the intestines in the opening that prevents its obliteration; it is the disposition of its parietes, which no longer allows the hope that they will ever approximate.

9. From these principles it is easy to perceive the differences which essentially distinguish the nature of the umbilical herniæ of children from that of adults; differences drawn principally from the tendency which the ring has to contract. From thence the facility of a radical cure at the former period, and the almost impossibility of this cure in adults. With the one it is sufficient to prevent the presence of the intestines in the opening, which becomes effaced of itself; with the other it always subsists, whether it is passed by the viscera or not. From thence again the error of the consequences, drawn by certain authors, from the umbilical hernia of the first, for those of the second, under the view of treatment. From thence, finally, the necessity of early supplying in those the insufficiency of the means of nature, by the resources of art. Celsus employed the ligature only in those who were from seven to fourteen years old.

§ III. *Of the different Methods of Treatment.*

10. We may arrange under three classes the means employed to obtain the cure of the exomphali of infants: 1st, external medical applications; 2d, compression; 3d, ligature. What can be said of the first method, so much recommended by certain authors? It is sufficient

to ascertain the mechanism of the hernia and the cause that keeps it up, to perceive its insufficiency and even danger. For whilst time is wasted in useless methods, the parts lose their tendency to contract, and the cure becomes impossible, when the means, indicated to obtain it, are employed. Let us then limit ourselves to the examination of compression and ligature, the only processes that can be rationally applied.

Parallel of Ligature and of Compression.

11. The one, which is due to the ancients, is lost in the night of medical history; the other, more modern, has succeeded it in practice, and seems for a long time to have effaced the remembrance of it. The first, differently performed by different authors, appears to have been adopted by the Greek physicians, from whom without doubt Celsus acquired it. The Arabians borrowed it from him, made general use of it, obtained marked success, and transmitted it to the Arabists, from whose works it was copied by the writers, who, after the revival of letters, described it without much practising it. It then sunk gradually into oblivion, and although successfully performed by Saviard in the last century, it was at length universally proscribed, and under the pretext of the pains which it occasions, and of the uncertainty with which it is attended, banished amidst the thousand and one operative processes, the ephemeral fruits conceived by imagination and crushed by experience.

12. In proportion as the ligature fell into disuse, the modes of compression, already employed by some physicians, came into notice; the forms of bandages were multiplied, and practitioners seduced by the mildness of the process, and by some examples of success happily obtained, seem at the present day to remove as far

as possible from the beaten track of the ancients, in order to pursue that traced by the moderns. Let us trace these two routes alternately, and see which conducts more surely than the other to the cure.

13. Ligature and compression have one common object—to prevent the remaining of the viscera that have escaped into the umbilical opening, and thus to favour the approximation of its sides. The first, in order to attain this end, retrenches the hernial sac and the skin, which it has pushed before it, procures by the re-union of the divided parts a cicatrix, which opposes the escape of the viscera; whilst the sides of the opening, obeying, on the one hand, their natural tendency, and solicited, on the other, by the irritation which they have experienced, contract, approximate, unite, obliterate the ring, and thus replace the cicatrix, which is nothing more than an auxiliary to prevent new displacements. The second replaces, by a body applied externally, that portion of the sides of the abdomen which is wanting at the opening, endeavours thereby to prevent the issue of the intestines, and to hinder any thing from opposing the contraction of the opening: from whence it may be perceived that the process of each is founded upon a different basis. Reason and experience prove that the results differ also.

14. No pain can be attributed to compression; but an inconvenience, troublesome to the child, accompanies it during the long space of time for which its use is necessary. The ligature is painful for the moment, but no difficulty attends it afterwards; it does in a few days that, which compression, when successful, takes several months to perform. The one demands constant attention, and if this is once remitted, the effect previously obtained is of no value; the other, independent of the cries of the child, and of the cares of those around it,

always attains its end with certainty. The first, incessantly compressing the sides of the opening, destroys its elasticity and opposes its contraction, in this point of view. The second, adding an artificial irritation to the natural elasticity of the umbilicus, hastens and expedites the contraction. When recourse is had to compression, it must be exercised either by the fold of a bandage applied upon the opening and which does not penetrate into it, or by a round and oval body, such as a ball of wax, a nutmeg, &c. adapted to the form of that opening, and which should be constantly lodged there, as Platner and Richter recommend in the treatise on herniæ. But in the first case, if the bandage is applied accurately, the skin and the sac, being pushed back into the umbilicus, prevents its obliteration, and perform, from without inwards, what the intestines when escaped operated from within outwards. In the second case, the body being sunk into and kept in the opening, produces, whatever Richter may say, the same inconveniences, and in a more sensible manner the same results. On the contrary, if the ligature is employed, the sac and the skin which covers it are removed; the opening remains free, and nothing can prevent its obliteration. In this the portions of omentum cannot, when it is applied, push outwards; in the other, when the means of compression are not exact, the parts slip above or below, and the disease subsists along side of the remedy, which has now become useless. Both of them, supposing that compression was successful, procure the contraction of the umbilicus; but the latter is limited to procuring the contraction, while the former adds to it the adhesion of the edges of the opening, either with each other or with the neighbouring parts; an adhesion that results from the inflammation of those parts, and from which arises a degree of solidity that would be

sought in vain, as the consequence of any other curative method.

15. To this parallel, dictated by reason, may be added that which is traced by experience. On the one hand we will behold compression rarely successful, and the children, on whom it is employed, suffering with difficulty, for years, its disadvantages and inconveniences. On the other hand, the ligature employed at the Hotel Dieu, will present to us an uninterrupted series of undoubted cures, which amount to more than fifty, in the cases of Desault. Every week in the latter years of his practice we beheld many persons coming to his public consultation with their children, on whom he operated immediately and without preparation, who were then carried back to return the next and the following days, in order to be dressed until they were perfectly cured.

16. To these considerations may be added other motives, which perhaps are not indifferent. The passing of a few days in a hospital is sufficient, with poor people, to assure the cure of their children by the use of the ligature. But, with compression, they are detained at an expense, which is often repeated, because the bandage rots and wears out, and attentions are requisite which the loss of their time makes hard to be borne by them.

17. We may conclude, from this comparison between ligature and compression, that, as to the choice of means, the ancient practice had made a progress, which the moderns have passed over in a retrograde direction; that the first has always a decided advantage over the second process, and that it merits the preference in the eyes of those who know how to appreciate it.

§ IV. *Of the different modes of making the Ligature.*

18. The manner of proceeding with the ligature varied among the ancients; but the processes, which they have transmitted to us, may be reduced to two. The one consisted in reducing the parts, and then tying the integuments and the sac, without opening the latter; in the other, the sac was divided either before or after the ligature, in order to ascertain that no intestinal portion could be or was strangulated by the thread. Celsus adopted the first method. Paul of Egina advocated the second, and had, as imitators, the whole class of Arabian physicians, and of their copyists the Arabists. Avicenna, Albucasis, Guy de Chauliac, furnish us with the proof in their works.

19. Experience easily decides the choice of these two methods of operating. The one, which is less painful, is always as certain; for the smallest skill is sufficient, by making the opposite sides of the sac slide upon each other, to ascertain the presence of an intestine, which may still be there. The other, unnecessarily cruel, adds to the pain, without adding any thing to the certainty of the process; the latter has also been generally adopted, and Paré, who described it, does not even mention the first. But here there are new variations in the manner of operating: some simply tying the base of the tumour; others surrounding this base with one or two needles, armed with threads, which are intended to secure the ligature better, and even making, in this view, circular incisions, where the threads were fixed. It is especially in the Arabian practice that this cruel and superfluous process is found; since the ligature is never known to fail when applied with accuracy. Paré also describes it; but Saviard, the only modern physician who has practised the operation under consideration, rejected it, fol-

lowing the precept laid down long before by Celsus. Sabatier, in his skilful work upon operations, seems to advise either indifferently, abstracting, however, the circular incisions. The process of Desault, nearly conformable to that of Saviard, was simple and not painful; it was as follows.

1st. The child, upon whom the operation is to be performed, must be laid on its back, with the thighs a little bent and the head inclined upon the breast.

2d. The surgeon reduces the parts that have escaped through the opening and form the tumour, restrains them with the finger, raises up the sides of the hernial sac, and makes them slip between his fingers, to ascertain that no part remains in the sac.

3d. Certain that the parts, which he raises up, are only the skin and sac, he directs an assistant to make several circular turns round their base with a waxed linen thread, of a moderate size, fixed at each turn by a double knot and tied in such a manner as to occasion only inconsiderable pain.

4th. The tumour thus tied is enveloped in a bed of lint, sustained by one or two compresses, that are secured by circular turns, which are themselves fixed by a scapulary.

20. A slight swelling of the strangulated parts commonly appears the next day, in the same manner as a polypus swells, whose base is tied. No pain accompanies this swelling, which is often hardly sensible, as may be seen in the first of the cases of this operation, collected in the *Surgical Journal*. The next day after, or the third day, the parts wither and then the ligature becomes relaxed; a new one must be placed in the same manner as the first and with the precaution of making it a little tighter. The sensibility of the parts, increased by the inflammation which the constriction of the thread had

already produced there, commonly renders this second ligature more painful: the dressing to be the same as for the operation. In a little time the tumour becomes dull, livid and withers. A third ligature, applied in the same manner as the others, intercepts its circulation entirely. It becomes black, decays and commonly falls on the eighth or tenth day. A small ulcer results, which, being methodically dressed with dry lint, heals in a little while, and leave the umbilicus so resistant, that coughing and the exertions made by the abdominal muscles do not occasion any impulse.

21. It is useful, during the first two or three months succeeding the operation, to make the child wear a circular bandage, so as more efficaciously to prevent the viscera, when pushed against the cicatrix, from deranging the work of nature, who is occupied during that time with gradually contracting the umbilical opening.

22. A number of cases might here be accumulated, in which experience would confirm the doctrine that has been established; but many of them have been already collected in the *Surgical Journal*. It would be useless to prolong this memoir by adding still more. It will be sufficient to know, that since they have been published, Desault has performed a number of operations of this kind with equal success; that every week several children were brought by their mothers to the amphitheatre, where he gave his public lectures; that there the ligature was applied before all his pupils; that the child then returned with its parents and was brought back every succeeding day to be dressed until completely cured.

23. But, says Sabatier. in citing the article of the journal in which Desault treats of these diseases, it may be doubted if these children were delivered from their herniæ, which might return some time afterwards. A

number of facts removes this doubt; many were brought to the public consultation of Desault, long after their operation, for diseases foreign from this, and were examined by the numerous pupils who assisted there, who all ascertained the complete obliteration of the ring, and a deficiency of impulse from the abdominal viscera, in the action of coughing, sneezing, &c. There are other children, known by most of the surgeons of the Hotel Dieu, who were perfectly cured of their umbilical hernia by the operation, which Desault has revived. Two young persons, who were operated on four years ago, are, to my knowledge, perfectly re-established and experience no return of their tumour.

24. The success of this operation, which is almost certain in young children, seems to become less assured in proportion as they grow older. The following cases will serve, not to prove it (for a general principle cannot be established upon so few facts), but to give room to suspect it.

CASE III.

Marie Riget, aged eighteen months, was brought to Desault's clinical lecture, to be operated upon for an umbilical hernia, by ligature, which was done in the usual manner. On the seventh day the tumour fell, and on the seventeenth the ulcer was cicatrized. Six months after, this child being brought back to the amphitheatre, was seen by all the pupils without any trace of her disease.

CASE IV.

Jean Niclos, aged four years, was operated upon in the same manner; the tumour fell on the eighth day, and the ulcer was healed on the twentieth. Being brought back to the consultation, two months afterwards, it was perceived, that, notwithstanding the precaution of a

bandage having been worn, there was an impulse of the viscera against the opening, which was not yet entirely closed. It was completely so however in the sixth month, when Desault had occasion to see him again.

CASE V.

Jeanne D'Arcet, aged nine years, was brought from one of the provinces for a congenital umbilical hernia. Desault being called to her, proposed the operation, which he had never yet performed at such an advanced age; it was done with success and the cicatrix closed quickly; but two months after the parents told Desault that the tumour had re-appeared. He advised the application of a bandage, which did not prevent the umbilical hernia from being as large six months after as it was before.

25. This last case seems contrary to that of Celsus, who either operated on or saw children operated on until fourteen years of age. It is a consequence of the principle established above, that the tendency of the ring to contract diminishes as age advances. Desault became convinced of this truth, which he seemed to doubt, when he says in his journal, that perhaps the ligature would succeed in adults. In the three preceding cases, it will be perceived that success followed exactly the ratio of age; it was complete at eighteen months, difficult to obtain at four years, and impossible at nine. Several other examples of operations, performed too late, have exhibited the same results.

OBSERVATIONS AND REFLECTIONS
UPON THE
Treatment of Strangulated Herniæ.

ARTICLE I.

Of the means to be employed before the operation.

1. **T**HE operation for herniæ is, like all others, an extreme resource, in which the art of waiting must precede that of acting, and which must not be embraced until all the means of avoiding it have been exhausted. These means are numerous to the man who wishes to know all that has been written upon every point of surgery. To the judicious practitioner they may be reduced to a small number; amongst them may be remarked the taxis, sanctioned by the practice of all ages and by the custom of all practitioners. If a patient is attacked with strangulated hernia, the first care is to make attempts for reduction, to endeavour to overcome the obstacle that opposes the return of the intestine, to exercise pressure upon the tumour in different directions. The other means are only employed subsequently. Let us examine this practice by the light of experience and of reason. The strangulation of herniæ is of two kinds, from choking and by inflammation. The taxis must be considered differently, according to each kind.

§ I. *Of the Taxis and of its inconveniences in Strangulation from Inflammation.*

2. Should the taxis be attempted in strangulated herniæ with inflammation? Desault has not attempted to answer this question, except in an indirect manner, by collecting in his Surgical Journal many cases in which a cure was obtained, without any effort of reduction, by the simple use of relaxing means. As he observes, it was not yet the moment to oppose openly a prejudice, that was almost generally received. But now, his doctrine, supported by many facts, may be publicly stated, such as he had for a long time delivered it.

3. The taxis, in strangulated herniæ with inflammation, may be considered at two periods. 1st. At the instant of the strangulation: 2d. After the employment, more or less continued, of other means. Must we attempt it at the first period, and act as practitioners commonly do, whose first care, when called to these kinds of cases, is to attempt the reduction? Always abstain from this practice; for the strangulation must either be inconsiderable or it must offer much resistance. In the former case, the bath, position and emollient applications will always be sufficient to make the intestine return, from the relaxation which is effected by them. Without doubt in some cases a more speedy result would be obtained by the taxis; but, along side of all these cases, place those, in which the attempt, though slight, would increase the inflammation and the swelling of the parts, would add to the degree of the strangulation, and under this view would be not only useless, but even very pernicious, by preventing the effect of relaxing means employed after them; and it will be seen if the probability of some success can compensate the certainty of a frequent reverse. It may be said that most herniæ do not become irredu-

cible, but from the attempts made to reduce them; and without these inconsiderate attempts most commonly they would return almost spontaneously, in the case under consideration, that is to say, in that where the strangulation is inconsiderable.

4. But if the resistance is great, a case wherein it has been falsely supposed that the taxis promises success only from making great exertions, much more real dangers are to be apprehended from making these attempts. The vessels of the membranous parts, included in the hernia, being more distended than usual by the fluids which inflammation has attracted there, render these parts more susceptible of contusion and ecchymosis—their contusion is then the almost inevitable consequence of strong pressure exercised upon the tumour. From thence arise affections, which are equally to be dreaded, whether the reduction is accomplished or not.

5. If the intestine cannot be reduced by these multiplied efforts, as most frequently happens, the operation remains as the only and last resource; but its success must seldom be expected, after these attempts have been made. Daily experience proves it at the Hotel Dieu, where, by placing the patients, operated upon in one year, on two lists; the one devoted to those in whom no attempt at reduction has been made, the other to those in whom it has been tried, the success of the second will be found to bear a manifest disproportion to that of the first.

6. Desault was accustomed to cite, every year, in his lectures, many cases in support of this doctrine. Only one will now be related, which is very striking.

CASE I.

A man well known in the republic of letters, was attacked with strangulation of a hernia, which he had

from his birth. Different practitioners, who were instantly called, made, one after the other, successive and great attempts to perform the reduction of the parts. Desault, who was consulted in the evening, found from the buckled form of the tumour that it could not be reduced; he proposed the operation, which was performed immediately, with a well grounded apprehension of the affections that might ensue from the attempts at reduction. If ever an operation ought to have succeeded, without doubt this should have done so. The strangulation had not subsisted more than fifteen hours—the patient was strong and vigorous—every thing was in his favour; but the incision of the sac exhibited a gangrenous state of the parts, which had become black and livid. However, the intestines were reduced, because that aspect might arise from their contusion and not from their mortification. The patient appeared to be better for six hours, but afterwards the affection increased and he died on the third day.

7. Different other examples, added to this, might furnish the same inductions. However early the operation may performed, and however suitable the state of the patient may be, it rarely succeeds after these imprudent attempts. Thus Desault founded his diagnosis principally upon this circumstance, and he seldom found it to fail. Always encourage hope, he said, in a hernia, which has not been touched before the operation.

He has obtained complete success at the end of the fourth and even the fifth day of the strangulation; whilst, in contrary cases, he has almost constantly experienced, especially when the attempts had been considerable, the unfavourable result exhibited in the preceding case.

8. It follows from thence that the taxis, when it does not succeed in reducing the parts, has always a more or less unfavourable influence on the subsequent operation.

Now the most common case, no doubt, is that, in which in fact the reduction is not accomplished, especially if the obstacle is considerable. Supposing, however, that it does succeed, must it then follow that the patient has escaped the unfavourable consequences of the taxis? The parts, which have been reduced by strong compression, become irritated and inflamed in the abdominal cavity; they also become gangrenous and give rise to effusions. Being affected with contusion and ecchymosis they lose the elasticity necessary to the progress of matters in the intestinal tube; there takes place, in like manner as during the strangulation, a retention of these matters, which cannot reach the anus; hiccup and stercorous vomitings continue, the pulse becomes more feeble and the patient perishes in a few days.

CASE II.

Some time before his death Desault was called to see a man, who had been affected for two days with an inflammatory strangulation of an inguinal hernia, which he had had for seven years: no attempt at reduction had been made. A bath was prescribed and then the tumour was covered with an emollient cataplasm. In the evening, there being no apparent alteration for the better and the belly even beginning to swell, Desault proposed the operation; it was not agreed to, until some physicians were previously called in consultation, who wished first to attempt the reduction of the parts. Two of them made fruitless exertions; but the third, by pushing in every direction, at length overcame the resistance and the reduction was accomplished. Already they began to congratulate; but Desault prognosticated an unfavourable issue as the result of the contusion of the parts. In fact the vomitings subsisted; the intestinal canal did not again become free; death supervened on the third day,

and the opening of the body shewed the ilium strongly distended by wind and fæces; it was livid and blackish at the place of the contraction.

9. In strangulated herniæ, as in the introduction of tubes in strictures of the urethra, must all preliminary resources be exhausted before recourse is had to the last means? Must all those who are consulted, as it may be said, make an attempt upon the tumour? If they are numerous, is it possible that it will not be bruised and lacerated; especially if, as often happens, each one is emulous, by force of pressure, to obtain what the preceding one could not.

10. From what has been said (4, 9), it results, that when the strangulation, offering much resistance, requires great efforts in the taxis, it is always dangerous to make those efforts, whose consequences are equally unfavourable, whether the reduction is obtained by them, or whether it is not, as most frequently happens. But, on the other hand, we have seen (3), that if the stricture is inconsiderable, the taxis would be useless; therefore, it may be established as a general principle, that at the first moments of the strangulation, we must always abstain from it, and limit ourselves to the use of relaxing means. No doubt, by obeying this precept, some herniæ, which would have been successfully reduced, will require a more uncertain treatment. But what is this inconvenience, compared with those that have been traced?

11. If the taxis should always be proscribed in the commencement of strangulation, it is not the same case, when by the use of relaxing means the tumour has been softened, and even partly returned. Then finish gently what the treatment has already almost accomplished. The smallest effort is sufficient; it will be necessary to stop, if too much resistance is offered, if the tumour

continues to exhibit the same hardness and the same gloss; recommence the use of the former methods, or have recourse to the operation, according to circumstances. Desault never employed the taxis, except in this manner. He forced less than assisted the reduction. If we may so express it, the relaxing means must have already removed the strangulation, and almost restored the hernia to its usual state, before any attempt is made. Finally, this will become more clear in the following paragraphs, in which will be stated the method of treating herniæ, strangulated by inflammation.

§ II. *Of the means proper to supply the Taxis in cases of Strangulation by Inflammation.*

12. It is not my object to review here all the numerous means added to the taxis, to assist the reduction. They belong to the man of erudition, and do not come under the province of the practitioner. In the following cases we shall trace only those that were employed by Desault.

CASE III. *By Boulet.*

Pierre Morlaix, aged sixty-six years, had from birth an omental hernia on the right side. An improper bandage, applied above it, was of no service in restraining it; and it had not been reduced for twenty years. On the 30th of September, 1790, in attempting to raise a burthen, he experienced a sharp pain about the ring. A noise like that of parts tearing asunder, and a rumbling of the intestines were heard at the same instant. The tumour was doubled in size; vomitings came on, continued during the night, and increased the next morning, when the patient was brought to the Hotel Dieu.

The belly was tense and painful; a bulky tumour extended from the ring to the inferior part of the scro-

tum, the skin of which was red, smooth and shining. The omentum above and a fold of the intestine below, easily perceived by the fingers, composed this tumour.

The patient was put into the bath as soon as he arrived; he did not support it but three quarters of an hour, and at first felt a little relief from it. However, the vomiting ceased soon after. He had not drunk for some time. He was laid horizontally in his bed, with the head a little raised, and the thighs slightly bent upon the pelvis, and sustained by a pillow under the hams.

An injection was administered—it brought away the hard fæces, contained in the large intestines. The tumour was covered with a large cataplasm, and a light decoction of dog's tooth was prescribed for drink, to be given by spoonfuls, in order to avoid vomiting, and to beedulcorated with a little of the syrup of guimauve. The nausea occurred more seldom; but the hiccup was as frequent and as intense.

In the evening, less tension and pain were remarked in the tumour; the hiccup did not occur so often; a fresh bath was prescribed and renewed the next morning. In the interval a cataplasm was applied upon the tumour, and an injection was given; an abundant evacuation resulted, and the tumour was sensibly softened. The patient was again put in the bath.

The size of the omental mass diminished a little; but it still formed a considerable button before the ring, which opposed its return into the abdomen. The cataplasms being continued for four days, softened it still a little, and at length the reduction of this part was made with ease. The patient, who until then had no stools but by the assistance of injections, had three copious and spontaneous discharges the night following. The inguinal ring, which was very much dilated, on the

least motion, suffered a portion of the omentum to escape, which it was the more difficult to retain, after it was reduced, from the patient being tormented with a violent cough. However, the retention of the hernia was accomplished by a horizontal position, and by means of graduated compresses, secured by the spica bandage, until a more suitable one could be applied. The cough soon ceased, and this man left the Hotel Dieu on the twelfth day after his admission.

CASE IV. *By Hernu.*

Marianne Bée, aged forty-two years, felt suddenly a severe pain at the top of the thigh, on attempting to raise a burthen—a hernial tumour, which she had had for five years, under the crural arch, immediately became larger; nausea, and soon after hiccup supervened, continued four days, ceased one night, and soon returned. The patient then came to consult Desault, who advised her to remain at the Hotel Dieu; but she refused, and returned home on horseback. The symptoms increasing the next morning, she came back to the Hotel Dieu. On her arrival, she was placed horizontally in a bath, and remained there for two hours, when the symptoms had already abated. The tumour was then covered with emollient cataplasms, and a simple injection was given, which procured a slight evacuation. The night was passed in tranquillity.

The next day the bath was repeated twice, and the symptoms disappeared almost entirely. Still the injections did not yet evacuate any thing but the fæces contained in the large intestines. On the fourth day, there was a fresh bath, accompanied with an injection, which produced a large bilious evacuation, and a manifest diminution of the tumour. The use of the cataplasms, continued some days more, soon made it disappear,

excepting a small portion, which was retained by its adhesions to the crural arch.

13. It may be perceived that in the preceding cases relaxing means composed almost the whole apparatus of reduction. The baths especially, are attended with striking advantages. As soon as a patient arrived at the Hotel Dieu with a strangulated hernia, the first care was to place him in the bath for as long a time as he could bear it. Some hours after it was repeated, and so on two or three times every day. Frequently, on coming out of the water, the hernia returned, particularly if a kind of syncope resulted. In general, the success depends much upon the position of the patient in the bath; he should be there as in his bed, laid in such a manner, as that every part should be relaxed; a cloth in the bathing tub stretched horizontally, and fixed at its sides, so that it should not touch the bottom, serves to fulfil this indication. The smallest confinement of the muscles would counterbalance the advantage of this method, the effects of which are sometimes surprizing.

14. In the intervals of the bath, the use of cataplasms may to a certain degree, supply its place. Let the tumour be constantly kept moist by them. In general, the best are those which are made with water of guimauve and crumbs of bread, that of all substances, like the flour of flaxseed, which is much dearer, have the property of imbibing a large quantity of water, and of retaining it for a long time.

15. Injections, which are a kind of internal bath, and more advantageous from being directly applied, must also hold a distinguished rank in the treatment of herniæ strangulated by inflammation. Besides the relaxation which they procure, they unload the large intestines of fæces, commonly very hard, which fill them, irritate

them, and add under this view to the symptoms of the strangulation.

16. When the hardness and extreme sensibility of the tumour, the tension of the belly, the hardness of the pulse, and other auxiliary symptoms indicate much inflammation, bleeding should be associated with the preceding means. Sometimes its effects are astonishing, particularly when syncope results. Then the tumour frequently disappears, as Desault has often remarked. Add to all these means the position of the patient, for which the general rules may be seen every where, and you will have a view of the most efficacious means for the reduction of hernial tumours strangulated by inflammation.

17. If the use of these means softens the tumour, and makes it partly return, then make some slight attempts, they will be sufficient to complete the reduction; but if the tumour remain hard, if it have, as it were, the form of a buckle, if the belly swell, if the hiccup and vomiting continue, if the pulse grow more feeble, then hasten to perform the operation, for all delay would be fatal.

§ III. *Of the Taxis in the strangulation from choaking.*

18. We have seen (1, 17) on the one hand, the dangers of the taxis in inflammatory strangulation, on the other the means that may be substituted for it in the reduction of the parts. Let us now examine what must be thought of this operation in the strangulation from choaking. If there is a case wherein it may be permitted, it is that without doubt, in which the tumour most frequently presents itself without evident pain or tension. However, beware then of acting like those practitioners, who knead the hernia (that is their expression) in order to reduce it. Inflammation would soon be added to the choaking, and a worse state than primitive

inflammatory strangulation would be the result. Desault has often remarked these pernicious effects of imprudent attempts: they should not excite surprise; for, during the little time that the fæces have remained in the intestinal fold, they acquire there an acrimony which irritates that fold; but, if to this irritation is added that of the taxis, especially by repeating it every day, as recommended in the Memoirs of the Academy, the effect may be easily conceived.

19. The same may be said of purgatives in general, and of Epsom salts in particular, some successful results from which have been communicated to the academy. They push more fæces into the tumour, distend it, irritate it, and oppose the reduction of the parts. The same judgment may be passed upon irritating injections; for example, those of tobacco smoke. Desault saw the most grievous inconveniences from them in a man of the place Maubert, who died two hours after the imprudent use of this remedy. Very little dependence is also to be placed upon the various positions recommended by different authors; upon that, for example, in which the patient is placed upon his elbows and knees, after the method of Winslow; or suspended with the head downwards, as proposed by Fabricius Aquapendente, Covillard, Sharp, Bell and Louis.

20. In general, Desault derived great advantage from the use of baths, or simple injections, and even from the application of emollient substances over the tumour, an application generally disapproved in the choaking, where, it is said, too much relaxation exists already; but which, however, becomes indispensable in consequence of the efforts of the taxis, in order to diminish the irritation resulting from them. The following case, extracted from the Surgical Journal, presents a view of his practice in that circumstance.

CASE V.

Chapron, a washer-woman, aged twenty-four years, came to the Hotel Dieu on the 21st of March, 1792, for a crural hernia, which had been choaked fifteen days. In the latter part of the time, the taxis and bleeding had been used without effect. The colic and nausea had increased; the vomiting and hiccup had become very urgent, and the belly tense and painful. An immersion in the bath for two hours diminished the tension of the abdomen; but the hiccup and vomiting still continued for some hours. The tumour was covered with a cataplasm, and the patient received a simple injection, which brought away nothing but hard fæces, that were found collected in the large intestines.

All the symptoms ceased, and the tumour diminished sensibly the following night. It disappeared entirely the next morning, after a second bath followed by an injection. The freedom of the bowels was immediately restored, and the woman went from the hospital on the fourth day after her admission, and the nineteenth from the first symptoms.

ARTICLE II.

OF THE OPERATION FOR HERNIA.

§ I. *Operative Process.*

21. If the means described above are insufficient, the operation for hernia remains the only resource. Desault has not added enough to this operation for it to be treated here in a methodical manner. Still the valuable operative details, peculiar to him, especially in bubonocèle, ought to be stated. The following case, recorded by Boulet, will exhibit a view of them; at the same time that it will show the success to be expected in herniæ, where the taxis has not been used.

CASE VI.

Charles Leroux had, in his childhood, an inguinal hernia of the right side, which a simple bandage of cloth, worn for some months, was sufficient to restrain, and which did not appear again until he was seventeen years old.

On the 19th of August, 1790, in making a considerable exertion, a sudden pain was felt at the ring, where there appeared an oval tumour two inches in extent; a noise, like that of tearing, was heard; nausea and soon after vomiting supervened. A surgeon, who was immediately called, bled the patient and advised him to be carried to the Hotel Dieu, and particularly that the tumour should not be compressed. He was not, however, brought to the hospital until the next morning. The pains in the groin were very severe, the vomiting frequent, and the pulse depressed. The patient was put into the bath as soon as he arrived. An injection was then given him, without any relief resulting from it. The tumour was shaved and covered with a cataplasm. A ptisan of dog's tooth, with a little syrup of guimauve, was prescribed as a drink, to be taken by spoonfuls.

In the evening the symptoms were the same, and moreover, the abdomen had become painful; the bath and cataplasm were repeated. He passed a restless night. The next morning the tumour was harder, the belly more painful, the nausea constant, the pulse small and concentrated, and the patient very much weakened; a fresh bathing did not allay the symptoms. The operation was the only remedy, and was performed in the following manner:

The surgeon made at the superior part of the tumour a transverse fold, one of the extremities of which was held by an assistant, whilst the other was stretched by

himself. He divided this fold down to its base with a single stroke of the knife, and in the direction of the tumour; then seized one of the sides of the inferior angle of the wound, causing the other to be raised up by an assistant, and thus successively elevating the portion of skin that was to be cut, he continued the incision down to the bottom of the hernia. An artery, situated near the external edge of the wound, was secured. The tumour being recent, the hernial sac appeared in view immediately. The surgeon seized the middle of it with the dissecting forceps, and divided it by layers, until he had made an opening large enough to introduce a director, upon which he cut it in its whole length and in the direction of the incision of the skin. This sac contained a fold of intestine about three inches long, which was already of a reddish brown, placed at its anterior part and on the external side of the spermatic cord.

The strangulation was formed by the ring, and it was with difficulty that a director could be introduced, which was held by an assistant, whilst the surgeon himself removed the intestine by the aid of two fingers placed behind the director. With these precautions he conducted an ordinary knife along the groove, and cut the ring upwards and outwards. An incision of about a line and a half was sufficient to remove the strangulation. The surgeon drew out a larger portion of intestine, which was perfectly sound above and below the strangulation. He then compressed it gently with the palm of his hand, making gentle motions in order to return into the abdomen a part of the matters which it contained. He then reduced it without difficulty, pushing one of its extremities towards the ring and holding the other, by the assistance of the index fingers, which acted alternately. For the dressing, he inserted into the inguinal ring the

middle of a fine piece of linen, pierced with small holes and filled with coarse lint. A pledget of lint, three long compresses, and the double T bandage, composed the rest of the dressing.

The symptoms disappeared as soon as the reduction was accomplished; four hours after the patient went to the close-stool, and the following night he had nine or ten bilious stools, abundant and very liquid. He had similar ones, and almost as frequent, the next day, and the day after. Towards the end of the second day, the dressing was moistened with an emollient decoction, which was done every day until the fifteenth. At this period, the pus being thick and small in quantity, nothing more than dry lint was used. Every thing progressed very well until the fifteenth day; the wound was then not more than an inch in extent; but at this period the edges became painful, the bottom was a little elevated, and assumed a whitish appearance. As the patient performed all his functions very well, as he had appetite, and as no faulty disposition in the primæ viæ could be suspected, it was judged that this symptom was occasioned by an irritation purely local. The quantity of food was, however, diminished a little. The wound was touched with the lapis infernalis, and dressed the next and the following days with the emollient decoction. This treatment succeeded; the cicatrix soon made new progress, and was completed forty-nine days after the operation. The young man left the hospital some days after, when the cicatrix was sufficiently solid to bear the cushion of an elastic bandage.

§ II. *Reflections upon the operative process.*

22. This case exhibits the details of the operative process in ordinary circumstances. Let us resume those details which are peculiar to Desault, passing over those

that are common to all authors. Practitioners are generally agreed as to the direction to be given to the incision of the teguments; but the manner of enlarging it, when insufficient, varies. Almost all advise the use of the director, to be slipped under the skin and cut upon; but this is adding a pain to that of the cutting instrument, from the laceration of the nervous parts which are spread over the skin; it will be better, by raising each of its edges, to stretch the inferior angle of the wound, then to prolong it at pleasure; a remark applicable to the greater number of operations. In this mode of operating, the tension of the borders must be uniform; without that, the incision would be uneven, and as it were, festooned. In general prolong it rather more than less, upwards to expose the ring fairly, downwards to avoid the cul de sac, which may be produced by the accumulation of the fæces.

23. The section of the ring supposes two things: 1st. The place where it should be made. 2d. The manner of performing it. The place of the section should be principally determined by the epigastric artery, which we should endeavour to avoid. Many practitioners think that its lesion is impossible; but the inspection of bodies, and the fact of *Bertrandi*, unite in confuting this opinion. But contradictory precepts have been given upon this point. Some, with *Heister*, *Garengeot* and *Bertrandi*, direct that the incision should be made inwards; others, with *Sharp*, *Lafaye*, &c. that it should be performed outwards; a diversity, which appears to be owing, as *Sabatier* observes, to the variable position of the artery, which is situated sometimes on one side, sometimes on the other. We must then find à rule which, in the operation, may serve us as an invariable guide, and put us out of all danger of injuring the artery, wherever it may be situated. *Desault* derived this

rule from the situation of the spermatic cord with regard to the tumour, and a number of observations made by him, and by different surgeons of the hospitals of the provinces, and of Paris, have assured him that it was never erroneous. Cut, said he, upwards and outwards, if the cord is behind the sac or on its internal side; upwards and forwards if it is found before the sac or on its external side. Now, as it almost always has the first position, the section must almost always be made in the first direction.

24. For this section, authors recommend a number of instruments, all more or less complicated, which add to the arsenal of the surgeon, without advancing the progress of surgery. The director and the knife are always sufficient. The first should have a groove deeper and more enlarged than usual, so that the second may the less easily get out of it; from thence the almost double size of the stem of the director employed by Desault. To introduce it, seek for the place of least resistance; it is not always that where the section is to be made; frequently adhesions, and the narrowness of the opening, prevent it from penetrating there; then insinuate it towards the opposite side of the sac, or even remove the intestine gently to make it penetrate above, and when you shall have succeeded, let small rotatory motions serve to conduct you to the place to be cut. This remark is essential. The surgeon, then depressing the intestinal fold with one hand, conducts with the other, the knife upon the director, which an assistant is directed to hold firmly. A small extension is sufficient for the incision in order to reduce the parts; a line or two is sufficient. Besides, it is better to incur the risk of returning to it a second time, because the patients remain the more exposed to hernia, in proportion as the opening is larger.

25. The obstacle being removed, the reduction is performed by the means generally known; when it is finished, employ only a simple superficial dressing. There is no fear on account of hemorrhagy, when the vessels have been properly secured during the operation. The piece of linen, perforated with holes, which Desault made use of, has the advantage, 1st, of being better than any other for suffering the escape of the fluid matters, that proceed from the abdomen; 2d, of completely preventing the lint from penetrating into the wound, upon which it is immediately laid. A pledget of lint, two long compresses, and a spica bandage, or even a triangular one, compose the rest of the dressing.

MEMOIR
UPON
PRETERNATURAL ANI.

General Reflections.

1. **DIGESTION** is not so dependent upon the assemblage of the digestive organs, that it cannot be exercised without some of them. The stomach and intestinal canal are the seat of this function; but each of the extremities of this canal has a different influence upon it. The superior is as it were the centre and focus of it; the inferior concurs only indirectly; that is to say, it is only an excretory pipe. From thence then the degree of danger from injuries received is less in proportion as the part affected is lower down. From thence in the economy of life the possibility of preternatural ani, an extreme resource provided by nature to supply the impotence of the natural passages, in the excretion of fæces.

2. Preternatural ani are always the result of an injury of the intestine, produced sometimes by a wound penetrating into the abdomen; sometimes by an abscess of the intestinal parietes, which opens externally; sometimes methodically made by the practitioner to remedy the imperforation of the anus, as Desault, and before him Lister had occasion to do. It is often a consequence of the operation for hernia, in which the knife has been imprudently directed; but more commonly it is the effect

of a gangrene of the intestine, which is itself produced by the strangulation it has suffered, whether this gangrene has been exposed in the operation, or whether the integuments of the hernial tumour, inflamed or separated by it, have opened to give vent to the fæces.

3. Few examples of this disease are to be found among the ancients. The moderns, who have observed it more frequently, have in general mistaken the state of the parts which form the opening. The protrusion of the intestines without the abdomen would seem even to have escaped all observers, from Hippocrates, who described it, to Fabricius de Hilden, who, in the beginning of the last century, related an example of it as a thing unknown and altogether extraordinary. It is therefore essential to form precise and accurate ideas upon this point.

ARTICLE I.

OF THE PHENOMENA OF PRETERNATURAL ANI.

§ I. *Of the state of the parts in the Preternatural Anus.*

4. We have said (2) that the preternatural anus was always the result of an injury of the intestine. Now this injury may be of two kinds, with or without a loss of substance; from whence there are two different kinds of preternatural ani. The first is the effect of an abscess, of gangrene, of a contused wound, &c.; the second is produced by a cutting or puncturing wound. The one always presents a more unfavourable character, from a more considerable portion having been destroyed. The prognosis of the other is relative to the aspect under which it is exhibited. In fact, sometimes the whole circumference of the intestinal tube has been divided; sometimes it has been only partly cut and this is the most common case.

5. Whatever may be the kind of injury which the intestine has undergone (4), it here exhibits a constant phenomenon, which is the adhesion of its two divided portions to the circumference of the opening of the abdominal parietes; a salutary adhesion, which prevents the fæces from being effused into the cavity of the abdomen, essentially constitutes, under this view, a preternatural anus, and proceeds from the inflammation, which is antecedent in gangrene and subsequent in wounds. Such is the strength of this adhesion, that, I believe, authors do not give any example, where, being torn by the exertions of the patient, it has given rise to the symptoms of effusion. It results from thence that if they were entire, the parietes of the abdomen would form a supplement to the portion of the canal, which has been destroyed, and that the fæces would continue to pass, as usual, by the anus; at least, however, when the portions of the intestine which is divided and adheres to the neighbouring parts, do not form an angle sufficiently acute to arrest them in their progress.

6. This angle, formed by the two portions of the intestine at the place of their division, is not a rare disposition, as Morand remarks. It opposes to the passage of the fæces a resistance greater in proportion as it is more acute; so that if it was near a parallel, all access into the inferior portion of the canal would be prevented; whilst the fæces would partly escape on that side, if it approached to a perpendicular. It especially affects the first disposition, when a large portion of the intestinal canal has been destroyed, and when this canal has been cut across; the second is principally observed, when the section has affected only a part of its sides. It may be conceived that the difficulties of the cure are in the direct ratio of the one and the inverse of the other, and

that the projection of that kind of internal stricture is always a greater or less obstacle to it.

7. From what has been said (4, 6), an idea may easily be formed both of the disease that is under our consideration and of the causes that keep it up, namely: 1st. The orifice of the abdomen, which offers an easier and shorter vent to the *fæces*, than if they had to run through all the circumvolutions of the intestines. 2d. The obstacle produced by the angle, more or less acute, which has been spoken of (6). Thus in urinary fistulæ, the crack in the urethra and its stricture are the two causes which prevent the urine from proceeding through the ordinary passages. 3d. To these two causes another is here added; it is the habitual contraction of the inferior portion of the intestine, which has ceased to be dilated by the passage of the *fæces*; a cause which some have exaggerated by pushing it even to obliteration. In fact no observation establishes this phenomenon, but on the contrary it is contradicted by all. In other fistulæ do we see the portion of the excretory duct close below the obstacle? Never. The mucous humour, which lubricates it, is sufficient to prevent its obliteration. Here this humour is very abundant, and in the case under consideration, being partly evacuated, it forms those whitish flocks which the patient discharges. Besides, this interior portion is frequently seen to be inverted on itself and to be invaginated, as there will soon be occasion to remark; an incontestable proof of the cavity of which it is hollowed out.

Finally, in the numerous openings of patients who have died with preternatural ani, it does not appear that this obliteration has been found. Lecat did not see it in a body which was opened twelve years after the *fæces* had ceased to pass through the intestines. Desault had occasion to observe the same thing in a patient who died

at the Hotel Dieu in Paris, of an exhaustion, the effect of a preternatural anus, the orifice of which was formed by the extremity of the ilium and whose duration had been two years.

8. The state of parts which we have exhibited (4, 7), is such as is observed in ordinary cases, in those where the preternatural anus is simple and without complication. Then it forms externally only a fistulous opening more or less sensible, a state which is commonly remarked when the fæces still pass, in a great measure, through the anus. But most frequently a tumour more or less bulky appears externally. This is especially the case, when the whole of the fæces escape through the preternatural opening. This tumour is the effect of the inversion of the intestine.

9. Inversion is a frequent complication of the preternatural anus. It is performed here in the same manner as in the rectum in prolapsus ani. In general, it is the more easy, as the intestine is more free in the abdominal cavity; the more considerable, as the efforts to go to stool are greater; the more unfavourable as it is older; sometimes it is simple, but frequently double. In this last case two tumours are formed: the one, by the portion next the anus; the other by that contiguous to the stomach. The size of each varies; it has been said that the first was always larger and quicker in appearing; but there is nothing constant upon this point, and the case, which will be related, exhibits a contrary phenomenon.

10. The form of these tumours commonly represents a kind of cone strangled at its base, pierced at its summit with an orifice, through which the food escapes half digested, if it is formed by the superior portion of the intestine; a white serosity or injections thrown up the anus, if it results from the inferior portion. But this form varies remarkably; the surface is reddish, analo-

gous to the internal surface of the intestines, and strewed with membranous folds.

11. Not large at first, these tumours become so insensibly, and sometimes increase so much as to acquire more than a foot and an half in size. Their increase in length depends upon the successive inversion of a larger portion of intestine. Their increase in thickness is specially owing to the engorgement of the intestinal parietes, an engorgement which is itself produced: 1st, by the constriction, which the base of the tumour experiences; 2d, by the perpendicular position which it affects; 3d, by the irritation, which is the effect of the contact of the fæces that escape, and of external bodies, of the friction of the clothes, &c.

12. Desault has sometimes observed in these kinds of tumours a peristaltic motion exactly analogous to that of the intestines. The exquisite contractility which they possess, exposes them to stricture from the action of the smallest irritant, for example, of some drops of water poured upon them.

13. Frequently they are reducible by the least exertion; they even return spontaneously. Their engorgement, and the adhesions which they contract, produce a contrary phenomenon. In general, in similar circumstances, the portion contiguous to the stomach is more frequently susceptible of reduction than the other.

§ II. *Of the Effects of Preternatural Ani.*

14. Nature is never disturbed in her progress with impunity; although the assemblage of the organs of a function is not always absolutely necessary to that function, as has been said (1), still without this assemblage it is seldom completely exercised. This may be observed here.

15. When the intestinal canal is open in a part very near the stomach, the food, not having been submitted long enough to the action of the digestive powers, escapes half digested; a small quantity of chyle is absorbed; nourishment is only partly received; the patient sinks into emaciation and marasmus; and he sometimes perishes, as Desault has observed, and as Hoin and Leblanc relate many examples of. In these cases the fæces evacuated have very little fetor; frequently they are sour.

16. When the opening affects only the extremity of the ileum, the cæcum or the colon, the danger is much less. In this case we often behold patients performing all their functions equally well, and with the exception of some colics, to which they are habitually subject, enjoying as good health as before the accident. Then the fæces are more fetid; their issue does not so closely follow the introduction of food into the stomach, and the patient retains them a longer time.

17. In both cases they are discharged involuntarily; the orifice, having no sphincter, cannot retain them; from thence the habitual slovenliness of the environs of the fistula, a slovenliness which is only incompletely prevented by the different machines invented for that purpose; from thence the painful excoriation of the surrounding parts, and the fungosities which arise there.

18. Most commonly no stercoral evacuation is made by the anus; still from time to time the patients go to stool, to discharge a little whitish and consistent matter, which is nothing else but the mucus furnished by the intestine near the anus. In certain circumstances this mucus is discharged in greater abundance. Desault has had an opportunity of remarking it in a patient who remained for two years at the Hotel Dieu with a disease of the kind now under consideration.

19. The opening of the abdominal parietes, being frequently too much contracted, compresses the intestine, impedes the issue of the fæces, occasions pains and tenesmus, an effect which is also produced by the internal angle of the two intestinal portions (6), and by the engorgement of which we have spoken (11). Puy has twice seen this engorgement carried so far as to cause death, by completely intercepting the passage of the fæces. The strangulation, which is then observed, is analogous to that of herniæ, and the opening made with regard to the intestine the same thing as the ring or the crural arch. Lange found the intestine so gorged with blood, that he thought the patient could not be saved, unless by removing the strangulation by an incision into the abdomen. Hoin and Leblanc cite examples, in which gangrene and death have been the consequence of these strangulations, and in the memoir of Sabatier on preternatural ani, may be found the example of an invalid, who fell a victim to a similar accident.

ARTICLE II.

Of the Treatment of Preternatural Ani.

20. The symptoms of preternatural ani have long since fixed the attention of practitioners, who have generally opposed only a palliative aid; sometimes they attempted a radical cure. Let us examine both of these methods.

§ I. *Palliative Cure.*

21. The palliative cure consists: 1st, in remedying the habitual slovenliness, which is kept up by the involuntary escape of the fæces; 2d, in combating the different symptoms stated (14, 19).

22. The first indication is answered by different machines of silver or steel, variable in their form and

mechanism, according to the fancy of their authors; which machines, sometimes directly applied to the orifice of the abdomen by a bandage with a spring, receive the fæces and prevent them from being effused; sometimes form reservoirs placed more or less distant from the preternatural anus, and into which the fæces are transmitted by a pipe kept constantly in the orifice. In general the elastic gum, being more supple, less weighty, and more capable of assuming every form, is the most proper substance for these kinds of machines, which, however, seldom fulfil their intention and always subject the patients to constant and fatiguing cares.

23. The second indication relates to the different symptoms of preternatural ani. To prevent the too early issue of the aliment and consequently the emaciation of the patient (15), when the orifice is very near the stomach, Richter has proposed the ingenious idea of applying, for a certain time, on the external opening, a sponge supported by an elastic bandage; a method which Lœffler rejects, because he has seen it followed by colics, constipation, inflammation and excoriation of the skin.

24. The stricture of the orifice of the abdominal parietes (19), and the inversion of the intestine, may be opposed by placing in the orifice a plug, which may be kept there constantly, as Sabatier has proposed, and may be frequently renewed to avoid uncleanness. Others advise the use of an ivory button, to be applied upon the circumference of the fistula and kept there in some way or other; a method insufficient, because the intestine may still escape through the hole with which the button is pierced, which may then become an artificial cause of dangerous strangulation, as the pressure exercised by so hard a body cannot but be unfavourable. The first process has not this disadvantage; but we may

object to it that of preserving a part of the sour and thin matter which escapes, and with which the plug being soaked is thereby liable to excoriate the parts on which it rests; an objection already made, as has been seen, to the sponge of Richter.

25. The most efficacious mode of preventing the inversion of the intestine, of always keeping the orifice sufficiently dilated, of causing the pains to cease, of retaining the matters in the interval of the dressings, and of making them remain long enough to nourish the patient, is a bung of cloth of a size proportioned to that of the orifice, inserted to remain in this orifice, sustained by a layer of lint, by compresses and a bandage moderately tight. This process unites the double advantage of not bruising the parts and of opposing with certainty the escape of the matters. If a little fluid should still escape, being absorbed by the layer of lint, it will not produce any excoriation; a little confinement to the patient results at first from this dressing; even slight colics are sometimes the effect of it; but in a little while the parts become habituated to their new mode of existence and every thing returns to the ordinary state. We shall shortly perceive how this method, considered here as palliative, may be usefully employed for the radical cure; but as its application supposes the previous reduction of the protruded portion of the intestine, we must first examine this reduction.

26. In general it is always easy in common cases, and the rules to which it is then subject, do not differ from those for the treatment of prolapsus ani. It is not the same case, when the parietes of the intestine, engorged and thickened by one of the causes stated (11), form a considerable tumour externally. This case has always been regarded by practitioners as an invincible obstacle to the reduction. But experience had taught Desault

that it is not beyond the resources of art, and that a compression, methodically exercised for some days upon the parts escaped, would soon diminish the size, so that they may be reduced almost to their ordinary state. Thus, in the prolapsus of the rectum, the same method is soon followed by the same result. A simple bandage is always sufficient to exercise this compression. The tumour is to be carefully enveloped with spiral turns, at first slack, and the constriction to be increased gradually in proportion as the parts are reduced by the diminution of the swelling, and with the precaution of always leaving a sufficient opening for the passage of the *fæces*. The use of this method for seven or eight days, is commonly sufficient to obtain the desired effect, and in the patient, whose case will be related, the relaxation was sufficiently great on the fourth day to reduce the parts.

27. It is not only the swelling of the invaginated portion, which has appeared to practitioners to be a counter indication to its reduction. Many have supposed that the intestine escapes from the abdomen in its ordinary state, and that it is not its extremity which adheres to the wound; from thence the fear of an effusion of *fæcal* matters into the abdominal cavity, if it is the superior portion which has escaped; of mucus, if it is the inferior portion. But what has been said (5) upon the state of the parts in the preternatural anus, is a sufficient reply to this objection, and it is useless to dwell upon it.

28. Are the number and depth of the internal adhesions, which some have supposed to be constant, more serious obstacles? They are not—for, supposing the existence of these adhesions, which is not, for the most part, always real, what advantage can arise from thus leaving a portion of the intestine without? we do not see any. The issue of the *fæces* will not be less easy; on the contrary, they would be more subject to be intercepted,

and consequences more or less unfavourable would result to the patient.

29. Add to these considerations, that of the symptoms which are the frequent consequence of the invagination of the intestine in the preternatural anus, symptoms stated (19), and it will be seen that in all cases, whatever may be the size and age of the portion of escaped intestine, whatever may be the form under which it is exhibited, sound practice commands that it should be replaced in the abdomen, and retained there by the method, simple and always easy to be procured, that is indicated (25).

30. Such is in general the palliative cure of preternatural ani, which, when the intestine is reduced, demands only an assemblage of careful details, more tedious and fatiguing than difficult to the patient

§ II. *Of the Radical Cure.*

Many practitioners are not satisfied with this palliative assistance; they have attempted the radical cure, pursuing for that purpose the route which nature appeared to them to trace in many cases. Indeed, we learn from numerous cases, that the fæces have often resumed their natural route, after having passed, for several months, through the wound of the abdomen, in consequence of operations for herniæ. These cases, common in general where the injury of the intestine is not attended with a loss of substance, are not even very rare, when gangrene has destroyed a more or less considerable portion. The works of Petit, Pott, Ledran, the scientific journals, the memoirs of different societies of surgeons, furnish us with examples.

31. The attempts of practitioners, for the radical cure, form a series of methods, which, more or less insufficient, have never completely attained their object. Some

have proposed to unite without the two portions of the intestine by securing them according to the method of Rhamdor, and then reducing them, when they should have contracted a sufficient adhesion. But the invagination of the intestine, mistaken without doubt by those who proposed this method, is an evident obstacle to it. Many have perceived it, and have reduced the cases in which the radical cure is possible, to that where the intestine was in the abdomen and where only an external fistula existed; then they proposed to excoriate its edges with caustic or a cutting instrument, so that they might at length obtain the union by means of some points of adhesion. This was the project of Lecat, in a circumstance, where the intestine made a projection outwards. He wished previously to reduce it; but the most considerable efforts could not accomplish it, and the patient, who bled much, refused to suffer new attempts. The German surgery exhibits some cases, where this method was employed, and where, it is true, union was obtained, but in a little while the wound opened, the cicatrix was torn and the preternatural anus formed anew.

32. The strict diet, proposed as a method of cicatrizing the orifice, by preventing the passage of the fæces, may offer some advantage at the commencement of the formation of this opening, in consequence of the operation for hernia; here it is always uselessly inconvenient, and even dangerous to the patient.

33. The general indication presented by the radical cure for the preternatural anus, is, 1st. To reduce the intestine into the abdomen, when it has escaped by the invagination. 2d. To supply in some way the deficiency of the continuity of the abdominal parietes, so as thereby to prevent the issue of the fæces through the fistula, to force them to pass to the anus, to accustom them to that route, to give to the external opening the power of clos-

ing itself, and then its cicatrix may replace the portion of intestine which has been destroyed. 3d. To destroy the internal obstacles which may oppose the passage of the fæces towards the inferior extremity of the intestinal tube.

34. We have seen (26) the means of accomplishing the first indication, even in the most difficult case, that of the thickening of the parietes of the intestine. Experience has proved, on the other hand, that the second cannot be certainly accomplished by the points of adhesion. The best method of fulfilling it, is to place in the opening a kind of wedge, the bung of cloth which we mentioned (25) in treating of the means of preventing the inversion of the intestine; it answers here the double end of opposing this inversion and of closing the fistula exactly, of preventing the fæces from escaping, and of forcing them to take a direction towards the anus. It has been objected to this method, that it is itself an obstacle to the cure wished to be obtained by it, because its presence between the borders of the fistula prevents their approximation. But how does it first act? By accustoming the fæces to pass through their usual route. Now when this end has been accomplished, by the closing of the artificial passage, take away the bung of lint, and the fæces continuing to pass towards the anus, the orifice will close spontaneously; the wedge bung does not then concur but in a secondary manner to the cure; it is only an auxiliary mean. Its use here is to determine the course of the fæces downwards; but it cannot accomplish this if an internal obstacle exists; this obstacle must then be previously surmounted, and this is the third indication.

35. The means of satisfying this indication vary according to the nature of the obstacle. The most common is the angle formed by the two portions of the intestine

(6); it must be enlarged and made less acute, for the fæces to pass. This will be accomplished by long plugs of lint, which, being introduced and fixed in the two ends of the intestine, will gradually change their direction, by making it approach towards a single and even a right line. The same method will dilate the superior extremity of the portion of intestine corresponding to the rectum; the wind and fæcal matter may consequently be engaged there, and dilate successively the rest of the canal.

36. When the dilatation is sufficient and the internal angle almost effaced, suppress the long plugs introduced into the intestine; use only the wedge, with the precaution of not pushing it too far, for then itself would form an obstacle to the passage of the fæces. Every thing may be hoped from this method, properly employed; its good effects are announced by the rumbling of the belly, and often by slight colics. The patient first discharges some wind by the anus, and in a little while the fæces begin to pass there. If their issue is difficult or does not take place, if the colics become violent, and the intestines are loaded above, remove the wedge; search for the cause from which the obstacle proceeds, and destroy it first. In this method there is an advantage, which does not exist in the union of the edges of the fistula by adhesion; that of being able to change or continue it according to the effects which result from it, of its being in all cases incapable of doing injury, and of having at the most the inconvenience of being uselessly attempted under certain circumstances. These circumstances would principally be the following: 1st. When the intestine may have suffered a great loss of substance: 2d. When the internal angle (4) is too sharp and consequently too difficult to be altered: 3d. When one of the two portions of intestine has contracted adhesions without, and cannot

be reduced, as will be seen in an example below. The most favourable case is that of lesion, without loss of substance, and that where a simple fistulous opening exists; but how is it possibly always to distinguish this case from the former? It is of no importance; the radical cure must always be attempted.

37. Besides, it has been remarked that even supposing the palliative cure only was had in view, the use of the wedge bung is most commonly indicated to oppose the inversion of the intestine, and cause the aliment to remain long enough for the nourishment of the patient. This was in fact the only advantage which Desault at first expected in employing it; but the unlooked for success, which the patient obtained, in the case now to be related, enlarged his views by demonstrating to him the possibility of curing, at least sometimes, a disease regarded hitherto as beyond the resources of art. This case, which is one of the most important that has been published for a long time, will exhibit a view of the particular details of treatment on which we have glanced.

CASE I.

Francis Vialter, a native of Moulins, was wounded by the bursting of a bomb, in the month of May 1786, on board the ship *Saint Michel*, in which he served in the capacity of a sailor. He lost his senses, and did not recover from his swoon until three hours after the battle. His wound extended, he said, from about two inches above the inguinal ring on the right side, to the lower part of the scrotum, where the testicle was naked. In the superior angle there appeared a kind of appendix, very red, about an inch long, formed by the divided intestine, which withdrew itself into the belly, when the wound was washed. The dressing which was applied to the wound, left a hole at that place for the discharge

of the fæces. A frigate, on board of which this sailor was placed, landed him a month after his accident at the Marine hospital of Brest, where he remained until his cure, if such an appellation may be given to a state of things, which maintained without the abdomen a portion of intestine, from which the aliment half digested continually escaped.

This unfortunate man, being then discharged, as incapable of duty, travelled on foot to his native place; and soon perceiving that his friends could not afford him any assistance, and that the fatigue of travelling had considerably elongated the intestine, he visited the principal hospitals of Europe, seeking in vain for some relief to the horrors of his situation. After wandering thus for four years, he came at length to the Hotel Dieu of Paris, on the 29th of September, 1790.

The portion of intestine, having hung without so long a time, had acquired a considerable size. Its figure was nearly that of a cone, nine inches high, whose middle part made a considerable projection forwards. Its base, which was a little contracted, proceeded from below a fold of the skin, a little above the inguinal ring: its summit turned backwards, and descending to the middle of the thighs, was terminated by a very narrow orifice, through which the fæces flowed. He had not discharged any thing similar by the anus, from the moment of the wound. However, he went to stool every three or four months, to discharge a little whitish and consistent matter, which was nothing else than the mucus furnished by the portion of intestine next the anus. The whole surface of this tumour was red and wrinkled, like the internal membrane of the intestines. There were remarked, particularly in its lower part, rugosities, which seemed those valvular reduplications that are formed by the internal membrane of the intestines. On the external

side of this mass there proceeded, through the same abdominal opening, another small tumour, but similar to the first in colour and consistence: this last had an oval form; and its extremity, plaited like a purse for counters, only permitted a little serosity to escape. These tumours had a peristaltic motion similar to that of the intestines, and some drops of water were sufficient to make them retract themselves.

This unfortunate young man, who was large, strong and well made, although extremely meager, was compelled, by the violent pains which he experienced in the abdomen, to keep himself bent so that he could not walk, so to speak, except in the form of a bow between two staffs. An earthen pot, attached to his waist by a cord and hanging between the thighs, received the extremity of the intestine, and the fæces there in a little time became insupportably fetid. It was ascertained that the principal tumour was formed by the portion of the intestine, corresponding to the stomach, invaginated, if I may thus presume to express myself, and returned upon itself in such a manner as to present externally only its internal face. It was also ascertained that the small tumour was the inferior part of the same invaginated intestine, and that the borders of the section of this canal were attached to the opening of the parietes of the abdomen, and confounded and conglutinated with them by a common cicatrix.

- The afflux of the humours, that were attracted to this part, as much by its particular disposition, as by the continual irritation which was produced by the access of air, the frictions, and especially the fæcal matters there, had thickened and hardened the membranes to such a degree, that it would have been more than rash to attempt the reduction of such a mass, if experience had not afforded conviction of what might be done by com-

pression in similar circumstances. To assure himself of the efficacy of this method in this particular case, Desault compressed the tumour for some minutes by embracing it with both hands; and the diminution of size, which he obtained, presaged what might be expected from a mode of compression more exact, and kept up for a proper space of time.

For this purpose he employed a simple bandage, with which he covered the whole extent of the tumour from below upwards, by spiral turns moderately tight, leaving only at its summit the orifice necessary for the passage of the *faeces*. The effect of this method was speedy; for in the evening of the same day he was obliged to renew the bandage, which no longer made any compression.

It was renewed in the same manner on the following days in proportion as the tumour diminished, and on the fourth day the intestine was only of its natural size. Desault then judging the reduction possible, caused the tumour to be raised up perpendicularly to the opening of the abdomen, and with one finger introduced into the orifice, whilst the other hand pressed it gently to prevent the parts from protruding, he unfolded the intestine by making it return into itself, and consequently into the abdomen. He used the same means for the reduction of the small tumour, which did not then present any difficulty. In so difficult a case, it was no doubt gaining much to have delivered the patient from a tumour so embarrassing, and to have placed him out of reach of the terrible accidents which might every moment result from it. But there remained a very grievous inconvenience, which was the continual issue of the excrements. To this issue he opposed a simple stopper formed by a great bung of lint, three inches long, introduced into the intestine and supported by an inguinal bandage. Desault intended to remove this kind of wedge twice a day, to

suffer the fæces to escape; but after rumblings, accompanied with a sensation of very sharp heat, the patient discharged wind by the anus, the happy presage of what was about to pass. In a little time colics and sharp pains in the rectum supervened, which compelled the patient to go to the close-stool. It was not in vain; he discharged by the anus and without effort half a pound of very fluid fæces, similar to those that are evacuated in consequence of an indigestion. This man had also the night following, eight stools of the same nature as the first, all preceded by slight colics, wringing pains and smartings in the rectum, which was not accustomed to the presence of the excrements. The next morning the patient was languid, as is generally the case after a diarrhœa. The stools were as frequent and the smartings less on the three following days. The fæces assumed the same consistence; it increased daily, and the number of stools diminished in the same proportion. The bung of cloth, which was retained in the intestine, was suppressed on the eighth day, and the external opening was closed only by a pledget of lint, supported by compresses, on which was placed the wide and flat cushion of an elastic bandage. This method was sufficient to close the passage against the fæces, which continued to pass entirely by the rectum.

The young man soon recruited, and resumed his strength, and even a considerable *embonpoint*, although he did not eat more than one third of the food which he was accustomed to take before. During two complete months which he passed in the hospital in order to establish more firmly a cure so extraordinary, he always discharged excrements similar to those of a sound man, and never experienced the smallest inconvenience. He was often examined in the amphitheatre by the surgeons, who attended Desault's lectures, the most of whom had

him under their continual inspection from the time of his admission. They never perceived any thing else but a slight serous oozing, which moistened, without staining, a small portion of the lint placed upon the fistulous opening of the abdomen. This patient was at length dismissed from the Hotel Dieu, and travelled for five months, performing all his functions perfectly well, discharging his excrements by the usual passages, and using even violent exercise. One day that he attempted to raise a cask which he had betted he would place upon his shoulders, his bandage broke, and as he did not experience any pain, he paid little attention to this accident and finished gaining his bet; he then walked for two hours, after making a girdle of his handkerchief. The intestine then got engaged in the opening of the abdomen, which still subsisted, and protruded about six inches in the space of an hour, which this man took to reach his lodging on foot. After having himself attempted to reduce it, he called in surgeons, who also made useless attempts (this was on the 4th of March). He then set off for Paris in a cart, whose motion he could not bear, and was obliged to proceed on foot, with a vessel between his thighs to receive the fæces. The engorgement and pain compelled him to stop at all the hospitals he met in his way: at length he arrived at the Hotel Dieu of Paris, on the 31st of March. He was bled the next day, because he was in much pain and the pulse indicated plethora; the tumour was as hard, but a little less bulky than when he had presented himself the first time, six months before. As before, compression was employed and continued for six days; it is probable, however, that the reduction might have been made sooner; but it was not wished to attempt it until all their natural suppleness had been restored to the parts; they were then reduced without any exertion, and retained by

a layer of lint and thick compresses, which were supported by an elastic bandage. An uneasiness and then nausea and bilious vomitings immediately followed the replacing of the intestine. These symptoms did not alarm, and ceased at the end of two hours, after the colics, rumblings and smartings in the rectum, which precede a copious and very liquid stool. That night and the following day he had a kind of diarrhœa, which abated on the second day: the fæces then began to resume their consistence; in a little while their issue through the opening of the abdomen was interrupted; they again passed by the anus, and in a short time matters returned to their usual state.

CASE II.

There was at the Hotel Dieu, at the same time, a man who had had a preternatural anus for eleven years, in consequence of a scrotal hernia, the strangulation of which had terminated in gangrene. The portion of intestine corresponding to the stomach was also invaginated, and formed a projection or protuberance of three inches outwards; the other portion of the intestine did not appear. This patient was emaciated and feeble, although he devoured a prodigious quantity of food, because he discharged it before it was perfectly digested; and this perhaps was the reason that made him prefer food of difficult digestion and particularly salad. He was extremely pusillanimous: somewhat emboldened, however, by the discourse of the sailor, and by the cure which he beheld, he requested Desault to treat his case also. The case of this last person was very different, since a fold of the intestine, next to the portion which appeared without, had formerly fallen into the scrotum and was adhering there; a disposition the more unfavourable, as compression could not be made upon the opening in the

intestine, without compressing this fold at the same time. However, the invaginated part of the intestine was reduced, and its opening closed with a bung of cloth, secured by a truss: eighteen hours after the patient felt rumblings and some slight colics; being then alarmed, he removed the dressing and gave up the project of being cured. This attempt, slight as it was, seemed however to have produced a sensible effect. This man, who before discharged the whitish mucus of the intestine only once in four months, was obliged on that day to go twice to the close-stool, and he discharged at each time as much matter as he used to discharge when the intervals between these kinds of stools were very long. The same thing happened during eight successive days; the intervals were then one day, afterwards two, four, &c.; and at the period when this was first published, one month had elapsed since he had discharged any mucus.

38. Doubtless no inference can be drawn from this last case; but perhaps it is of importance to the progress of the art to collect all the facts which relate to a disease so little known, especially when these facts have been public, and no doubt can be entertained either of their authenticity or of their accuracy.

39. The publication of the preceding cases in 1791, animated the efforts of practitioners to illustrate the doctrine then exhibited by Desault in his journal; several experienced fortunate results; some failed of success, perhaps from the want of that combination of care and details so necessary here; perhaps from the very nature of the case presented to them. Behold what M. Noel wrote to Desault.

CASE III.

Your reflections on preternatural ani, appeared to me so just, and your advice so useful, that I immediately put

Fig I.

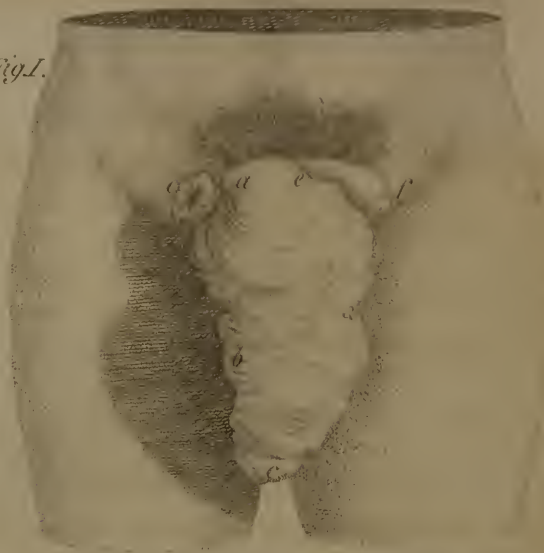


Fig II



J. Wandelaar del.

them in practice. I had then at the Hotel Dieu of Rheims, an unfortunate father of a family, who had been for some time afflicted with this cruel disease: he began to discharge fæces by the anus on the fifth day; from that time there has been no extraordinary interruption, and he is ready to depart perfectly cured.

Explanation of the fifth plate.

Fig. I. Preternatural anus described in case I.

a, b, c, d, e. The principal tumour, formed by the superior portion of the intestinal tube, invaginated.

a, e. Neck of the base of the tumour.

b. Rugosities of the internal membrane, now become external.

c. Summit of the tumour, from whence the fæces proceeded.

e, f. The penis pushed upwards by the tumour.

Fig. II. State of the parts after the cure.

a, b. Fold of the skin forming a kind of valve before the opening of the abdomen, which remained fistulous.

MEMOIR
ON THE
Operation for the Fistula in Ano.

ARTICLE I.

General Reflections.—Parallel of the Ligature and of Incision.

1. **T**HERE are few diseases, whose treatment has undergone more variations than that of the fistula in ano. Every age has had its methods—every practitioner his processes. The actual or potential cauteries, injections, dilatation, compression, ligature, incision, excision, alternately employed, have each reigned for a certain time over the scene of practice. Experience has at length fixed the rank which they should occupy. Some, almost forgotten, figure no more except in the history of our errors: others have remained, supported by the success which they have obtained. Of what service would it be to exhibit the first? repeated a hundred times, they would here present nothing new. Let us confine ourselves to the examination of the second, which alone Desault has enlarged by his discoveries. The ligature and incision will engage our attention.

2. In these latter times the ligature and incision have been the object of the discussions of practitioners, as to the respective preference which is due to them. Some have exaggerated the advantages of the first, whilst

others have boasted too much of those of the second. A middle course is to be steered between them; and if the ligature is frequently proper, the incision is as often necessary. In their parallel let us trace their respective limits.

3. An inconsiderable degree of pain is attached to the ligature. A severe but transitory pain accompanies the incision. In this the dressings are not painful; in that the patient always suffers, more or less, every time the thread is tightened. The one does not require him to keep his bed, and he can attend to his business during the treatment: a longer or shorter rest is always necessary in consequence of the other. The first exposes the patients less to fever and subsequent symptoms; the second assures a more speedy cure.

4. The ligature agrees, 1st. With those persons who are habitually subject to diarrhœa. 2d. With those who are feeble, and affected with cacochymy, whom a long suppuration would exhaust; a suppuration that is here always avoided, because in proportion as the lead divides the parts on the side of the anus, the cicatrix progresses on the opposite side, so that after the falling of the ligature there only remains a small oozing. 3d. With those who reside in damp and unhealthy places, where wounds often assume a bad character; such, for example, are large hospitals, at the periods when a moist gangrene exercises its ravages there; an affection the more dangerous in this case, because the sphincter, being destroyed by it, leaves an incontinence of urine. 4th. With those whose business prevents them from disposing of their time, and who, not being able to be visited frequently by their surgeon, are obliged to dress themselves. 5th. When any considerable vessels are found in the parts to be divided. 6th. The ligature alone should be employed, when an invincible horror revolts from the cutting

instrument. Desault cured a man by the ligature, on whom he had first intended to operate by incision; but when placed in a proper situation, he discovered such a degree of horror at the operation, that it was obliged to be deferred until the next day, and the method to be changed. Incision is exclusively indicated in complicated fistulæ, in which a great number of sinuses terminate, in those which are attended with much callosity, or where a considerable denudation exists, either in the skin or the intestine.

5. Sometimes both operations must be united. One day, as Desault was operating by incision on a deep fistula, he perceived, by introducing his finger into the wound, another sinus, with denudation of the intestine, on the surface of which some considerable vessels were spread: their injury might have been dangerous if he opened this new sinus. He made a ligature on it, and in a little while the intestine was divided by this method and the fistula cured.

6. When none of the preceding circumstances occur, the ligature or incision are indifferent. As to the certainty of the cure the results are the same, and it would be difficult to make an exclusive choice. Desault employed them alternately; and frequently the only motive of his determination was to show his pupils the operation by the two different processes.

ARTICLE II.

Operation by the Ligature.

7. Fistulæ in ano present varieties, which determine the modifications that are essential in the operative process. These varieties relate particularly to the state of the intestine. Indeed, it sometimes presents to our instruments an opening through which the ligature may

pass; sometimes there is a necessity for opening it by the same instruments, so as to make a passage for the ligature. The first case includes complete fistulæ, whose internal opening has not a denuded portion of intestine above it. In the second are classed, 1st. External fistulæ, where the intestine is denuded without being opened. 2d. Those where a considerable denudation is found above the opening. It is evident, indeed, that if, in this latter circumstance, the ligature should be passed through the opening which already exists, a purulent collection may be formed after the cure opposite the denuded place, and give rise to a new fistula. Let us examine the operative process of Desault in both cases.

§ I. *Of the operative process in cases where the perforation of the intestine is not necessary.*

OF CASES, WHERE THE FISTULA HAS LITTLE DEPTH.

CASE I. *Recorded by Bouillaud.*

Prudence Huguet, aged thirty-two years, had in the month of November, 1790, an abscess near the margin of the anus, in consequence of laborious parturition. She was treated at the Hotel Dieu, by the incision of the tumour and the application of emollient poultices. The intestine was not denuded. The hardness and pain were soon dissipated, and the suppuration diminished so much that the patient thought herself cured, and left the hospital on the tenth day, in spite of the representations of the chief surgeon. This woman returned six months afterwards with a complete fistula, whose external orifice was situated forwards and to the right about an inch and a half from the margin of the anus, at the same spot where the skin had been cut, and the internal orifice at the depth of an inch in the rectum. The intestine was not denuded at this period; but callosities were felt, which occupied half of its circumference, and extended

upon the buttock, along the fistulous passage and considerably beyond its external opening. There were severe pains, and even a little fever, which the antiphlogistic regimen and the use of emollient poultices speedily dissipated, by increasing the suppuration. Almost all the callosities were scattered at the same time, so that on the eighth day they did not extend more than a few lines from the fistulous passage. This period seemed favourable to the operation, which was performed on the same day in the following manner. The patient being laid upon the side on which the fistula was, with the left thigh a little bent and the buttocks separated by an assistant, the surgeon introduced the left index into the anus, carried with the right hand the probe (plate IV, fig. 2) into the external orifice of the fistula, and gently pushing it, caused it to penetrate through the internal opening into the cavity of the rectum and against the finger. He then introduced the canula (fig. 3) upon the probe, and the finger, which was placed in the rectum, served to carry the extremity of both outwards through the anus, which the disposition of the fistulous passage, and the situation of the orifices, rendered easy and not painful. Then the surgeon withdrew the probe, in order to substitute for it a thread of lead. He afterwards withdrew the canula, retaining the lead, which thus remained in the fistulous passage. He approximated the extremities of this lead, and introduced them into the canula (fig. 9.), which he pushed in nearly up to the external opening of the fistula. He folded the ends of the lead on each side into the cleft x (fig. 10) of the canula, and cut them at the length of a line and a half. Finally, he placed on the two sides small rolls of lint, to preserve the neighbouring parts.

This ligature did not give any pain, nor did it prevent the patient from walking. It was thought useless

to restrict her to a particular regimen. It was sufficient, during the first days, to observe cleanliness, and to renew the rolls of lint, when they were moistened by the supuration and humidity of the part.

On the third day the ligature being relaxed, it was tightened by drawing one of the ends of the lead, whilst the other was retained in the cleft of the canula. This end was bent and cut as at first. The ligature was again tightened in the same manner every three or four days, until the twenty-first, when the parts comprised in the noose were entirely divided. There then remained a small cleft, which was kept open for three days, by placing some threads of lint between its edges, lest they should unite before the bottom of the wound was cicatrised. The woman left the hospital perfectly cured, five days after the ligature fell.

Of cases where the Fistula is deep.

CASE II. *By J. B. J. Boulet.*

Madame Froment, aged forty-three years, came to the Hotel Dieu, on the fourth of December, 1789, for a fistula which she had had for six years, and which had proceeded from an abscess that was occasioned by a contusion. The external opening, which was very small, was situated on the right buttock, a little behind, about an inch from the margin of the anus; and the internal, which was larger, at the depth of two inches and a half in the rectum. The intestine was denuded in the whole of this extent, and the fistulous passage surrounded with callosities; but the skin was sound. The pus escaped in greater abundance through the internal than through the external opening.

As this woman suffered no other inconvenience, she was prepared for the operation, only by emptying the rectum by a simple injection some hours before it was

performed. This patient was placed in a position similar to that of the one in the preceding case, and the probe was introduced in the same manner; but as the internal opening was too high for the canula to be brought outwards, without causing very severe pains, a different process was adopted in the rest of the operation.

After introducing the probe into the cavity of the intestine, the surgeon withdrew his finger to introduce in its place the forceps (fig. 5) slightly smeared with cerate, and which was kept closed, lest the rectum should be wounded by the projection *a*, which the branch *a b* makes when the instrument is open. He then permitted the branches to separate, by leaving them to the action of the spring *r*. The probe was inserted in the cleft *f g*, resulting from the separation of the branches, and conducted to the cul de sac *f*. Then an assistant introduced the canula, whose borders, being guided by the probe, placed themselves on the sides of the cleft. The probe, whose only intention was to conduct the canula, then became useless; the assistant withdrew it to pass the leaden thread in its place into the canula, which the surgeon was careful in holding quite perpendicular to the width of the forceps, without which precaution the end of the thread, instead of being engaged in the cleft, would be stopped on one of its sides. As the end of the thread was only about three lines longer than the canula, it was easily perceived, from what remained without, that it was inserted into the cleft. Still, to be more assured of it, the assistant drew gently the extremity which remained without, while the surgeon kept the forceps closed. The resistance plainly showed that the thread was in the forceps. Then after pushing in the forceps some lines, lest the lead, by bending itself on the edge of the fistulous opening, might tear the intestine, he withdrew the forceps, and at the same time

the canula was withdrawn through the external opening of the fistula. One of the extremities of the lead was thus brought through the anus by the forceps, and the other remained without the external opening, so that this thread formed a noose which comprised the whole fistulous passage. The ends were then approximated in a parallel direction, and fixed in the canula in the same manner as in the preceding case.

Although the fistula was much more deeply seated than the preceding, the cure was nearly as speedy. The ligature came away on the twenty-fifth day. There remained here as in the first patient a cleft, which was ten days in cicatrizing, because the assistant surgeon, who had the care of the dressing, neglected to introduce lint between its lips, which adhered before the bottom of the wound was cicatrized, and because it was then necessary to destroy that adhesion, lest a new fistula should be formed.

Reflections on the Process.

8. The two preceding cases exhibit a view of the process of Desault, in cases where the operation is easiest; in those where the fistula being complete and without denudation of the intestine above the fistulous opening, the route is open to the instruments and there is no occasion to make an artificial one. To appreciate the advantages of this process, let us take a rapid view of those which were in use before it.

9. Hippocrates, who was the first that described this operation, in performing it made use of a very fine linen thread, folded in five parts and wound on a horse hair. This ligature was introduced into the fistulous passage by means of a pewter probe, pierced with an eye at its extremity, and which he pushed in until it met the left index, which, being placed in the intestine, served to

bend its extremity, to carry it without, and with it the ligature, whose ends he tied and then tightened every day until the parts were divided.

10. Celsus describes a ligature different from that proposed by Hippocrates. It is that of the skin which covers a fistulous passage in the neighbourhood of the anus. He employed nothing but the scalpel, when the fistula went towards the intestine. According to him we must carry to the bottom of the cul de sac of the fistula a probe with a hole at one end, and threaded with a double or triple thread; and the skin is then to be cut on the point of this probe, to draw it through this new opening. It is evident that here there is no mention of a fistula which would affect the intestine. We may even suppose, with some reason, that when the fistula was complete, Celsus rejected every kind of operation, at least when its internal opening was situated at a certain depth—a case for which he advised nothing but topical applications.

11. The operation of Celsus, however, is that which most authors have taken for their model. In cases of complete fistula, almost all have employed a probe with a seton, which they caused to penetrate into the rectum and brought out through the anus with the finger, either by inverting the intestine, when the internal opening was but shallow, or by bending the probe when it was deep. The probe was most frequently of silver; some practitioners have, however, employed a leaden probe, no doubt on account of its flexibility. Foubert, who revived this operation, which had fallen into disuse some time before him, made use of a kind of larding-pin of silver, terminated on one side by a blunt point, on the other by a kind of pipe which was formed in its thickness, and to which the thread was adapted. Like all the others, he employed only the index to bring it

without. Girault was the only one who, with this view, made use of a kind of raven's bill.

12. When these different processes of applying the ligature to complete fistulæ, are compared with that stated in the preceding cases, it is easy to perceive what is the difference. Indeed, if the fistula should be high up, by its bending upon the edge of the opening what pain may be produced by a metal instrument, whose resistance, if it be made of pewter, is always considerable? Besides, this resistance is necessary for its passage through the fistulous passage: without it, it would bend and yield to the smallest obstacle. May not the probe, when brought back with force through the anus, stretch, detach and even lacerate the sides of the intestine? From thence the inconveniencies found in this method, by the greatest number of persons, who regard it only as a resource for those subjects who absolutely refuse to submit to incision. To these inconveniencies may be added another, which attends the ordinary processes, the quality of the ligature and the manner of tightening it. Most employ nothing but a thread of hemp, or of silk, simple or mixed with hair, but always subject to rot from the contact of the fæces, to break in the successive constrictions which it has to undergo, thereby requiring a new operation. To obviate these disadvantages Foubert invented a ligature for fistulæ, by means of a leaden thread wire-drawn, whose extremities he united and twisted. This kind of ligature has the advantage over the others of causing less pain, by cutting the parts which it embraces, and of not being impaired as speedily; but, it may be objected to it: 1st. That it painfully stretches the edges of the fistulous opening, by the twisting of the thread: 2d. That it is liable to be broken by this same twisting: 3d. That the noose is elongated by it instead of being shortened and tightened: 4th. That commonly it does

not complete the section, and leaves a portion of the flesh to be divided by the knife; because the twisting becomes more difficult as the noose of the leaden thread is diminished in extent.

13. None of the preceding inconveniences can be attributed to Desault's process. 1st. The introduction of the leaden thread is always easy, by means of the canula. 2d. This supple and yielding thread, being alone bent from the fistula into the intestine, cannot by any means irritate the edges of the fistulous opening, as was done by the instruments that conducted the ligature, when it was necessary first to bend them in order that it might be brought through the anus. 3d. By this mean pain is always avoided, frequently even every kind of troublesome sensation; and under this view the advantage of these instruments is such, that Desault has frequently operated upon patients, who, not having been sensible of their passage into the fistula, asked if he would soon begin the operation, when it was already finished. 4th. With the forceps, we may, without fear of wounding the rectum, seize the thread at a great depth, and consequently operate on and cure, as Desault did, fistulæ which are situated much above the reach of the finger; an advantage which will be particularly appreciated, when it is known that this last circumstance has been regarded by all authors, as beyond the resources of art. Bertrandi, Bell, and even Sabatier, do not believe the operation to be possible in this case. 5th. The method of tightening the ligature by means of the small canula, on which it is bent, places the after dressings out of any hazard of the pains which resulted from the twisting of Foubert. 6th. This ligature is not liable to be broken; it may be tightened at pleasure, and in a determinate and precise degree. 7th. We are never obliged to complete the section with the knife, as in the

twisting, since we may always shorten the noose formed by the ligature, and even make the whole of it enter into the canula. 8th. The operation, performed in this manner, does not commonly occasion a subsequent treatment longer than that by incision. Sometimes Desault has even obtained a more speedy cure.

14. The forceps, whose use has been pointed out in the preceding cases, has not always been of the form expressed in the sixth plate; at first it was nothing but a kind of pinchers with a concave handle, which, when it was opened on the side of the thread that was to be seized, also opened on the opposite side; so that the folds of the internal membrane of the intestine might be engaged in the cleft, which resulted from the separation of the branches, and be painfully pinched: to obviate this inconvenience, Desault enlarged one of the branches and terminated it by a sheath (*t, u*, fig. 6) which covers the posterior cleft at the instant the instrument is opened. Instead of the handles, which it first had at its extremity (*d, b*, fig. 5), he bent back that same extremity, kept it separated by a spring (*r*), and thus managed the instrument more easily during the operation. Although the forceps, thus corrected, had many advantages, still its use sometimes occasions an inconvenience analogous to the preceding. The internal membrane of the intestine, when it is loose and as it were floating, may be engaged in the interior cleft (*f, g*, fig. 5) intended to receive the lead, and be pinched at the instant when the branches are brought together.

The instrument engraven (fig. 11) runs no risk of this accident. It is a kind of gorget, concave on one side and convex on the other, terminated by a cul de sac, in which is a small hole, intended to receive the leaden thread, hollowed interiorly into a gutter in which slides a metallic blade, which, being pushed below, fixes and

secures the thread. In proceeding to the operation by means of this instrument, 1st. We must conduct the canula upon the probe (fig. 3), which is to be pushed into the opening of the intestine in such manner as to make its extremity correspond to the cul de sac (*a*) of the instrument that is introduced into the rectum. It should not, however, enter into the cul de sac, lest being pinched together with the thread, it might prevent that from being drawn out. 2d. The leaden thread must be slipped through the canula into the cul de sac of the gorget. 3d. The button (*d*) must then be pushed down, and with it the metallic blade, which then fixes the thread. 4th. The instrument is pushed a little into the intestine, to give more extent to the leaden thread and to be certain that it is taken hold of. 5th. If the canula were with it, which would suppose too much room in the cul de sac, the button (*d*) should be pushed upward; it would be disengaged and the thread tightened anew; the gorget, being then withdrawn, would bring it out, and then the operation becomes the same as in the preceding case. Of late years Desault adopted this instrument almost exclusively, preferring it to the forceps that was first invented to draw back the thread.

§ II. *Of the mode of operating, in cases where the perforation of the Intestine is necessary.*

15. If the process of Desault merits an exclusive preference to others, in cases where the fistula is complete, and where the passages are altogether clear, its advantages are not less real, when it is necessary to make an artificial opening into the intestine; either because there is none by nature, as in external fistulæ, or because we meet with a considerable denudation above that which exists already.

Of cases where there is only a denudation of the Intestine without an opening.

CASE III. *Recorded by Guillier.*

J. Bladinier, aged thirty years, came to the Hotel Dieu, on the 17th of January, 1791, with a fistula, that proceeded from an abscess, which was opened with caustic six months before. The opening of the fistula was in the left buttock, and about two fingers breadth from the margin of the anus; there were several sinuses, one of which extended towards the intestine, which was denuded and made thin, to the depth of two inches; another, less extensive and directed towards the coccyx, was covered by nothing but the skin, made thin and almost disorganized in this spot.

The intestine was not pierced in this case, as it was in the preceding, and on account of this the manner of proceeding in the operation was somewhat different. The finger was introduced into the anus, and the canula carried, by the aid of the probe, through the fistulous opening, unto the highest part of the denuded intestine. Then an assistant passed into this canula the trocar (fig. 4), and the surgeon, pressing upon the button, which terminates this instrument, pushed it into the canula, and made it penetrate with it into the cavity of the intestine. In the mean time he supported the denuded side of the intestine, by pressing with the end of the finger immediately below the spot which he was about to pierce, and which he thus pushed away from the opposite side, lest it might be wounded by the point of the trocar, without this precaution. Then he withdrew the instrument, leaving the canula in its place, and finished the operation as in the subject of the preceding case. The whole extent of the sinus, that ran backwards, was then laid open, by cutting the skin which covered it. The wound resulting from this new operation, although small,

was not entirely cicatrized until the thirty-ninth day, ten days after the coming away of the ligature and the cure of the fistula.

Of cases in which there is an opening into the Intestine and a denudation above the opening.

CASE IV. *Recorded by Boulet.*

Louis Lecoq, aged twenty-eight years and very robust, had, at the end of the year 1789, on the right side of the margin of the anus, a very extensive abscess, that emptied itself into the intestine. Some months after, a new abscess broke out upon the buttock, about an inch and an half from the margin of the anus, and thus the fistula was made complete. This man, who suffered little from this inconvenience, neglected it until the 2d of January, 1791, and then came to the Hotel Dieu. At this period the intestine was denuded to at least three inches above the margin of the anus, being an inch higher than the internal opening of the fistula. The fistulous passage was surrounded with callosities, which extended even upon the buttock, to three inches beyond the external opening, without appearing however to affect the skin that covered this part.

This last circumstance, together with the depth of the fistula, was a reason for preferring the ligature to every other kind of operation: but it was not sufficient to pass the leaden thread through the fistulous openings that already existed; it could not be hoped that the intestine, denuded much above the internal opening, would join itself to the neighbouring parts. To cure the fistula it was therefore necessary to embrace with the ligature all the diseased portion of the rectum.

For this purpose the intestine was pierced in the highest point of its denudation, and the canula was introduced, by means of the trocar, as had been done for the

external fistula in case third. In this case the trocar, though very sharp, penetrated with difficulty, because the extremity of the finger, which was placed in the rectum, could not get near enough to the point of the instrument to secure the portion of intestine which was to be pierced. After this was done, there was nothing particular in the rest of the operation. The thread was passed, seized with the forceps and brought through the anus, with the same ease and in the same manner as with the patients in the second and third cases.

Lecoq did not keep his bed during the treatment, not even on the day of the operation. He did not suffer, but only experienced a slight and momentary pain while the ligature was tightening. Twenty-three days after the operation there still remained much callosity on the side of the buttock; it dissipated gradually and furnished an abundant suppuration. The ligature was very slow in cutting the thick parts comprised in it; and although it was carefully tightened every two or three days, in proportion as it relaxed, the division was not completed until the sixty-third day. This man left the hospital, perfectly well, the 18th of March 1791, sixty-nine days after the operation.

16. The two preceding cases, present Desault's mode of proceeding in cases where it was necessary to make an artificial opening into the intestine, in order to pass the ligature into it. Let us compare this process with those used before his time. There has been a singular variation of practice in this, as in all the parts of the operation. Some employed simply the probe, as a conductor of the ligature, of which we have spoken (11), and which they pushed against the thinned sides of the rectum; others, wishing to avoid the pain, which is the inevitable effect of the laceration produced by a round body, such as the button of the probe, thought of sub-

stituting a blunt point; some even sharpened this point and made it cutting; but it then became difficult to pass it through the fistulous canal, without wounding the surrounding parts. From thence arose the modification of Fabricius Aquapendente, who placed at the end of the instrument a small ball of wax; and from thence the more happy idea of Paré, who pushed a canula against the intestine and passed within it a needle with a lancet point: by this mean the surgeon was not liable to wound himself, in bringing back a pointed instrument through the rectum, or in turning it in the cavity of the intestine. But, after withdrawing the canula, how was he to retrace the artificial route with the leaden thread? How was he even to introduce into the fistulous canal the canula, whose extremity always presents a greater or less surface.

17. In Desault's process, all these difficulties vanished. 1st. The introduction of the canula is always easy, by means of the conducting probe, previously passed into the fistula. 2d. The canula, being introduced, enables the trocar, that is destined to pierce the intestine, to pass without fear of wounding the neighbouring parts. 3d. The intestine is opened at the superior part of the denudation, without the surgeon's running the risk of wounding his finger. 4th. The canula, being introduced at the same time with the trocar, and remaining in the opening, facilitates the introduction of the lead, and then the operation becomes the same as in the preceding case.

18. When the denudation of the intestine extends much above the reach of the finger, the ligature may be applied equally well, by piercing the intestine previously. But in this case, in order to fix the intestine while the trocar is passing through it, the gorget of wood (fig. 1) of which we will speak in the article of incision, is sub-

stituted for the finger, that is now too short. The following case will present the details of the process that is then necessary, at the same time that it will furnish an example of the success of the ligature, in one of the most difficult cases that can occur.

Of cases in which the denudation is much above the reach of the finger.

CASE V. *Recorded by Boulet.*

Gilbert Sagitte, aged forty years, had for ten years a fistula in ano, that occurred after a critical abscess. The patient had always neglected this inconvenience, although new collections appeared from time to time; but, about the month of July 1790, there were formed, at the margin of the anus, two tumours, which were so large that they prevented him from walking. He had himself carried into one of the hospitals of Paris, where he was operated upon by incision of the intestine, and excision of the disorganized skin. This, however, did not prevent new sinuses from being formed under the skin, within a month after, which obliged him to undergo a second operation, that was as fruitless as the first. After a treatment of three months, the fistula still existed; and he was then sent away, it being declared to him, that his disease was incurable. It was then that he determined to come to the Hotel Dieu, into which he entered on the 3d of November, 1790.

At this time, there was in each buttock a considerable sinus, upon which the skin was thinned and disorganized, to a great extent. One of these sinuses communicated with an open fistula upon the right buttock, about an inch and an half from the margin of the anus, and towards its posterior part. This fistula penetrated into the intestine, which was denuded for about half of its circumference, and to the height of more than four inches.

At the same time there were perceived, in the rectum and round the anus, considerable hardness and callosity, which were diminished a little by the use of poultices, that were continued until the moment of the operation, which was performed on the ninth day.

The patient, being laid upon the right side, and disposed as in the preceding cases, the surgeon made an incision into the sinus of the right side, upon a grooved staff, and as near as possible to the margin of the anus, in order to leave upon the side of the buttock all the disorganized skin, which he then seized with his fingers and cut off with a single stroke of the bistoury. He then did the same with the other sinus.

Then he pushed, through the fistula, to the top of the denudation, the probe, the canula, and lastly in that the point of the trocar: but, the intestine could not be pierced in any other way, than by supporting it with the extremity of the wooden gorget (fig. 1), instead of fixing it with the finger, as would have been done if the fistula had been less deep. The ligature was then made, as in the preceding cases, but with a leaden thread eleven inches long. The wounds, resulting from the excisions, were filled up with coarse lint, which was covered over with compresses, supported by the triangular bandage.

Suppuration commenced the next day. The treatment was attended with nothing else that was particular. The ligature came away on the forty-second day, and left a cleft, about an inch in depth, which it was also necessary to dress for twenty-four days, to prevent the premature union of its edges. The cicatrization was not quite complete until the ninetieth day. The patient then left the hospital, perfectly well, and has never experienced any inconvenience since.

ARTICLE III.

Operation by Incision.

19. The operation for the fistula, by incision, may be traced to a period as remote as that by ligature. Hippocrates has described it; Celsus advised it; the Arabians practised it, and we find it explained in all the books of the Arabists, their compilers. But art was then far below the level, with regard to this point, at which it is now found. External fistulæ were the only ones which they dared to touch; when they penetrated the intestine, they were regarded as incurable, and the operation was then limited to laying open the bottom of the sinus without touching the rectum; which was, no doubt, an advantageous mode of proceeding in sinuses, that were superficial and remote from the intestine; but it is insufficient when they approach near to it, and when that is denuded. Experience soon demonstrated the truth of this. It was perceived that in almost all external fistulæ, as well as in the complete ones, there was no hope of a cure but by cutting the intestine, and dividing all the parts comprised between the fistulous canal and the anus; and properly speaking, it is at this day the operation by incision, which is performed differently according to the state of the fistula. Let us examine it first, in the most simple and easy case, that of a complete fistula, shallow and without callosity.

§ I. *Mode of operating in cases where there is an opening outside of the intestine.*

20. In this, as in other cases, every one had his own mode. The ancients passed into the fistulous canal, a flexible director, which they bent back with the finger introduced into the rectum, and which they then brought outwards to serve as a conductor for the bistoury, which

divided by a single stroke all the parts comprised in the noose of the director. If the intestine was not open, they pierced it with the extremity of this instrument.

21. Galen made use of a kind of falciform knife, since designated by the name of syringotome, terminating at its extremity in an inflexible probe, which he introduced through the external opening of the fistula, made it penetrate into the rectum, brought it without and cut the parts, by drawing back the whole instrument through the same way. The moderns have made some changes in the syringotome, by crooking the end that was opposite to the point and making the probe flexible. In spite of these changes this instrument has been long disused, and it makes no figure now except in our magazines of surgery. Scultet, who describes it, speaks also of an instrument very analogous to it, and which differs in nothing from it but by having a metallic sheath, with which its blade was covered while it was pushed into the fistula; this is the royal bistoury: others propose, and Scultet himself recommends especially, the bistoury for hernia. Pott and Bell make use of a crooked bistoury, long, narrow, and having a blunt point or button, which they push into the intestine without the aid of the director. On the contrary, most of the moderns pass a director previously into the fistula, bring it back through the rectum and cut upon it.

22. Let us glide over the more ample historical details; these are sufficient to show us that the instruments employed until now for the incision of the fistula in ano, have all of them common and essential faults: 1st. They cannot be used in fistulæ that are deeply situated above the reach of the finger. 2d. When they are withdrawn through the anus, they present the same difficulties that were remarked in the instruments intended for the ligation. 3d. That they stretch and bruise the sides of the

intestine, and thus prolong the operation and the very sharp pains that always result from it. 4th. That they expose the surgeon to the danger of wounding himself. 5th. That they often strike, tear, and even cut the opposite side of the rectum. 6th. That they cannot be used in fistulæ, whose external orifice is very remote from the anus. Some of these inconveniences are not applicable to the instrument of Branbilla, which is compounded of a grooved director and a steel gorget; but such is its complication and the difficulty of using it, that no judicious practitioner can adopt it.

23. For the incision of fistulæ, Desault made use of a bistoury with a long and straight blade, of a grooved director, that was blunt at the end and without a cul de sac, and of a kind of gorget of wood, engraved (fig. 1), concave upon one of its faces, rounded below and terminated by a cul de sac, in which the director was to be engaged, and mounted above with a handle in the same direction. Being introduced into the rectum, it serves as a conductor to the bistoury, which cuts the whole fistulous canal upon it, without fear of injuring the opposite side of the rectum. This gorget is not a new invention. Marchettis employed a similar one of metal, the cavity of which he stuffed with cotton that it might not blunt the bistoury. In the beginning of this century, Raw recommended the use of it in his lectures. Masiero, a surgeon of Padua, had it engraved. We find the figure and description of a similar gorget, in the second volume of Heister's *Institutes of Surgery*. Runge, a surgeon of Brême, also employed it, with this modification, that the handle formed an angle with the part that was intended to be introduced into the rectum. His grooved director was also crooked in a contrary direction; so that the hand of the assistant, who supported the gorget in the anus, and that of the surgeon, who in-

troduced the director into the fistula, were farther from each other. But this curvature is useless, since, when the instruments are once engaged in the soft parts, they can always be sufficiently separated. The gorget of Runge was of metal, like that of Marchettis; but Desault found that it would be more simple to make it of wood, that he might not be obliged to stuff it. Besides it is lighter, less costly, and if there be need we may construct it ourselves in an extraordinary and urgent case.

24. With this instrument the mode of operating is simple. It is performed thus:

1st. The patient is laid upon the edge of his bed, which is furnished with a cloth folded into several doubles, and on the side corresponding to the fistula; the trunk being bent upon the pelvis, and the thigh above brought nearer to the belly than that which rests upon the bed, so as to lay open the fistulous orifice and the anus.

2d. An assistant is directed to separate the buttocks, by raising up that which is opposite to the fistula; and another, placed near the surgeon, hands him the instruments.

3d. The surgeon introduces into the anus the left index finger, greased with cerate, turning the palm of the hand to the side of the fistula; with the other hand he takes the grooved director, which he introduces and pushes into the fistulous canal, conducting it by means of the finger placed in the intestine.

4th. If the fistula is complete, and its internal orifice is in the highest point of the denudation, the director is made to penetrate through this orifice. On the contrary, in the case of an external fistula, or of a complete fistula, with denudation of the intestine above the internal orifice, he pushes up the director until, with the fin-

ger and through the thinned sides of the rectum, he perceives that it has reached the height of the denuded place.

5th. He withdraws the finger, and substitutes the wooden gorget, slightly smeared with cerate upon its convex side; by gentle lateral movements, he engages the end of the director into its cul de sac, either immediately when it has passed through the fistulous orifice, or mediately by pushing before it the membrane of the intestine, when the denudation is above or the fistula is external.

6th. The gorget is confided to an assistant, who holds it strongly, at the same time separating it from the grooved director; while the surgeon conducts upon this director, held by himself, the long and straight bistoury, which he pushes into the gorget and with it divides, at a single stroke from within to without, and without danger of wounding the other parts, all that is found comprised between the fistulous canal and the anus.

7th. To be certain that nothing remains to be cut, he causes the end of the director to slide from below upwards along the groove of the gorget. If he perceives any resistance, the bistoury, being slipped again upon the cleft, cuts the parts that escaped it the first time, and then the director is withdrawn outwardly with ease. The gorget is also withdrawn.

8th. The dressing consists in introducing between the edges of the wound a large pledget of lint, intended to keep them separate, and which is renewed every twenty-four hours.

25. The process just described is simple, easy, prompt in its execution, sure in its results, and avoids the numerous inconveniencies stated (22). No stretching and no painful distension of the membranes of the intestine are to be feared. The surgeon incurs no risk of wound-

ing himself. The opposite side of the rectum is guarded by the gorget. This process is applicable, whatever may be the thickness of the parts that are to be divided. The previous incision, which the most of other operations require, is always dispensed with in this. Finally, this may always be practised, however deep the internal orifice of the fistula may be, as may be perceived in the following case.

Of cases in which the opening of the intestine is above the reach of the finger.

CASE VI.

Therese Vacry, aged thirty-six years, had in the month of July 1785, on the left buttock and near the anus, an inflammatory tumour, accompanied with sharp and throbbing pains, which terminated in a very extensive abscess. The pains were then diminished, and ceased almost entirely some days afterwards, when the pus ran through an opening that was formed upon the buttock, about four inches from the margin of the anus. The patient then placed herself in the hands of different quacks, who exhausted a multitude of means upon her, the insufficiency of which compelled her at length to come to the Hotel Dieu, to seek the effectual assistance of art.

At this period there were two external openings, whose edges were hard and callous. A fistulous canal, also accompanied with callosities, extended from one opening to the other, then mounted up along the rectum; into this cavity the probe entered much above the reach of the finger, since the end of it could not be discovered but by means of the gorget pushed in four or five inches. A reddish and sometimes bloody sanies oozed out from the external openings.

As the patient was full of humours, she was prepared,

during some days, by diluting drinks, an emetic and a slight purgative; and Desault operated, on the 21st of August 1787, in the following manner: He first cut, upon the grooved director and with one stroke of the bistoury, all the skin that was situated between the two openings on the buttock. He then conducted the grooved director into the sinus that ascended along the rectum, directing it with the finger placed in the intestine; and, after making the point of it pass through the internal opening and placing it in the cavity, he cut the intestine upon the gorget of wood in the manner that was stated (24, 6th), except that he was obliged to employ a longer bistoury than he used in ordinary cases.

This operation was not followed, as might have been feared, by a considerable hemorrhage. The small quantity of blood, which oozed from the edges of the division, was easily stopped, by means of a tent pushed into the intestine to the depth of the wound, and by pledgets of lint sprinkled with colophony.

A cholera, that came on five days after the operation, ceased on the tenth; but the wound was tedious in cleansing, and the cicatrix was not complete and the patient well cured, until the sixty-ninth day of the treatment.

§ II. *Mode of operating in cases where there is no external opening.*

26. If the fistula is blind externally, the process does not undergo any change; but it is different if it is blind internally: let us examine the difference. When therefore the bottom of the sinus is very superficial, and when the pus has already produced a swelling outwardly and a change in the colour of the skin, we must cut upon this portion of the diseased skin, thus render the fistula

complete and operate as in the preceding case. The following case offers us an example of this practice.

CASE VII. *Recorded by Levacher.*

About the beginning of August, 1789, Victor Guiterme, aged nine years, felt strong pains in the rectum. Soon after a considerable inflammation extended from the anus to the middle of the left thigh, and was succeeded by an abscess, that opened into the rectum at the height of an inch. Although the sinus did not empty itself completely, there was no external opening; and three months after, when the patient came to the Hotel Dieu, the skin only began to grow thin and to be disorganized to a small extent. Desault first cut the skin along the whole extent of the purulent collection; then, after laying open by a second incision, a sinus, which went towards the coccyx, he seized with his fingers the angle of skin resulting from these two incisions, and he cut off the thinned and disorganized skin, which he had left entire on the side of the anus, so that he might be able to remove it with a single stroke of the bistoury. He then introduced a grooved director into the fistulous canal, and cut the intestine upon the gorget of wood. The patient was dressed in the usual manner, with a tent, pledgets of coarse lint and two compresses, sustained by the T bandage. In the rest of the treatment there was nothing remarkable, and the patient left the hospital, perfectly cured, thirty-four days after the operation.

27. Without doubt the preceding case is not the most embarrassing in internal blind fistulæ. The principal difficulty is, when, the skin being sound and no swelling taking place in the neighbourhood of the anus, there is no sign to indicate whether a purulent collection exists there. In this case, Petit has directed to introduce and

leave for twenty-four hours in the rectum, a large tent, which, by stopping up the internal orifice of the fistula, prevents the discharge of the pus, and forces it to collect and produce an external tumour, which is an index of the place where we should cut. This mean is almost always useless: 1st. Because the compression can never be sufficiently exact to prevent all purulent oozing. 2d. Because most commonly the thickness of the parts, lying under the skin, would prevent the swelling.

28. With the same view others employed a different method. It consisted in introducing into the rectum the index finger, which was then, in the withdrawing, to be bent upon itself, so as to push outwards the collection of matter and at the same time to press upon the environs of the anus. The spot where the patient experienced pain from this pressure, was that on which the incision was to be made. A third process consisted in inserting into the anus, for the length of the index finger, a probe folded in two, in such manner that one of its ends should be shorter than the other; this was attempted to be engaged in the internal orifice, and in withdrawing the other end, it was carried into the collection; it was then made to point outwardly, in such a manner as to show the collection and of course the place of incision. But, besides the difficulty of introducing this probe into the fistula, and the pains that would inevitably result from it, this process has an inconvenience, which is common to the two just examined, that of making a double incision necessary, first to make a way for the instruments, and secondly to cut the intestine.

29. Desault advised to make the incision of the internal fistula at a single stroke, by employing an ordinary bistoury, the concealed lithotome, or even in certain cases the kiotome, of which we spoke in the article concerning excision of the amygdalæ. If the common

bistoury is employed, the surgeon, after having placed the patient in a suitable position, 1st. Introduces the left index finger into the rectum, and ascertains the place and state of the collection by the presence of induration, by the fluctuation, and by the small tubercle and depression which correspond commonly to the fistulous orifice. 2d. He slips along his finger a bistoury, turning the flat side of the blade against the palm of his hand, and pushes it a little higher than the bottom of the sinus. 3d. He makes an assistant stretch the skin on the side corresponding to the fistula, and turning the blade of the bistoury he makes an incision, which lays open the bottom of the collection, and extends, more or less, upon the margin of the anus, according to the more or less considerable extent of the collection. 4th. Introducing his finger into the wound, he ascertains if any additional sinus or any callosities exist, and if he meets with any, he opens the one and scarifies the others.

30. If he prefers using the instrument of Friar Come, the finger, being previously introduced into the rectum, serves to direct this instrument into the intestine, being graduated to a degree suitable to the extent of the incision that is to be made. When it has arrived there the finger is withdrawn, and whilst he stretches the skin of the margin of the anus with his left hand, with the right he opens the lithotome, and in withdrawing it makes a sufficient incision.

31. If there is only a small collection, and its orifice is very near to the anus, the kiotome is sufficient for its incision. The portion of the edge of the anus, corresponding to the small collection, is engaged in the slope of the sheath; the blade is depressed and the division is made.

§ III. *Of the mode of operating in Fistulæ, which are ancient and complicated with callosities.*

32. Notwithstanding the multiplied success obtained by the simple incision of the rectum, it is very necessary that this operation should be generally adopted, especially for ancient fistulæ, whose canal is often accompanied with indurations, and whose sides are callous. Most practitioners, prejudiced by a false idea respecting these pretended callosities, have thought that fistulæ could not be cured without cutting away all the parts which appeared to them to be affected with an unnatural hardness. In Aëtius we see that Leonidas passed into the sinus a flexible director, which he bent, after bringing it back through the anus; and that he cut off, around this director, all the parts which it comprised. Almost all modern authors have recommended this method, which was also, until within a few years, most generally followed by practitioners. Experience, however, had demonstrated, and Guy de Chauliac already knew that these callosities, which were caused principally by the presence of the pus and the passage of stercoral matters, were dissolved and dissipated, as soon as their cause was destroyed by the incision of the fistula. Petit agrees to this truth in his posthumous works; but, no doubt carried away by custom and prejudice, he does not the less recommend the excision of the callous parts, while at the same time he proves its inutility.

33. This method has, however, very great disadvantages. Besides prolonging the treatment, occasioning much sharper pains than the simple incision, and increasing the danger of hemorrhage, the loss of substance which it occasions, produces frequently a contraction of the anus, and sometimes leaves, on the side of the natural anus, a kind of artificial anus, by which the fæcal

matters escape involuntarily during life. Desault saw an instance of it, in a man who had formerly undergone this operation at the Hotel Dieu. Another, whom the excision had not cured of his fistula, and to which had supervened an unnatural anus, similar to the preceding, came to the Hotel Dieu in the last stage of marasmus, and died some days after his entrance.

34. It is not without reason then that Bell asserts, that we ought absolutely to reject excision, which is founded only upon prejudice; and that in cases, where the considerable decay of the anus would seem to indicate a necessity for it, one incision or more, on each side of the rectum, is always sufficient to effect a cure.

35. There is another kind of excision, very different from the preceding, and which often becomes necessary; it is that of the skin, which is commonly found thinned, and so disorganized by inflammation and the presence of the pus, that it is impossible for it to recover its natural state, and to unite to the other parts. No doubt Celsus knew the necessity of this excision, since he advises a double incision to be made of the skin which covers the sinuses, and to remove a portion of it. Fabricius Hildanus also recommended to cut away the skin, or to destroy it in some other manner, when it is so thinned that there can be no hope of its uniting to the bottom of the ulcer. This kind of excision abridges the treatment much, at the same time that it renders the dressings more easy and less painful.

36. It may then be established as a principle, 1st. That the incision is always sufficient to procure the dissipation of the callosities, which, being only kept up by the presence of the pus, would soon disappear with the purulent discharge. 2d. That the disorganization of the skin is almost the only case in which excision should be associated with it. If the long abode of the pus in a

vast collection had so disorganized a portion of the intestine, that there remained no more hope of preserving it, it should also be removed at the time of the operation.

§ IV. *Of the subsequent treatment in the operation by Incision.*

37. Whatever may be the manner in which a fistula in ano has been cut, the dressing consists in introducing every day, between the lips of the wound, a tent of lint, whose length and thickness should be proportioned to the depth and extent of the incision. This is an essential precaution, and recommended, with reason, by Sabatier, to keep it constantly between the lips, especially at first. If it slips into the anus, the wound may re-unite and the fistula would soon appear again; on the contrary, with the precaution indicated, the re-union takes place from the bottom towards the surface, and the cure is certain.

38. If the operation is accompanied with hemorrhage, an accident that sometimes occurs in practice, it may be stopped by pushing up to the top of the incision a dossil tied with a long thread, and then introducing into the wound, with some force, several pledgets of lint sprinkled with colophony, applying above it a layer of lint, long compresses, and supporting the whole with a T bandage.

39. When the blood escapes in great quantity, and this method is not sufficient to stop it, it spreads into the cavity of the intestine, where it finds less resistance than towards the external part; the patient then experiences slight colics and a sensation of heat similar to what would be occasioned by a lukewarm injection; the pulse becomes feeble and small, the extremities cold, and syncope takes place. As soon as this internal he-

morrhage is suspected, the dressing should be quickly removed. We must not then be astonished if the blood should escape in a flood, and as if it had been poured out of a bason; it is that which has been accumulated in the intestine, and which then comes out all at once. Desault has sometimes had occasion to make this observation. In a little time the flowing ceases, and there is none but what is furnished by the open vessel. In this case we must employ more powerful means of compression than those mentioned above. Many practitioners, after the manner of Levret, make use of a bladder, which is introduced into the intestine empty, and then filled with air to compress the sides of the intestine; but the difficulty of then directing the compression in a special manner upon the open vessel, renders this method, in general, of little advantage. The process, mentioned by La Faye, should constantly merit the preference. One day, Desault had occasion to prove the insufficiency of the bladder, in a patient upon whom an excision had been made of the internal coat of the rectum, that had been for a long time protruded outwards and considerably swelled, in consequence of a prolapsus ani. The hemorrhage was considerable; to stop it he had recourse to Levret's method; in spite of this the blood continued to flow, collected in the intestine, and already the patient experienced the symptoms mentioned above. The bladder was then removed to try another mean, and at that instant the blood ran in a flood. It was soon stopped, all the clots were removed, and compression was made in the following manner: A piece of square cloth, having at its four angles strings of thread, was introduced into the anus. In the cavity, which resulted from it, pledgets of lint sprinkled with colophony were stuffed, and upon these layers of lint were applied and retained by tying the threads. This dressing, being left for four

days in its place, was taken away at the end of that time, without the least hemorrhage supervening. The patient was cured soundly.

40. It is rare that the incision of fistulæ is followed by an accident, which the ancients feared especially, and which Paul of Egina regards as inevitable, namely, the incontinence of the fæcal matters. The division of the sphincter seemed to involve this consequence; but at this day we know that divided muscles unite again, like other parts, and perform their functions equally well, after this re-union. Besides, the ligature ought evidently to be subject to the same inconvenience, with which no person, however, has ever thought of reproaching it. It is true that sometimes it happens that, during the first days after the cure, the patient experiences a little difficulty in retaining the fæces; but this seems independent of the division of the sphincter. Desault attributed it to a kind of groove, which is still to be seen in the anus at the end of the treatment. In reality, this difficulty ceases as soon as the groove, of which we speak, is effaced and the cicatrix consolidated. If, however, it should happen that the sphincter of the anus cannot recover its original action, we must attribute this to the disease, which may have eaten and destroyed a portion of this muscle, and not to the operation itself, which may be repeated many times without bringing on this inconvenience, as is demonstrated by reason and experience.

Explanation of the sixth Plate.

Fig. 1. Gorget of wood, concave on one side, convex on the other, seven inches long, seven or eight lines wide, serving for the incision of the fistula.

Fig. 2. A metallic probe, six or seven inches long, about two thirds of a line in diameter, cylindrical, without a button, and the ends a little rounded.

Fig. 3. A canula of gold or silver, about six inches long, exactly fitted to the probe and terminated, like the extremity of the canula of a trocar.

Fig. 4. A trocar of gold or steel, of the same size as the probe, exactly fitted to the canula, which it surpasses in length by the whole of its point, terminated on one side by a kind of button.

Fig. 5. Metallic forceps, used to draw back the leaden thread, about seven inches long. The width of each of its branches is about six lines. *a f g*, A gutter formed by the re-union of the branches, cut in a slope according to their length. *f g*, A cleft, a line and a half deep, resulting from the separation of the branches, and intended to receive the end of the probe and of the ligature. It is a little less than a line at its larger extremity *f*, so that it cannot admit the end of the canula. *r*, A spring intended to separate the branches.

Fig. 6. Female branch of the forceps. *t*, Top of the cul de sac, which is to retain the other branch. *t u*, A blunt sheath, exactly fitted to the convexity of the male branch, and covering over all the cleft, when the forceps is open.

Fig. 7. Male branch, terminated by a prolongation *y*, corresponding to the cul de sac *t*. This prolongation is narrower than the cul de sac, through the whole extent of the opening of the forceps *y z*. The side of the branch is cut at the edge, and furrowed, as also the correspond-



ing side of the other branch, that it may hold the leaden thread the better.

Fig. 8. A section of the forceps, to show the sheath.

Fig. 9. A canula of gold or silver, flattened, five or six lines long, two wide, intended to tighten the ligature; this is a front view.

Fig. 10. A similar canula, longer, a lateral view, so as to show the cleft *x*, which is intended to receive and fix the ends of the leaden thread. The ends of these canulæ must be very blunt, lest they might cut the ligatures.

Fig. 11. A repelling gorget, intended to replace the forceps in the extraction of the thread. This figure represents a front view. *ab*, The concavity of the instrument. *a*, Cul de sac, in which the ligature is engaged; its size must be such that the canula cannot penetrate into it. *d*, A button, fitted to the metallic stalk, which slides in the internal groove of the instrument. By pushing this down or up we may draw the stalk in the same direction, and thus take hold of or abandon the ligature, that is engaged in the cul de sac. *c*, The handle of the instrument bent backward. *e*, The rounded extremity.

Fig. 12. The same instrument in a back view. *ab*, The inferior end of the internal groove, in which the metallic shank slides, seen after the sheath has been taken away. *a*, The internal orifice of the cul de sac, in which the thread is engaged. *d e*, The superior end of the groove. *e*, The end of the metallic shank seen in its groove. *c*, The handle of the instrument.

Fig. 13. The sheath of the inferior end of the groove *ab*; by removing this we can take off the shank and clean the instrument.

MEMOIR

UPON THE

SCIRRHOSES OF THE RECTUM.

ARTICLE I.

Of the Causes.

1. **T**HERE is no portion of the intestinal canal which is more liable to scirrhosis, than its two extremities. The pylorus above and the rectum below, afford us frequent examples of it. The last, in particular, is very frequently affected, and the practice of the Hotel Dieu furnishes frequent occasion of observing this malady. Notwithstanding, it seems to have engaged the attention of authors very little. Only some desultory observations are to be remarked in their works; there is nothing methodical in its description—nothing complete—almost nothing judicious in its treatment. Let us show what Desault has added to both.

2. Scirrhoties of the rectum appear in all ages and attack all sexes; but women are much more liable to them than men. There is no doubt that it would be difficult to determine the reason of this difference, which is nevertheless real; since, in the comparative table of these diseases, the proportion has been nearly ten to one in the Hotel Dieu. Persons, advanced in age, are also more subject to it in general than the young; frequently they appear at the time of the cessation of the menses.

Weak and phlegmatic temperaments seem more disposed to it.

3. This affection is a very common consequence of venereal affections, contracted a long time before, and in whose treatment the internal virus had been imperfectly destroyed. Morgagni, who had often observed it, found the remains of this disease existing in most of his patients. Desault made the same remark: considerable hemorrhoids are also a frequent cause of these scirrhosities. Manget relates the history of a man, who, being operated on by excision, for the hemorrhoids, was attacked with these shortly after. Vasalva cites different cases, where the same cause produced a similar effect: it even appears that these affections have often been confounded with each other, and Morgagni supposes that from this circumstance the first is still so little known by physicians. At the Hotel Dieu, we have also often seen this succeeding to the second, and probably depending upon it.

4. Amongst the causes, we may also rank the metastasis upon the intestines of different cutaneous diseases, such as the itch, tinea, ring worms, &c., a metastasis so much the more easy, from there being, as is well known, a very direct relation between the two organs. Desault had under his care two women, who, having imprudently caused a retrocession of ring worms, by the application of a greasy ointment, were affected, soon after, and without any other apparent cause, with a considerable swelling in the membranes of the rectum. Simon Schultz relates, that a German lord had his skin covered with pustules, which tormented him more in the inferior extremities than in the other parts; besides that he experienced sharp pains in the left side of the face, and towards the lower jaw. He had refused to subject himself to the use of an issue. Purgatives, taken occasionally,

diminished the symptoms, but they soon returned; at length the disease of the skin disappeared without any evident cause, and soon after all the signs of scirrhus of the rectum shewed themselves. Add to this the change from a warmer to a colder climate; the different affections of rheumatism, gout, &c.; the suppression of habitual evacuations, of perspiration, &c.; the abuse of anti-venereal injections, &c. In fine, the action of different mechanical causes, which may, when introduced into the intestines, irritate, occasion inflammation and consequently scirrhus; and thus there will be a table of the numerous and various causes of this affection.

§ II. *Phenomena of the Disease.*

5. Whatever may be the causes, the disease announces itself by a weight in the fundament, by pains, more or less prolonged, in the rectum, and by disagreeable prickings which are felt there; in a little time tenesmus and straining are added; every stool becomes more painful, and there arise frequent desires, but mostly useless, to go to the close stool. Hard and reddish tubercles elevate themselves upon the internal surface of the rectum, or even without the intestine; they do not differ from the hemorrhoids, which they resemble in the beginning, except by being more hard and painful. More or less rapid in their progress, they assume a thousand different forms, sometimes having a pedicle, at others a large base, often so multiplied, that the whole membrane of the intestine seems scirrhus. Morgagni, on opening a subject who died of this disease, found the sides of the intestine hard, thick and strewed with tumours, which were of the size and form of large beans, and which seemed to be conglobate glands. Their surface was smooth, their substance firm and compact; and they

were larger and harder in proportion to their neighbourhood to the anus.

6. When situated externally, these tubercles take more room in the efforts that are made to stool; when placed internally they are then often pushed outwards. They still increase, partly shut up the intestinal canal, and extending sometimes six or seven inches up the anus into the rectum, they even occupy occasionally a portion of the intestine colon, whose cavity is partly obliterated, as has been observed by Cortesius, Haasius, Wenkerus, De Haen, Benevénius. At other times being more superficial they form a hard and callous collar around the anus, as Desault has recorded an example of in his journal, and as, before him, Vasalva had observed. They always impede the passage of the fæces, which in passing through, take the figure formed by their mould, appear as if they had passed through a wire drawer, are covered with the pus that escapes, often accumulate above, and in the efforts when at stool, produce sometimes the invagination of the intestine, and frequently such pains, that at the Hotel Dieu, we have seen patients prefer almost dying with hunger in order to protract the necessity of going to stool.

7. If nothing opposes their progress, these tubercles increase, shut up the intestine completely, finally ulcerate, are covered with varicose veins, occasion frequent hemorrhagies, assume a cancerous character, produce pains that are always increasing and are propagated to the neighbouring parts; at this period it is not rare for a crack to be made in the vagina, and the fæcal matters then escape through it. Desault observed this symptom many times. Finally, in the last stage of the disease, we behold a hideous spectacle of the intestine, bladder, vagina, womb, and all the neighbouring parts, confounded in one common ulceration.

ARTICLE II.

§ I. *Different methods of treatment pointed out by authors.*

8. Having arrived at the last period described (7), the scirrhosities of the rectum, are always beyond the resources of art, which can only afford an impotent aid. Practitioners have even supposed that most generally it was the nature of the disease to arrive at this stage; also, for the most part, they have only sought to protract the symptoms, without attempting to combat them radically: from thence the long train of palliative means, which they employed; from thence the oils, the ointments and the mucilages that were applied to the part; the emollient decoctions that were taken in injections or semi-cupiums; soothers of every kind; resolvents; mineral waters, sulphureous or aluminous; terebinthines, opiates, &c.; and a thousand other varieties, according to each practitioner who employed them. Some, in order to make suitable applications to the evil, made use of tents. Claudinus advised them with this view, and not as being themselves a mean of curing. Vasalva placed in the anus of his patients, while they were in the bath, a canula pierced with many holes, so that the fluids might more easily get into the intestine.

9. The small number of practitioners, who attempted a radical cure of the scirrhosities of the rectum, did not extend their views farther than the general disorder of the humours, without attending to the local affection, which is the contraction of the intestine. Morgagni, persuaded that all these affections partook more or less of the syphilitic character, made anti-venereal remedies the basis of his treatment. He recommends to avoid purgatives, which, irritating the intestine, would not fail to increase the swelling: others, in order to divert the

humours, proposed to have issues upon the sacrum, thighs, &c.

10. There were some, who, confounding scirrhosities with hemorrhoids, proposed and even performed excision; examples of this are to be found in Morgagni.

11. All these methods of treatment are, generally, insufficient, irrational, and even dangerous. 1st. Those who have employed nothing but palliative remedies, have gone upon a false principle, namely, that the disease is incurable: no doubt it is, as has been already said (8), in its last stage, when the cancerous state is confirmed; but when there is as yet no ulceration, when the scirrhus is only beginning, being yet remote from carcinoma, we may then hope for a radical cure by the process which will be pointed out. 2d. Those, who have sought this radical cure only by general means, have not reflected that scirrhus, once formed, seldom yields to these means, which no doubt, ought to be employed previously to destroy the internal disease; but, which, having no effect upon the local affection, must necessarily be associated with remedies that act directly upon it. 3d. We will say nothing of the radical cure by means of excision. In fact how can this operation be hazarded, when we are uncertain both of the height to which the disease has extended in the intestine, and of the thickness of the parts which it occupies? These reflections did not escape Morgagni, who relates a case, in which this bad practice was employed.

§ II. *Treatment used at the Hotel Dieu.*

12. This is the general indication: 1st. To subdue the constitutional disease: 2d. When this is destroyed, to treat the local malady. The means of fulfilling the first part of this indication are as various as the numerous causes which we desire to subdue by them. In certain

cases anti-venereal remedies, in others those which act upon the skin, irritants applied externally, &c. compose these means principally. But, it is not an object to examine them here, because, being common to a multitude of local affections, they have nothing particular with regard to this. Let us suppose then that the internal disease has been destroyed, or that it does not exist, as when the disease depends upon irritations produced by extraneous bodies, hemorrhoids, &c.

13. But in this case there still remain two things to be done by the practitioner: 1st. To restore its natural diameter to the contracted cavity of the rectum, to facilitate the passage of the fæces through it, and to destroy the irritation and pain which result from their passage: 2d. To press down the callosities, to soften and dissipate them, so that the intestine, being restored to its natural state, may not again experience a new contraction, after the treatment. Desault attained this double object, by a simple method, tents kept constantly in the rectum, and whose size was every day increased gradually. Let us consider this method with relation to both the objects, which we propose to attain by its use.

14. The dilatation of canals, which have been contracted by any cause, may be accomplished by bodies of different natures. Sometimes art makes choice of those that are hard and solid, and sometimes it employs those that are more soft and flexible. The former are always attended with great disadvantages; they fatigue, irritate and bruise the parts upon which they are applied, either by their weight and hardness, or because, being moulded with difficulty to the inflexions of the canal, they keep it habitually in a state of torturing pain. It is also necessary that this inconvenience should be compensated by a superior consideration to induce us to disregard it. For example, in our catheters, the disadvantage of

solidity is effaced by the advantage of having a continually free canal through them, and which, without deranging them, allows the evacuation of the fluid contained in the bladder. But this advantage is of no account here; for it has been proved that, although we make use of canulæ of a large diameter in contractions of the rectum, the fæces never can escape through them. The internal membrane of the intestine becomes invaginated in the artificial tube, and forms an obstacle to them. Even wind does not pass out, and Desault, who sometimes employed canulæ, with a view to give them vent, never obtained any good effect from them. It follows from thence that tents, which, with regard to the evacuation of the fæces, are not more inconvenient than canulæ, and which, on the other hand, being supple and flexible, accommodate themselves to all the folds of the intestine, and, not exercising a painful pressure upon it, cannot by that mean fatigue the patient, merit in this case a decided preference over every other dilating body. It is useless to appreciate the necessity of only increasing the size gradually; by that mean the dilatation is made almost in an insensible manner, and, if I may so express myself, without the patient perceiving it. We must conclude then, that in order to fulfil the first object (13) of the local treatment of scirrhosities of the rectum, namely, the dilatation of this intestine, tents, such as Desault used, have real advantages over all other means.

15. To attain the second object of this treatment, or to procure the diminution and disappearance of the callosities (13), this method is not less advantageous. Here authors have multiplied topical, discussing and resolving applications, &c.; but there is no better discutient than a methodical compression upon these scirrhus tumours. The analogy of other tumours would indicate this, if

experience had not assured us of it. It is by their presence alone, by their pressure upon the swelled sides of the rectum, that tents procure the reduction of it, and not by the medicaments with which they are charged. Desault never greased them with any thing but cerate, to facilitate their introduction. It would seem that the intestine, being surrounded on every side with cellular membrane, should yield with difficulty to this compression, and that in making dilatation we would only press the scirrhosities into the rectum. Experience, which is always an invariable judge, answers to the contrary, by showing us, in a number of cases, that these tumours have completely disappeared, at the end of some time, by the use of this method.

16. It follows from what has been said (14, 15), that tents, gradually increased in size, accomplish the double object of the local treatment of scirrhosities of the rectum, namely, 1st. The dilatation of the canal: 2d. The diminution and resolution of the tumours appearing on its sides. Desault employed them with this double view, and in his hands the most happy effects resulted. Upon this point many facts have been published in the Journal. A number of others exist in his manuscripts, and it would be useless to swell this memoir by their collection. Some practitioners, in employing the tents, did not obtain the success which those of Desault seemed to promise them; no doubt the stage of the disease being too far advanced, and perhaps the deficiency of that assemblage of cares, which is so necessary in this case, were the cause of this. In fact, what can be hoped when carcinoma has succeeded to scirrhus? Then the presence of the smallest body becomes insupportable, and to attempt to introduce tents would be rash and irrational. This was never the practice of Desault, although it has been attributed to him.

17. The introduction of tents is always simple and easy, as also the treatment which accompanies their use. The following case will show the details of this treatment, at the same time that it will serve to confirm by experience what has been already advanced.

CASE I.

Reine Collot, aged forty-four years, of a sanguineo-bilious temperament, and of a very good constitution, experienced, about the end of the year 1787, very sharp pains and prickings at the margin of the anus, which returned every time that she went to the close-stool. There then appeared at this part hard and painful tubercles, which impeded the free passage of the fæces. An almost continual straining supervened, and the pains became insupportable whenever this woman made efforts to stool. Many physicians and surgeons, being consulted in turn, considered this disease as a simple inconvenience, produced by the hemorrhoids, and thought that it would quickly yield to the remedies used in such cases. Ointments of every kind, fomentations, baths, drinks, soap boluses, pills, &c., were all employed and without success for many months in succession. The disease increasing and even making rapid progress, in a little time the voiding of the excrements became so difficult, that the patient would go twenty times before she could pass some small portions. They came out moulded in the form and size of a goose-quill and with such violent pains, that this woman (who had borne nine children) judged them to be more severe than the pains of childbirth. She almost starved herself to protract the necessity of going to stool. Her sufferings and inanition had reduced her to such a state of debility, that she could scarcely support herself, when she came to the Hotel Dieu at Paris, the 15th of January, 1791.

Desault attempted, in vain, to introduce into the rectum the end of his finger smeared with cerate. He could not even pass a female catheter into it, but by twisting it alternately from right to left, in every direction, so as to avoid the hard and painful tubercles and lumps which filled up nearly the whole capacity of the canal, and which prevented the catheter from being introduced in a straight line.

This affection was treated by pressure, which was made by means of a tent of long lint, knotted and folded in the middle, smeared with cerate and pushed into the rectum by the assistance of a forked probe. Although this was not at first larger than a goose-quill, it could not be made to penetrate more than two inches in depth. Thick compresses, sustained by a triangular bandage, were placed upon the external tubercles. The patient was put upon the use of a drink slightly diaphoretic, and was entirely nourished by rice.

This woman appeared to be relieved on the same day. Excited without doubt by the kind of suppository, which she had in the rectum, she had in the evening a copious stool, which did not cause such sharp pains as she experienced commonly. She was then dressed again, as before; but the tent of lint penetrated farther. The dressing remained until the next morning. It was then removed to give an injection, and the fæces, thus delayed, came away without causing much pain. A much larger and longer tent, than that in the morning, was introduced with ease.

The patient was dressed twice every day until the sixth, increasing the size and length of the tent a little at every dressing. The strength then began to return, and the excrements came away without pain, by the assistance of an injection which was taken in the morning. The intestine had acquired sufficient capacity to

admit the finger. By this Desault discovered, wherever he could reach, callous lumps, that were very sensible and very hard at their base, but less so towards their loose edge, which had, without doubt, been softened by the compression made upon it by the tent. Afterwards the dressing was not changed but once in twenty-four hours. The tents, being gradually increased, soon acquired a considerable size. The patient was nowise incommoded by them, and her health and strength became more established every day.

On the twenty-fifth, Desault again examined the state of the intestine, and instead of the hard and painful tubercles and lumps, which he found at first, there were nothing more than soft, compressed folds, which were not painful to the touch. The tubercles, that were situated at the margin of the anus, were so compressed, that scarcely any vestiges of them could be perceived. However, the use of the tents was continued, and their size still increased, so that on the thirty-fifth day they were an inch in diameter.

On the forty-fifth day this woman began to introduce the tents herself, so that by using them occasionally she might be in a state of preventing the return of the disease hereafter. She dressed herself, for eighteen or twenty days that she still remained in the hospital, to confirm her cure. She finally went away to resume her labours in the country, on the sixty-seventh day from her entrance into the hospital, and twenty-six months after the commencement of her disease.

*Of Cases in which Fistulæ are added to Scirrhosities.—
Of the consequent treatment.*

18. The preceding case offers a view of the treatment of scirrhosities in ordinary cases, those of simple contraction of the intestine; but when to this contraction

there is added an opening into the vagina, it will be perceived that this must occasion a difficulty. But this case does not seem to be always beyond the resources of art, if we make use of the means that have been proposed. The following case will prove this assertion, with respect to which we have not, without doubt, facts enough to establish general principles, but which nevertheless we may bring forward with assurance.

CASE II.

Louisa Grandner, aged forty-six years, had been treated, at the age of twenty years, for a venereal affection. Affections of the periosteum, that supervened some time after on different parts of the cranium, terminated in abscesses. Other symptoms then appeared, and this woman, during many years, dragged on a languishing life. Her health was at length a little re-established, and her life was tranquil enough until the commencement of the year 1787. At this period she felt a pricking heat in the rectum, and soon after pains that became so sharp, whenever she went to stool, that she had convulsions. The difficulty of passing the excrements increased every day, and in a little time there came away nothing but a kind of wire-drawn stuff and mixed with pus. A new anti-venereal course was then advised for her, which she underwent completely in the hospital Bicêtre, and from which she derived no advantage.

Some time after, on making violent efforts to expel the fæces, she perceived that they came through the vagina. From that time the wind and excrements always followed this new route, and the last, especially when liquid, ran through almost continually and without the patient's perceiving it. In this state she came to the Hotel Dieu on the 10th of September, 1790. Desault

having, with much difficulty, introduced the index finger into the rectum, found, two inches above the margin of the anus, a hard and callous lump, which closed the intestine. Having dilated it a little, he got over it, and found above its anterior part the opening through which the excrements passed into the vagina; it was about an inch in diameter, and its edges were hard and callous.

At first he placed in the vagina a large plug, that was a little conical, smeared with cerate and having the base turned upwards, so that it might slip the less, and that the canal of the urethra might not be compressed by it. He then introduced into the rectum a tent, whose end was pushed beyond the scirrhus lump. He prescribed besides a sudorific ptisan, to each pint of which were added six grains of the mineral alkali; and she took, morning and evening, a pill composed of one grain of calomel and as much sulphurated antimony, in a suitable conserve.

On the first days of this treatment, the fæces ceased to pass through the vagina. The tents were soon introduced with more ease into the intestine; they were increased by degrees, and the excrements did not experience any more difficulty in passing through the anus. On the twenty-fifth day the scirrhus lump, having been worn away by the compression, was no more to be found. The hole communicating with the vagina was diminished, and its edges were thinned. There still existed callosities, that could be felt with the end of the finger, and which extended far beyond its reach, as might be judged by the difficulty of making tents pass them. These callosities were not yet entirely destroyed, when the patient, not suffering any more, and believing herself entirely cured, left the hospital. She soon repented of this, for two months after the pains appeared again,

This woman then went into another hospital, where she was treated for three weeks by internal remedies. At length she came back to the Hotel Dieu, with the same symptoms that brought her there at first.

The treatment was re-commenced, and had all the success that could be expected. At the end of two months, there remained no more callosities in the intestine; the fistulous opening of the vagina was hardly three lines in diameter, and it might have been hoped that the treatment, continued for some time, would make it disappear; but at this time also the woman would not wait for the fistula to be closed before she left the hospital. She was advised to use the tents, which she knew how to introduce herself.

REMARKS AND OBSERVATIONS
UPON THE
DIFFERENT KINDS OF HYDROCELE.

ARTICLE I.

Reflections on the radical cure of Congenital Hydrocele.

SECTION I.

CONGENITAL hydrocele, with which the ancients were unacquainted, was not known until lately by the moderns. We are indebted for its history to Viguerie, a surgeon of Toulouse, who, in a memoir presented to the academy, has marked the symptoms and described the treatment of it. I will not repeat the former; but it is necessary to state the latter, that we may have a right conception of Desault's additions to it.

It is known that the special characteristic of this kind of hydrocele, is the communication of the water contained in the tunica vaginalis, with the serosity of the abdomen;—a communication which results from the non-obliteration of the sheath, furnished to the chord by the peritonæum, and which, permitting the effused fluid to ascend and descend alternately, keeps up the dilatation of the ring and prevents it from contracting, while at the same time the presence of the fluid also prevents the re-union of the sides of the sheath. If, therefore, this communication be intercepted, the water being pre-

viously made to return into the abdomen, we might hope for the double advantage of contracting the ring and obliterating the sheath of the chord. This is the object proposed by *Viguerie*, who advises, 1st. To make a regular pressure upon the tumour, which causes the ascent of the fluid that had descended into the tunica vaginalis. 2d. To retain it in the abdomen, and to prevent it from descending again, by means of a truss, whose cushion, being placed exactly upon the ring, should be kept there habitually and constantly, until nature shall have accomplished the double object contemplated by art. Many cases of this author support the marked success of this method, and *Sabatier* himself has been a witness of this success. *Desault* also wished to attempt the radical cure by this method, but he was not so fortunate. However exactly the bandage was applied, the smallest effort caused the tumour to re-appear, by the falling down of the fluid into the scrotum; and after the long continued use of pressure there was no appearance of obliteration. The insufficiency of these attempts induced him to employ a process more sure in its results, more speedy in its execution, and the efficacy of which is confirmed by many cases.

§ II. *Desault's Process.*

This process consists, 1st. In causing the greatest possible quantity of the fluid to descend into the tunica vaginalis, in order to distend its sides, and thus facilitate their perforation. 2d. To make, with the trocar, a puncture in the tumour at the usual place, that is to say, at the anterior and inferior part of the scrotum, and thus to give issue to all the aqueous collection. 3d. To ascertain if, as is sometimes the case, a portion of the intestine has not descended into the sac, and to reduce it, if

that should be the case. 4th. Through an assistant to make a strong pressure upon the crural arch, by means of a cushion, which intercepts all communication between the abdominal cavity and that of the tunica vaginalis. 5th. Then to throw into this latter cavity, at two different times, an injection of red wine, which must be suffered to remain and then be evacuated as in the ordinary operation for hydrocele by injection. 6th. When the wine is evacuated, the assistant discontinues the pressure, the surgeon withdraws the canula, and the scrotum is wrapped up in compresses, soaked in the wine which was used for the injection. 7th. The pressure, that was made by an assistant, is replaced by that of a truss, which is applied upon the ring, with the double view of preventing the intestines from descending into the sac, irritated by the injection, and of preventing the little wine, which might remain there, from passing into the abdomen.

The irritation occasioned by the momentary presence of an extraneous fluid, upon the internal surface of the sheath of the chord and of the tunica vaginalis, soon produces an inflammation there, from which proceed the adherence and obliteration of both cavities; and by the same means we may accomplish the radical cure, not only of hydrocele, but sometimes even of hernia, which is most frequently complicated with it.

This method has the advantage, over the preceding, of being more sure, more speedy, of never risking the regeneration of the tumour, and of being always practicable. Perhaps it may be feared that the inflammation, which is here necessary to the obliteration, might be propagated to the viscera of the abdomen, through the continuity of the peritonæum with the sheath of the chord; but experience has never realized this fear, from

which the practitioner is always secure, by taking care that the pressure made upon the ring is very exact, while he throws up the injection, so that no portion of the fluid can penetrate into the abdomen; by attention to its complete evacuation, leaving nothing in the sac before the canula is withdrawn, and then placing a bandage, as has been related.

CASE I.

Alexander Mourot, aged nine years, from his birth had, in his scrotum, a tumour, that was fluctuating, semi-transparent, without pain, of the size of a large egg, which disappeared by pressure and a horizontal position, and the nature of which could not be ascertained by several of the profession.

Desault, being called to the patient and being certain, from such evident symptoms, of the existence of a congenital hydrocele, proposed the operation described above. He first made a previous puncture in the tumour, and by it gave vent to a quantity of fluid, which was much more considerable than the sac seemed to contain; the water being evacuated, he examined the state of the parts, and perceived that a small portion of intestine was down; he reduced it, and being then free from all fear on that account, he made a compression at the groin, so as to prevent the injection from ascending, injected lukewarm wine at two different times, evacuated it as in the ordinary case of hydrocele, and then substituted, for the pressure made by an assistant, that of a bandage, for the reasons stated above.

The pains, which were severe during the operation, soon abated. A slight swelling of the scrotum supervened the next morning, increased on the third day, then diminished and disappeared on the fifth. The patient was then made to cough, to see if the hydrocele

would re-appear as usual. A small tumour was formed at the ring, but without fluctuation, and did not pass below the pubis; this was the intestine, which made a simple inguinal hernia. The patient, having remained a long time without the bandage, did not perceive any trace of his tumour in the scrotum; the tunica vaginalis having, no doubt, been obliterated by the injection, and not the smallest inconvenience remained from the double affection.

ARTICLE II.

Reflections upon the radical cure of the Hydrocele, complicated with swelling of the Testicle.

SECTION I.

One of the precepts that is most recommended in the operation for hydrocele by the method of injection, is to examine with care the state of the testicle, after having given vent by puncture to the effused fluid, so that we may confine ourselves to the palliative treatment, if any swelling should be found in this organ. The fear of increasing this swelling, by the irritation which the injected liquor produces, has given rise to this precept, which has been almost universally adopted in practice.

But it seems that the application of this has been too general, and that many cases present a contrary indication. Several cases have proved it to Desault, who, by making use of injection, has been able, at the same time, to make a radical cure of the hydrocele, and to procure the resolution of the swelled testicle, as will be seen in the following cases, recorded by Larbaud.

CASE II.

Francis Moisseron entered, on the 21st of September, 1793, into the great hospital of Humanity, to be treated for a hydrocele of the tunica vaginalis, complicated with a swelling of the testicle. No cause appeared to have given rise to this double affection, whose slow and insensible progress offered nothing particular; but which, considering the quantity of the effused fluid, demanded pressingly that it should be evacuated. Before making the puncture, Desault prepared the patient, as for the operation by injection, hoping in fact to perform it, if the swelled testicle seemed susceptible of resolution. A strict regimen, veal broth taken abundantly, some grains of emetic tartar, given to keep the belly free, were the means employed during five or six days, at the end of which the patient was brought to the amphitheatre to be operated upon there.

After the previous puncture and evacuation of all the fluid that was confined in the tunica vaginalis, the state of the testicle was examined. Its size was much augmented; but it was soft, yielded easily to the pressure of the fingers, and did not seem to have any of the characters of scirrhus. This circumstance determined Desault to continue the operation, by throwing twice into the tunica vaginalis, an injection of luke-warm wine, which remained there three minutes each time. The scrotum was then covered with compresses soaked in the wine, and the patient, who during the operation had suffered sharp pains, was carried to his bed.

The swelling of the testicle increased the next day. Pain and inflammation also supervened: emollient poultices were substituted for the compresses. A strict regimen was prescribed. The progress of the swelling and inflammation were sensible for the four following days,

but they began to diminish on the fifth; light food was then allowed to the patient. The symptoms diminished gradually from the sixth to the twelfth day, at which time the testicle was smaller than before the operation. On the twenty-third, it was almost reduced to its natural size: at length the patient went from the Hotel Dieu, perfectly cured, both of his hydrocele and of the swelled testicle, on the 10th of December, one month and a half after the operation.

CASE III.

J. B. Maudieu, a butler, native of St. —, department of Calvados, was attacked, in the month of February, 1793, with a pain in the right testicle; a swelling succeeded a few days afterwards; its rapid progress soon forced the patient to come to the Hotel Dieu, where rest, and the application of emollients, soon dissipated this symptom. Returning home he found, in the month of August, a new swelling, which was accompanied, at this time, by a manifest fluctuation, and whose slower progress permitted him to attend to his business for a month. He returned at the end of that time to the Hotel Dieu; and on examining him, Desault immediately recognized a considerable hydrocele. The indication was, as in the preceding case, to make a puncture, examine the testicle, and then make use of the injection, if the swelling was of a nature to be resolved. Desault determined upon this. The operation being performed as in the preceding case, exhibited the same phenomena and had the same results. The testicle, which was at first more swelled than before the operation, diminished gradually in size, and was reduced, on the thirty-fifth day, to its natural bigness.

SECTION II.

We might add to these many other cases, in which the same process has been employed with equal advantage. Among others Desault mentioned, in his lectures, the example of a goldsmith, in whom a double hydrocele was complicated with a double swelling, and who was cured in a few days by this method. From thence it follows that this general maxim, of abstaining from the operation in the cases under consideration, ought to be modified under many circumstances. Reason would tell us this, if the experience of Desault had not assured us of it. In fact the testicle is subject to different kinds of swelling, which, being essentially distinct in their nature, demand also very different treatment. Without doubt it would be imprudent, when the scirrhus is at its last stage, to add to the irritation already existing, that of the contact of a foreign fluid. The passage to the cancerous state would probably be the consequence: but, when the scirrhus of the testicle is commencing, when it is only in its first stage, all practitioners advise that we should attempt to obtain its dissipation by resolvents placed upon the scrotum. Now the effect of these resolvents would be much more powerful, if, instead of applying them upon the testicle, through the integuments, they were applied immediately upon its surface, which is done in this case by injecting the wine into the tunica vaginalis. What takes place, in consequence of the injection, proves evidently that the injected fluid acts as a resolvent. In fact, as in swellings which are dissipated by these remedies, we behold here the swelled organ at first increasing in size, for some days; but in a little while this new swelling, coming to a resolution, seems to involve with it the resolution of the primitive swelling.

It may therefore be established as a principle, that the swellings of the testicle, which are in their commencement, and in which this organ has not yet acquired that degree of weight that is essentially characteristic of confirmed scirrhus, so far from being an obstacle to the operation for hydrocele by injection, present on the contrary a manifest indication for it, in order to cure at the same time the disease of the tunica vaginalis and that of the testicle.

The scirrhus enlargement of the testicle, is not the only one that may be complicated with hydrocele; there is another kind of enlargement, different from this, which depends essentially on the relaxation of this organ, and in which its substance, while increasing in size, becomes soft, relaxed, and extends, so to speak, by choaking; a state which is easily indicated by the touch, after the water, contained in the sac of the tunica vaginalis, has been evacuated. But here also to strengthen by tonics the enfeebled elasticity of the parts, is the indication that presents itself. But how can tonics act more efficaciously, than by applying them to the spot, as is done by injection? Our remedies would have a more certain effect, if we had always, as here, the facility of applying, without an intermedium, other bodies upon that in which we wish to produce some changes.

REMARKS AND OBSERVATIONS

UPON THE

OPERATION FOR SARCOCELE.

DESAULT has added nothing very important to the operation for sarcocele. In this, however, as in all the other operations, his practice carries the stamp of that surgical genius, which, by modifying, knows how to appropriate to itself, even to the least detail, whatever places its subject in the most proper light, and which seems to create anew, by repeating what another has done. It is therefore by presenting here, so to speak, his practice put in action, that we must give an idea of it. This is the end proposed in the two following cases, extracted from the Surgical Journal, one of which will exhibit the operative details, in the most simple case of scirrhus testicle; whilst the other will present them to us in the most essential complication, and with which we meet most frequently, the enlargement of the chord.

CASE I. *Recorded by Plaignaud.*

Jean Gautier, after having enjoyed good health until the age of forty-one years, was attacked suddenly, on the 18th of September, 1788, with a very painful swelling of the right testicle, without being able to suspect the cause of this symptom. After some hours the pain was alleviated by the use of general remedies; but the

size of the part affected remained the same, and in a little time the testicle became hard and scirrhus.

Things remained in this state during six or seven months, without Gautier's feeling any other inconvenience than the weight of the tumour. Lancinating pains and the rapid increase of the size of the testicle, at length determined this man to come to the Hotel Dieu, into which he was received on the 10th of October, 1789, one year after the commencement of his disease.

The tumour then had the size and form of a goose-egg; it was very hard and but little sensible to the touch; the skin, which covered it, did not participate at all in the affection of the testicle, neither did the chord of the spermatic vessels. Otherwise the subject appeared well formed; every thing, in short, seemed to promise a successful issue to the operation, which was rendered indispensable by the accelerated progress of the tumour, and the approach of lancinating pains. With the view of making the success still more certain, some weeks were employed in preparing the patient by general remedies, and especially in encouraging him against the fear of the dangers of amputation, which he had exaggerated much. Desault operated at length, at the end of a month, when he saw him prepared suitably and in the state of mind which he desired.

1st. The patient being laid upon his back, with the thighs and legs extended, the surgeon made, a little below the ring and perpendicularly to the direction of the chord, a fold of the skin, one end of which was held by an assistant, while he held the other himself.

2d. Placing the end of the bistoury upon the middle of this fold, he cut it obliquely up to its base. Then raising up the skin of the scrotum, and seizing with his fingers the lower part of one of the edges of the wound, whilst an assistant did the same on the other side, he

prolonged this incision to the posterior part of the scrotum and of the tumour, whose lateral parts he then disengaged.

3d. Before finishing the dissection, he separated the chord, which he found entirely sound, and cut it as low as possible; slipping the cutting edge of the bistoury behind it, whilst he raised it up with the left hand, by holding its upper part between the thumb and the index finger.

4th. After this section, and without abandoning the chord, he seized, with the dissecting forceps, the ends of the spermatic arteries, one after the other, and an assistant secured them immediately with a ligature of double waxed thread.

5th. He then abandoned the chord, and finished the separation of the tumour, by dissecting it from above downwards, holding the cutting edge of the bistoury turned towards the testicle. This is then done without pain, since there remained nothing to be divided but the branches of the nerves, the trunk of which had been already cut in the section of the chord.

6th. That he might not be incommoded by the blood, during the operation, he had taken care to tie the small arteries, as fast as they were divided, so that when he had finished, the wound was almost dry. The whole of the skin of the scrotum had also been preserved, because, as was remarked above, it was perfectly sound, and because the size of the testicle was not great enough to make him experience a very considerable distension. There was then nothing to cure but a simple wound, the uniting of which it was thought might be attempted without inconvenience.

7th. In consequence of this the edges of the wound were brought together and were kept in contact by a cushion of lint placed on each side, and by some other

lint applied to the wound itself; some long compresses, sustained by a double T bandage, composed the rest of the dressing.

The patient did not suffer during the first two days. He was kept on a strict regimen and the use of a diluting drink, acidulated by oxymel. Fever appeared on the third day; it increased a little the two following, but was still moderate. The wound did not then appear disposed to unite; but suppuration had not yet taken place, and it was not well established until the seventh day.

The ten following days exhibited nothing particular; the state of the wound even seemed to announce a speedy cicatrization. But towards the twentieth day, the suppuration of the edges, which until then had been moderate, became extremely abundant; the flaps of the scrotum became thin and folded themselves inward, becoming inverted in spite of the care with which the dressing was made. From that time the strength of the patient diminished daily, and his mind became restless; in a little while a colliquative diarrhœa, which resisted all remedies, completed his exhaustion, and this man died the forty-fifth day after the operation.

The most accurate research could not discover any thing extraordinary in the body. The chord, in particular, was sound through its whole extent.

CASE V. *Recorded by Cagnion.*

Joseph Lenoir, aged thirty-seven years, and of a feeble constitution, came to the Hotel Dieu, on the 25th of April, 1792, with a sarcocoele much more considerable than the preceding. The right testicle was as large as two fists. The chord, being swelled near to the ring, was more than twice the size of the natural state. This mass, which was very hard and but little painful to the touch, occupied the whole of the scrotum and pushed up the

left testicle towards the groin; the skin of the bag was sound and without adhesions. The patient almost continually experienced a sharp pain, which corresponded to the inferior part of the chord and was prolonged into the abdomen, and even to the region of the kidneys, when the tumour was not relieved and kept up carefully. He also felt, at intervals, lancinating pains in the testicle. This disease was of long standing: two years before, Lenoir had bruised the testicle in a violent exertion and although the pain went away of itself in a few days, there always remained a swelling, to which this man had never paid more than a slight attention. The progress of the tumour at first had been too slow to occasion much inquietude; but the pains, that came on afterwards and the rapid increase of the disease, had at length compelled him to seek the aid of art, which he had heretofore rejected.

At this period there was no other resource than the operation, which became the more necessary as, in the existing state of affairs, it was to be feared that the disease might soon be propagated into the interior of the abdomen. No more time therefore was lost than what was necessary for the patient to make up his mind and to prepare him by rest, a temperate regimen, the use of diluting drinks, and some gentle purgatives.

This operation was not without difficulty, especially on account of the extensive enlargement of the chord. This enlargement, as has been said, was prolonged even to the ring, and it might be supposed that the sound part of the chord, answering to this opening, had been deeply situated within the abdomen, before it was drawn downwards by the extraordinary weight of the testicle, and that it would retract much above the ring, as soon as this same weight should cease to act upon it. After having foreseen all that might happen, Desault commenced

the operation, as in the preceding case, by cutting the skin and cellular membrane, upon the chord, from the ring to the bags, and dividing the scrotum by two semi-lunar sections, which left between them all the superfluous skin that was to be cut away. He then separated the lateral parts of the scrotum from the testicle, whose posterior part he dissected, proceeding from below upwards, and always directing the cutting edge of the bistoury against the tumour. After having in the same manner separated the chord, by continuing the dissection unto the ring, the surgeon drew it downwards carefully and gently, until he could seize the sound portion between the thumb and the index finger of the left hand. Then he finished the separation of the tumour, by cutting the chord above the enlargement, and near his fingers: afterwards he laid hold of the spermatic vessels with the forceps and had them tied by an assistant, before he let go the end of the chord, which was kept out. It was soon seen how necessary these precautions were; for the chord was no sooner left to itself than it retracted into the abdomen. The operation was thus terminated fortunately and without the patient losing blood, because all the arteries were tied as fast as they appeared, which Desault did in all his operations.

The tumour, that was extirpated, presented to the examination nothing but a uniform mass, similar to rancid lard, and in which no trace of organization could be recognized. Its consistence in some parts was like that of the cartilages of young animals. About the spot, which corresponded to the insertion of the chord, there were several red points, in the centre of which there were some drops of a sanious fluid. The chord had not as much consistence as the principal tumour; but it was already decomposed at its inferior part, and no doubt it would soon have become like the testicle.

The patient slept in a few hours after the operation, and passed nearly the whole day and the greater part of the following night in profound repose.

The wound progressed as usual, until the eleventh day. At this time there came on a general distress, pains in the head, shiverings and fever. The patient stooled with difficulty, his mouth was bitter, and his tongue was covered with a thick yellow slime. The edges of the wound were of a dull red, and furnished a scanty suppuration, which was also thin and of a bad colour and smell. The fever ceased the next day, after evacuations had been produced by emeticised veal broth. The other symptoms diminished at the same time. The cicatrization was completed on the thirty-second day.

MEMOIR

UPON THE

OPERATION FOR THE STONE,

ACCORDING TO THE IMPROVED PROCESS OF HAWKINS.

ARTICLE I.

§ I. *General considerations.*

1. **L**IKE all others, the operation for the stone is a field, where every one wishes to sow, and where few reap; which all think themselves able to enlarge, and which almost all contract; making an immense mass for the man of erudition to investigate, but which is reduced to a small space for the practitioner. Amidst a multitude of processes, we find that in the books of their authors opinion stifles in the birth some happy processes which genius conceived, which experience has consecrated and which have survived the ruin of others. In the method of the great lateral apparatus, these processes, especially those of Friar Côme, and Hawkins, are at this day the most generally adopted in France, being the same in their effects, but different in their action; the one dividing the neck of the bladder and the prostate from without to within, and the other from within to without; each of them attended with their advantages and inconveniences. Desault employed them indifferently; but,

for the second he had a kind of predilection, founded upon the numerous and useful improvements, by which he had made it almost his own. To make these improvements known, and to show the mode of operating by means of the instrument thus improved and perfected, is the object of this memoir.

§ II. *Of the original instrument of Hawkins and the manner of using it.*

2. The numerous processes which compose the lateral apparatus, do not differ, as is well known, except in the instrument intended for the incision of the neck of the bladder and the prostate. Hawkins, wishing on the one hand, to diminish the number of the instruments that are necessary for the operation, and on the other to avoid injuring the bladder, thought of making this incision by means of the conductor which serves to direct the forceps into the bladder, and which with this view he made with a cutting edge upon the right side. The instrument, which he used, engraved (fig. 1), is a real gorget, convex on one side, concave on the opposite side, five inches and an half long from (*B*) to (*d*), three inches from (*B*) to (*f*), for adult subjects of an ordinary size, an inch wide at its base where the handle is united to it, narrowing from thence towards the point, where it has no more than one third of its original diameter, terminated by a stylet (*c, d*), projecting beyond that extremity, cutting almost the whole length of the side (*c, e*), blunt and obtuse at the other end, mounted with a handle (*B, f*), which is flattened, curved to an angle with the body, and presenting an oblique direction.

3. In making use of this instrument, the patient is secured and held as in the other methods of cutting for the stone. The urethra is previously cut, to the extent of half an inch beyond the bulb, and upon the staff in-

troduced into the bladder, in the same way as in all the other processes of the great lateral apparatus. This incision having been made, 1st. The bistoury, which was used to make it, is brought back towards the superior angle of the wound, and serves as a conductor to the stylet point of the gorget until it enters the groove of the staff. 2d. When that is done, the bistoury is withdrawn; the surgeon seizes the handle of the staff, which is inclined to the left, brings it back towards the pubis in such a manner as to make a right angle with the body, lowers it, while he presses upon the rectum in order that the gorget might penetrate through the widest part of the angle of the os pubis. 3d. Slipping this last instrument to the extremity of the staff, in a horizontal direction, he cuts the neck of the bladder and the prostate: 4th. He disengages and withdraws the staff, and taking the handle of the gorget into his left hand, he makes use of it to conduct the forceps into the bladder. 5th. The gorget is withdrawn in the direction, in which it was introduced, for fear of wounding the surrounding parts and then the process becomes the same as the others and has no more peculiarities.

4. This cursory view, both of the gorget of Hawkins and of the manner of using it, is sufficient for understanding the numerous modifications of which both are susceptible; modifications that are necessary, on account of their numerous inconveniencies. Let us examine these inconveniencies both in the instrument and in the process which it performs.

5. 1st. The concave form of the gorget produces, in the incision of the neck of the bladder and of the prostate, a semicircular flap superiorly, which may swell and thus impede the passage of the urine, and make a deformed cicatrix. With regard to this, the changes made by Bell in this instrument, have not been advantageously

modified. 2d. Being a little too large at its cutting extremity it does not cut the parts deep enough, and by that makes necessary either farther incision or frequently pernicious dilatations. On the other hand its extremity, which is next to the handle, is uselessly enlarged and cannot but impede the operator. Bell perceived this double defect; but, in remedying the first, he carried the correction of the second to excess. 3d. The lateral inclination of the handle makes the instrument unfit to be pushed in simultaneously with the staff, by an uniform and well combined movement. 4th. When pushed imprudently into the bladder the gorget may, from its terminating in too long a stylet, bruise, lacerate and even perforate the membrane of the bladder, and give rise to infiltrations, which are the more dangerous as the places from whence they proceed are more inaccessible. This accident is especially to be feared, when, as the English do, we make use of a staff without a cul de sac. 5th. The cutting edge is uselessly prolonged upon a whole side of the instrument, since the extremity alone makes the incision of the neck of the bladder; besides, the posterior part of the cutting edge may, in its introduction, wound other parts than those that are to be cut. 6th. The stylet, being placed in the middle of the instrument, does not leave width enough to the straight part, which must make the incision of the neck. From thence arises much difficulty in this incision. An English surgeon has pushed the correction of this inconvenience too far, by totally suppressing the left side of the instrument, which then becomes a simple cutting blade, analogous to our common bistouries.

6. These essential faults of the gorget of Hawkins, necessarily make imperfect the process that results from its use. But to this process are also attributed other inconveniences, which are occasioned by the manner of

using the instrument. 1st. The method of pushing it horizontally into the bladder upon the staff, held at right angles with the body, has two great disadvantages; on the one hand, that of penetrating through the narrowest part of the pubis, and consequently making a sufficient opening with difficulty; and on the other, that of not establishing a parallel between the external incision of the integuments, which is oblique, and that of the neck of the bladder and of the prostate, which then becomes horizontal. From thence arises the possibility of infiltrations, from the obstacles which the urine might find to its flowing out. An advantage seems to compensate these inconveniencies, that is, by this manner of cutting and especially from the concave form of the gorget, the rectum is always secure as well the internal privy parts, a double difficulty that we have also to shun in the use of almost all instruments. But with a skilful hand and which is directed with certainty by anatomical knowledge, the injury of these two parts is hardly ever to be feared; and under this view, this consideration, when put in the balance, ought not to outweigh the two preceding. 2d. In using his gorget, Hawkins did not push in the staff at the same time, by a simultaneous movement; from thence it happens, either that the instrument reaches the cul de sac before it has cut the prostate sufficiently, or, that, if the staff is without a cul de sac, the stylet will bruise the sides of the bladder, as has been stated. 3d. The gorget, being withdrawn in the direction in which it was introduced, may wound the surrounding parts, on account of its shunning them so little. Monro wished to remedy this accident, by adapting to the gorget a blunt blade, which covers the cutting edge as soon as it has made the incision. But this is an useless complication, and by a particular turn given to the

instrument it may always be withdrawn safely, as will be seen.

ARTICLE II.

§ I. *Of the Instrument of Hawkins, as improved by Desault, and of the manner of operating with it.*

7. The instrument of Hawkins, which was first made public in England, where it was supported by numerous instances of success, was introduced into France by Louis, who had a kind of predilection for this process, from the solitary example of a cure obtained by it at the end of the third day. Desault, still young at this time and almost a stranger to practice, soon conceived, however, all the advantage that was offered by this instrument, if, presented under new modifications, it was introduced into practice exempt from the great defects that were applicable to it, as has been seen, both in its construction (5), and in the manner of employing it (6). He then thought of the numerous improvements which he has since preserved, made it the subject of his thesis of reception into the college of surgery, and modified the instrument in the manner we have represented (fig. 2). But when we compare this, thus modified, with that originally invented by Hawkins, we perceive that it differs from it in many views.

8. 1st. The concavity, given by Hawkins to the blade (*B b*, fig. 1), is almost entirely effaced. The blade (*a b c*, fig. 2), almost flat, preserves only a slight curvature, which is necessary to the introduction of the forceps. From thence proceeds an incision without the semi-lunar flap, and more fit for the evacuation of the urine, which it does not impede. 2d. The width of the extremity touching at (*e d*, fig. 2), compared with that of the blade in its lower part, is much more considerable than in the original instrument, which always diminishes

from the handle to the stylet. By this the prostate is cut to a greater extent, and with more ease. 3d. The handle (*a*, fig. 2), placed in the same direction with the blade (*a c*), instead of inclining laterally like the handle (*B f*, fig. 1), permits more easily the combined movement of the gorget and staff. 4th. In the place of the too much elongated stylet (*d e*, fig. 1), a simple beak (*b c*, fig. 2), has been substituted. Its form and size should be exactly analogous to the groove of the staff. 5th. The cutting edge is limited to the anterior third of the side (*c e*, fig. 2), it is rounded and becomes blunt in its posterior two thirds. 6th. The beak, instead of dividing equally the anterior part of the blade, is placed much more to the left, leaves more width to the right part, and thereby gives it more facility for cutting the parts through which it passes

9. Such is the assemblage of the changes made by Desault in Hawkins's instrument, changes which give it the form expressed (fig. 2). Now if we compare this form with that represented (fig. 1), we will see that the numerous inconveniencies, applicable to that, as we have seen (5), cannot be objected to the other. The simple parallel of the two articles (5 and 8), will be sufficient for conviction. I will not therefore trouble myself more upon that subject.

10. The length of the gorget varies according to the subject on whom it is employed. Desault had three kinds. The greatest was about five inches long, and from eleven to twelve lines wide, at the part where the cutting edge stops; the second was four inches and a half long and from nine to ten lines wide; the third was four inches long and from seven to eight lines wide; these proportions relate only to men, in whom a number of parts is concerned. With women the maximum of the size of the instrument was the minimum of that of men.

11. The difference in the form of the instrument must necessarily involve one in the manner of employing it. I have mentioned (6), what, under this view, were the inconveniencies of Hawkins's process, both from the horizontal direction impressed upon the gorget at the instant of its introduction, and from the immobility of the staff at the same instant, and from the manner of withdrawing the gorget. The following case, in which Desault's process is accurately traced, will prove that these inconveniencies were avoided, and at the same time it will exhibit all the details of the operation.

CASE.

Anthony Martin entered into the Hotel Dieu, on the 27th of April, 1790, with all the characteristic symptoms of a stone in the bladder: a painful itching at the end of the penis; involuntary erections; bloody urine occasionally, especially in violent exertions; retention of urine coming on suddenly and disappearing in the same manner, pains and weight in the perinæum, and in the region of the bladder, which were less sensible in a state of rest, but more sharp when exercising, and especially after making water; the urine always loaded with a yellow sediment, &c. During one year that the patient felt these symptoms, he had employed different remedies in vain, the insufficiency of which forced him at last to enter the Hotel Dieu, when the certainty of the disease, whose existence might easily be suspected, was ascertained by sounding. Some diluting drinks, that were given during eight days; a purgative then administered and repeated, to subdue a bilious disposition which manifested itself some time after the arrival of the patient; an injection given in the morning; were the only preparations for the operation, which Desault performed in the following manner on the seventeenth day.

1st. The patient being placed properly upon a table, as in all the methods of cutting for the stone, the thighs separated, the legs bent and secured with the hands by simple bandages, a staff, being introduced into the bladder, recognized the stone again, and was then confided to an assistant, who held it perpendicularly to the axis of the body, inclining the handle a little towards the right groin, and in such a manner as to make the convexity project at the perinæum, in the space that separates the raphe and the anus from the tuberosity of the ischium.

2d. The surgeon, raising up the scrotum with the upper side of the left hand, and stretching the skin of the perinæum transversely between the thumb placed upon the anus, and the index finger resting upon the ischium, began, about an inch above the anus, and with the bistoury, held like a writing pen, an incision directed obliquely from right to left, to the middle of the space comprised between this opening and the ischiatic tuberosity; taking care to make the incision deeper at the middle part than at the two superior and inferior angles, and cutting the integuments, the cellular membrane and some cutaneous vessels and nerves.

3d. Into this preliminary incision the nail of the index finger was introduced, in order to feel, beyond the bulb, the groove of the staff, which was laid open by cutting the membranous portion of the urethra more deeply, with the bistoury placed upon the nail, and directed in such a manner that the handle, being elevated in turning the fist, should cause the blade to be lowered and slip easily into the groove.

4th. The bistoury being withdrawn, the nail of the index finger, remaining at the superior angle of the wound and supported upon the groove, serves to conduct the beak of the gorget, whose blade must be introduced parallel with the edges of the incision; and we

must then be satisfied, by slight lateral movements, that it corresponds to the staff.

5th. The surgeon then grasped with his left hand the staff, that has been hitherto held by an assistant, brought it back to the left side, in such a manner as to incline it a little to that side, then turning the handle of this instrument down, as if to push it more forward, he plunged it, in reality, into the bladder, by a simultaneous movement with the gorget, whose beak he elevated at the same time, and whose cutting edge, being obliquely directed from below towards the ischium, and very parallel to the division of the integuments, cut from without inwards the lateral part of the prostate and the neck of the bladder.

6th. The beak of the gorget being then disengaged from the staff, by giving the one a slight depression and the other an elevation, the staff was withdrawn from the bladder. Then the surgeon, placing his finger upon the concavity of the gorget, conducted it into the bladder, on the one hand to feel the calculus, and on the other to press the cutting edge against the external and inferior angle of the wound, which was enlarged by that mean.

7th. The incision being found sufficient for the passage of the stone, the finger was withdrawn and the forceps, being substituted, were slipped upon the concavity of the gorget, that had remained in its place, and which was then drawn out by a slight rotatory motion, from left to right, impressed upon it round the forceps, which motion was intended to secure, from the action of the blade, the parts through which it was withdrawn.

8th. The stone, being laid hold of methodically, was withdrawn, according to rule, with a prudent slowness and by different motions, impressed in opposite directions upon the forceps. The operation was terminated by an emollient injection.

A considerable branch of the pudica, that was cut in the first incision, occasioned a hemorrhage, which it was necessary to stop. To do this Desault caused an assistant to place his finger upon the principal trunk, at the spot where it passes over the ischiatic tuberosity. The patient being then carried to his bed, was laid on it horizontally, the thighs being separated so as to leave the lips of the wound free for the escape of the urine.

In the evening the patient complained of pain in the loins and in the hypogastric region. The urine escaped, mixed with clots of blood, which resulted from the bleeding of the divided branch at the time when the fingers of the assistant compressed the internal pudica with less accuracy. In the night the flow of urine diminished sensibly, the little that escaped being coloured with a reddish tint. Towards morning the patient began to feel an insupportable weight and anxiety; fever supervened, and hiccup and vomitings were added to it. A round, circumscribed, fluctuating tumour, was rapidly formed above the pubis. This last symptom evidently pointed out the source of the accidents. To remove them Desault passed into the bladder a catheter, through which there flowed a pint of bloody and fetid urine. Some clots of blood still remained and coloured the injections that were thrown into the bladder; but these injections, repeated several times, at length removed these clots; and the patient, freed from the accidents, which were occasioned by a momentary retention of urine, advanced rapidly in his cure, which was completed at the end of the thirty-second day.

12. Let us remark upon some details of the operative process, exhibited in the preceding operation. 1st. The form of the exterior incision, being deeper in the middle than at its extremities (2d), has the advantage of laying bare the membranous portion of the urethra, in the only

place where it ought to be cut; of not exposing the transverse parts to be wounded posteriorly; of not uselessly laying bare the posterior part of the bulb in the beginning of the operation. 2d. The nail, remaining upon the groove of the staff, after the bistoury has been withdrawn (3d), serves more advantageously than this for a conductor to the gorget; and, under this view, the introduction of this instrument is easier than in Hawkins's process. 3d. The slight inclination of the staff to the left, at the moment of the introduction of the gorget (5th), gives the surgeon the facility of directing the blade of this in such a manner, that it is found exactly parallel to the exterior incision. Now this parallel is a very advantageous condition to the success of the operation, for the double reason stated (6). Besides, there is another additional consideration, which is that the blade, having nearly lost its curvature, might, when it is pushed in horizontally, wound the vessels of the pudica, a danger that is always to be apprehended; so that what would only be advantageous in the operative process of Hawkins, becomes here indispensably necessary. 4th. The simultaneous insertion of the gorget and staff (5th), is, with regard to the ease and safety of the incision, a great advantage added to this process. By a small depression of the handle of the staff at the moment when the gorget penetrates, the cutting edge is removed from the bottom of the bladder, and from the left part of that organ. 5th. The precaution of previously inserting the finger upon the concavity of the gorget (6th), before the introduction of the forceps, is not less necessary to enlarge this incision, if it is insufficient, in every case for recognizing the stone. In the first view, and when he only wished to dilate it, Desault employed some times two blunt gorgets, of unequal size, placed at the two angles of the wound, and between which he intro-

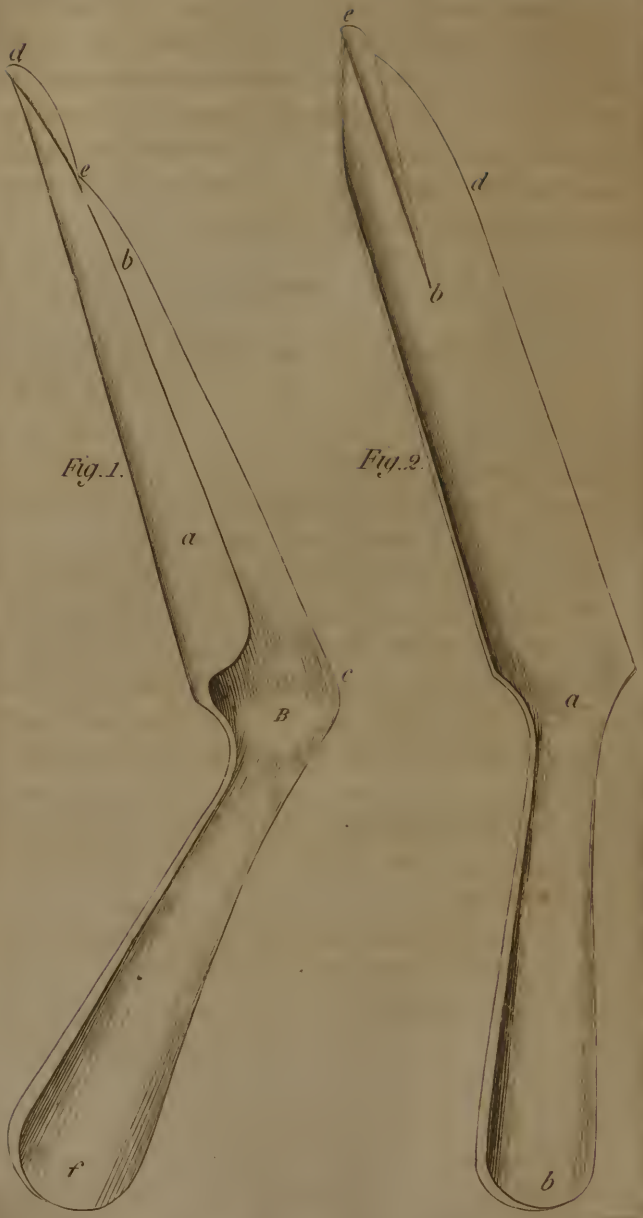


Fig. 1.

Fig. 2.

duced the forceps, which, in separating the gorgets, separated also these angles. 6th. Lastly, the manner of withdrawing the gorget by a slight rotatory motion from left to right, which is impressed upon it around the forceps, constantly dispenses with the numerous modifications that are made in the instrument, to preserve the parts through which it is withdrawn.

Explanation of the seventh Plate.

Fig. 1. The original gorget of Hawkins. *B b*. The concave side of the blade. *a*. The convex side. *d e*. A stylet surpassing the extremity of the gorget by three lines. *c e*. A straight cutting edge in almost the whole length. *B f*. The handle inclined laterally.

Fig. 2. Hawkins's gorget, improved by Desault. *a b e*. A blade nearly flat, substituted for the concave blade of Hawkins; it is wider than this at the extremity, which is to cut the neck. *d e*. A cutting edge limited to the superior third of the right side, replacing the cutting edge of Hawkins, which is prolonged over the whole of the side.

b e. A beak substituted for Hawkins's stylet, which is too long. It is placed more to the left, and divides the blade unequally.

a b. The handle, having the same direction as the blade, instead of being inclined laterally.

MEMOIR

UPON THE

EXTRACTION OF ENCYSTED STONES.

ARTICLE I.

§ I. 1. **T**HE instruments that are intended to lay hold of stones, do not always find them loose. Sometimes an elongation of the internal membrane of the bladder envelops them, and forms with them a kind of cyst, in which they are retained in an immoveable manner. This phenomenon is commonly found at the mouth of the ureter. Commonly less suffering then results from their presence, but more difficulty is found in their extraction. A double operation must then, as it were, be performed: 1st, to extract them from the cyst; 2d, to take them out of the bladder. The first object is attained by different processes, which authors have singularly multiplied, in proportion to the small number of cases, in which it is necessary to treat the variety under consideration. These processes may, in general, be included in three general methods: 1st, by injections: 2d, by laceration: 3d, by incision.

§ II. *Method by Injection.*

2. The method by injection is due to Le Dran, who, in the case of a stone that was found to be stopped at the mouth of the ureter, procured its discharge by means

of fluids injected through a canula, that was suffered to remain in the bladder for six weeks. But Le Dran observes that he shook it occasionally with the forceps, so that it may be presumed that these shakings, rather than the injections, occasioned it to fall into the bladder. How, in fact, could injections act? Was it by destroying the sides of the sac that retains the stone? But then they would also act upon the rest of the internal surface of the bladder. Was it then by occasioning the relaxation of this sac? But how can we conceive the possibility of such a relaxation in a sound and untouched part? Besides, even if we could hope to produce this, the slowness of the process, the afflicting and painful inquietude in which the patients would be left during their cure, would not permit it to be used.

§ III. *Method by Laceration.*

3. The second method must be principally referred to Littre, who directed that, by means of a sound introduced into the bladder, we should bruise and lacerate the membranous side that covers the stone, after taking the precaution to fix it firmly by introducing the finger into the rectum. If the stone projects much, the same author recommends to grasp the sac with the teeth of the forceps, and to bruise and chew them, so that the suppuration, resulting from this, may destroy the sides of this sac and facilitate the escape of the stone. Others supposed that it would be as advantageous to make an immediate extraction of the stone from the cyst, without waiting for this suppuration. La Peyronie employed this process once at the Hotel Dieu. Maréchal obtained some success by these means. It is easy, however, to perceive the insufficiency and dangers of it. In fact, we cannot thus destroy with impunity an organ so sensible and irritable as the bladder, especially at its internal sur-

face. Inflammation, abscesses and gangrene would be the almost inevitable consequence of it; and under this view, the probability of some success cannot compensate for the certainty of many reverses. It may, therefore, be established as a principle, that laceration is always to be rejected as a method of extracting encysted stones.

§ IV. *Method by Incision.*

4. The third method, or that by incision, merits generally an exclusive preference, and yet few authors have had recourse to it. Houstet, in his memoir upon encysted stones, says that "Foubert's method of cutting teaches the way that must be pursued to disengage the stone." It must be presumed that, in citing this method, Houstet only meant to point out the place where the exterior incision should be made; since in following the process, which he recommends, the bladder is not penetrated, but an incision is made, immediately upon the stone, of the parts which cover it. The operation done in this manner approaches nearer to the little apparatus than to the method of Foubert. However that may be, the uncertainty of the precise spot occupied by the stone, and the danger of cutting so deeply into parts which should be spared, will never permit a prudent surgeon to hazard this operation. It would be still better to imitate the conduct of Garengéot, who, in a similar case, cut, with a bistoury introduced into the bladder upon the finger, the superior side of the sac, and thus effected the escape of the stone. However, this practice is not without its inconvenience. It is difficult to cut, with the point of a bistoury, upon a surface that is frequently unequal and rough. The bistoury may slip upon the stone, which is commonly round, and thus may pierce the bladder.

§ V. *Desault's Process.*

5. The consideration of these inconveniencies induced Desault to apply, to the extraction of encysted stones, the use of his kiotome, which has been described in the article of the excision of the amygdalæ, and which here secures the practitioner from all fear of injuring the bladder. The manner of using it is very simple. After introducing the finger into the bladder, and ascertaining the part of the stone which is bare in that viscus, we must engage, in the slope of the kiotome, the kind of collar that is formed by the membranous fold which covers the calculus, and we must cut this fold by pushing the blade of the instrument into the sheath. If this collar does not project enough, or if it cannot be engaged in the slope of the kiotome, there would be no other inconvenience than to place this slope upon the tumour formed by the stone, and to cut in this place the envelope which fixes it there. The incision is enlarged at pleasure by placing the slope of the sheath more forward, and reiterating the stroke of the blade. It is not always necessary to give this incision an extent proportioned to the size of the calculus: frequently it is sufficient to cut a few lines of the membranous reduplication, which embraces the part of the stone corresponding to the bladder, in order to disengage this extraneous body, whatever may be its length. Besides, the finger may be used instead of the button or forceps, to turn the stone out of its collar, and then it may be extracted according to the rules prescribed for calculi of the bladder.

6. The following case, recorded by Manoury, will give a view of the conduct to observed in this case; and at the same time it will present to us, on the one hand, the only example, known in art, of this sort of stones

among women; and, on the other, an application, to this sex, of Hawkins's improved process, which we examined, with regard to men, in the preceding memoir.

CASE.

M. Margaret Remiers, aged sixty-six years, strong and sanguine, experienced, for three years in the right lumbar region, sharp pains, which were fixed at first in that spot, but soon seemed to descend gradually lower every day. They ceased almost entirely for one month, at the end of which they appeared again, and were then confined to the bladder and the meatus urinarius. This second attack was also accompanied with frequent desire to make water. The urine, habitually glairy and frequently bloody, stopped suddenly sometimes and flowed again as soon as the patient changed her situation or walked some steps. After eight months of almost continual suffering, she had for three days an abundant discharge of bloody urine, which was succeeded by a complete retention for twenty-four hours. The urine then came away by drops, with the most painful efforts. Alarmed by these symptoms, this woman consented to be sounded, which she had for a long time refused. The introduction of the sound discovered, at the entrance of the meatus urinarius, a stone as large as a nut, which was immediately extracted with the dressing forceps.

This woman enjoyed the most perfect health for some months, then her former pains re-appeared in the region of the right kidney and in the course of the ureter, and determined her to go the Hotel Dieu at Paris, into which she was received on the first of September, 1788. At this period her pains were constant, and fixed in the interior of the bladder; they increased a little whenever she took exercise, and produced frequent desire to make water, but the urine was not bloody as formerly,

nor the flow interrupted. By introducing the sound into the bladder, Desault felt towards the fundus, a stone which he judged to be small. He did not think it necessary that this patient, who was otherwise in good health, should undergo any particular preparations, and he therefore operated upon her five days after her admission into the hospital. This woman was placed upon the bed, intended for the cutting of men, and fixed in the same manner. Two assistants separated the large and small lips; then the surgeon introduced an ordinary staff into the bladder, assured himself again of the presence of the stone, gave the handle of the staff a direction perpendicular to the axis of the body, inclined a little towards the left groin, applied the concavity of this instrument under the symphysis of the pubis, engaged in the groove, which was directed to the right, the beak of one of Hawkins's improved gorgets, whose cutting edge was turned to the left and downwards; and while he pushed the gorget along the groove of the staff, he lowered its handle a little and separated, by this movement, the cutting edge of the gorget from the fundus and left side of the bladder. He thus made an oblique incision in the posterior and left part of the canal of the urethra and of the neck of the bladder; the staff being withdrawn, and the index finger of the right hand placed upon the gorget, he pushed it gently into the bladder, introduced the forceps, and in withdrawing the gorget, that it might not cut the parts upon which it glided in coming out, he made it describe a semi-circle, from right to left, around the forceps. The surgeon touched the stone again with the forceps, but he could not succeed in laying hold of it. He perceived, with the edge of the spoon, a pretty large body in the spot where he had felt the stone, that did not give the sensation of a naked stone. After some useless attempts he withdrew the forceps, introduced

the index finger a second time into the bladder, and instead of a stone he felt a tumour, which the finger pushed back easily. For a moment he doubted the nature of this tumour; it might be a fungus of the bladder, a collection from congestion formed in the thickness of the coats of this viscus, an extraneous body in the vagina, &c. The index finger of the left hand, being introduced into this canal, soon destroyed this last conjecture.

The certainty, which Desault had, of having felt a stone in the same place which this tumour occupied, and the situation of this at the end of the ureter, caused him to suspect that the stone was still engaged in the oblique passage of that canal and encysted by the tunics of the bladder. He was convinced of it, when again passing over the whole surface of the tumour, with the end of his finger, he distinguished at its inferior part a small hard body, capped with a membranous reduplication. Several surgeons, who assisted at this operation, also introduced their fingers into the bladder, and all recognized the same disposition. The ease and safety with which Desault had cut, in different circumstances, deeply situated strictures in the rectum and other cavities, by means of the kiotome, suggested to him the idea of making use of it here. The index and middle fingers of the left hand, being placed in the rings of this instrument, and the thumb in that of the blade, he introduced it shut into the bladder, along the index finger of the left hand, drew back the blade enough to leave the slope of the sheath free, applied this slope upon the tumour by means of the same finger, and by pushing the blade gently he cut, at once and without danger, that part of the ureter and bladder which covered and retained the calculus. That being done, he withdrew the instrument, and with the finger, which had served for a conductor, he disengaged the stone, the extraction of which was

easily completed with the common forceps. The time during which he had to wait for an instrument, the use of which could not be foreseen, prolonged this operation a little, which otherwise was little painful and supported with courage by the patient. This woman was put to bed, and had given her for a ptisan, a light decoction of dogstooth and flaxseed, sweetened with syrup of marshmallows. She passed that day and the following night in tranquillity, complaining only of the smarting produced by the passage of the urine, which escaped involuntarily and by drops. The next day, there was some heat upon the skin and frequency in the pulse, but the belly was neither tense nor painful. On the third day, the patient not suffering any, and thinking there was no more danger to be apprehended, took solid food, which she procured by stealth. The fourth day she was better. Emboldened by the impunity of the day before, she eat more abundantly. On the fifth day fever came on, the tongue was red and dry, and the abdomen painful and tense. She was bled in the arm, and put on the most strict regimen; two injections were given her in the course of the day, and she was made to drink abundantly and alternately of her former ptisan and veal broth. On the sixth, she was more tranquil; the fever, heat, dryness of the tongue and pain of the belly, were abated; the urine always flowed involuntarily, but almost without smarting. On the eighth day, there was no more fever; the belly was become supple; the patient retained about half a glass of urine, and the next day, the ninth, a full glass: she was permitted to take a little nourishment. On the tenth, she discharged her urine as she pleased. The quantity of her food was increased gradually. This woman remained in the hospital until the twentieth from the operation, and did not cease to retain and discharge her urine as she pleased.

MEMOIR

UPON THE

Ligature of Polypi of the Womb and of other Cavities.

§ I. *General Considerations.*

1. **T**HE progress of external medicine is sometimes the rapid fruit of genius, and it is, without doubt, one of its advantages over internal medicine, which is carried toward perfection by experience alone. When in 1742, Levret conceived and executed the ingenious idea of tying polypi in the different cavities which contain them, a new light seemed suddenly to be shed upon the treatment of these tumours, which, having until then been always inaccessible to the succours of art, may henceforth be ranked amongst those, whose cure may be obtained most promptly. The processes, which he then contrived, being since modified differently, have become more simple and more easy in the hands of practitioners who have followed him; but he alone traced the route, into which they had only to enter—he alone dissipated the obscurity which still enveloped this point of practice. Until his time art, restrained to impotent means, had no other way of destroying polypi, contained in the cavities where they grew, than the simple section, plucking off with twisting, and cauterization.

§ II. *Of different curative methods, besides the Ligature.*

2. The section, which is sometimes advantageous, is often impracticable, seldom easy and always dangerous. A distressing hemorrhage may be the consequence, and then it is with difficulty that the proper means for stopping the flow of blood can be applied to the bleeding vessels. To place a ligature upon these deeply situated vessels is most commonly impossible, because we cannot see them; for want of a point of support their compression is also embarrassing. Besides, the instrument being sometimes insecure, and directed blindly into a deep cavity, may it not, in removing the tumour, also wound the viscus in which it is implanted? For a long time back the incisive forceps of Fabricius de Aquapendente and other instruments, connected with this process, have been found only in our magazines of surgery.

3. The plucking away with twisting is, in general, less frequently followed by hemorrhage. We know in fact that, in wounds from laceration, the blood is stopped more quickly than in those from incision: moreover, there are many cases in which this process alone is applicable; such, for example, are most of the polypi of the anterior nares; but if the vagina, the womb or the rectum give origin to these tumours, the coats of these cavities being soft and yielding easily, would they not experience in part the effects of the twisting? Would they not be bruised and lacerated? Would not numerous accidents arise from their injury, especially in their then increased state of sensibility?

4. In the treatment of polypi of all the cavities, the dangerous and cruel process of cauterization is proscribed by numerous inconveniencies. Supposing that it should succeed, this process is always tedious from the successive and repeated applications that are neces-

sary. The sharpest pains result from these applications; it is seldom that the action of the caustic can be directed easily, and when applied to the tumour, it may also affect the neighbouring parts. Cancerous fungi may arise from the irritation which it produces.

5. These general considerations are doubtless sufficient to banish, from the treatment of polypi contained in most cavities, means whose effect may be more pernicious than the very evil against which they are directed. Therefore the practice of the great teachers was almost always to leave to nature these kinds of polypi, that were deeply situated, and to wait until her efforts had procured their spontaneous expulsion, that they might then make the ligature and excision of them. But nothing is more rare than this spontaneous expulsion; and if polypi break through the vulva, for example, of their own accord, it is only by the successive progress of a growth that is always tedious. During this time frequent hemorrhages and discharges of a different nature, weaken the patient gradually, and the evil is already irreparable, when the remedy is applied to it.

6. Some practitioners, from these considerations, have proposed to lay hold of the polypus in the cavity which contains it, and drawing it outwards then to make the ligature and excision of it; but will the tumour always yield to the efforts that are made upon it? These efforts, being made equally upon the viscus to which it adheres, will they not produce in it a tension and irritation, and of course the accidents which may result from these?

§ III. *Of the Ligature.*

7. This cursory view of the inconveniencies attached to the preceding method is, no doubt, sufficient to make us appreciate the advantages of that of Levet, and the services which have been rendered to the art by the

practitioners who have perfected it. Amongst these practitioners, some have done nothing but adding to the instruments already invented; others have contrived new ones; all have it in view to render the means more simple to the surgeon, less painful to the patient, and applicable to all the cases that may offer. But all have not equally attained this end, which alone every operative process ought to attain in order to be perfect. A rapid glance over the different processes, now in use in the different kinds of polypi, will be sufficient to convince us of it, and at the same time it will serve to show us the parallel of these processes with those contrived by Desault.

§ IV. *Of the Ligature of Polypi of the Womb and of the Vagina.*

8. The polypi of the womb are, doubtless, of all others those in which the ligature is most visibly indicated. Nature seems here to point out to art the course which she ought to pursue, in order to supply the insufficiency of her efforts. Sometimes, in fact, the orifice of the womb, strangling the stem of the polypus, to which it had given a passage, intercepts the circulation in it, occasions its mortification, and soon after its separation and protusion. Thus the ligature of this sort of polypi has principally engaged the attention of practitioners. For this they have contrived the greatest number of processes, which are all applicable to polypi of the rectum, and the greater part answering for those of the anterior nasal cavities.

Of the different Processes by Ligature.

9. Levret, whose genius was exercised a long time upon the different instruments that are proper for this operation, has left us two porte-nœuds, the only ones

that were furnished by art for many years, and which many surgeons still employ at this time. The one is his double silver tube, straight, soldered in a parallel direction, terminated above in a drop, having below two rings upon its sides; and the use of which is to introduce into the superior part of the vagina the noose of a silver thread, in which the polypus is engaged, and which is then fastened by twisting the two ends of the thread. The other instrument, which Levret substituted for the first, is also formed by two silver tubes, separated from one another and connected like a forceps at the rings, which they resemble in figure, with this difference that the branches are more or less curved, that they may be adapted to the form of the tumour. A linen thread, which is intended to form the noose, is passed into each of these tubes. This instrument is pushed as high as possible into the vagina, upon one of the sides of the tumour; it is then brought back upon the opposite side, by making the polypus pass into the interval of its branches, its base being thus comprised in a noose, which is tightened gradually and at pleasure, by means of the instrument remaining in its place.

10. Both these instruments have this common inconvenience, that by their means a ligature cannot be applied to a polypus of the womb. If the first is employed, the noose of silver thread, which is enlarged in ascending into the vagina, cannot pass through the narrower neck of the uterus. If the second is used, its size is evidently disproportioned to the narrowness of the passage. The ligature of the polypus must therefore be made below the *os tincæ*, from whence it will result that the stem, remaining untouched in the womb, will be divided only at its inferior part, and that it may become the origin of a new tumour.

11. But, besides this common inconvenience, each of the preceding instruments has its peculiar ones. 1st. The straightness of the first impedes and prevents its introduction, when the polypus is too large. 2d. If the noose of the ligature, in ascending to the vagina, meets with a fold of this canal, or a projection of the tumour, it folds itself round it and does not penetrate. 3d. The silver thread may break in the different twistings which it experiences, and make a new operation necessary. This last is an essential inconvenience, and under this view, any instrument is to be rejected that makes it necessary to have a ligature of this metal. 4th. When recourse is had to the second instrument, its introduction is fatiguing to the patient and difficult to the surgeon. 5th. If a very large polypus fills the whole vagina, it is made to pass with great difficulty into the space between its branches. 6th. While it remains in the vagina, it incommodes by its size.

12. So many disadvantages being attached to Levret's processes, have engaged the attention of many surgeons with respect to the ligature of polypi. Their researches have produced different methods, more or less ingenious, which it would be too long to describe particularly; but the most of them, being founded nearly upon the same principle, exhibit common advantages, which it would be useful to know.

13. These instruments are, like those of Levret, composed of two stalks of metal, so that these stalks in their interior present a tube to contain the thread, or at their extremity they have only a ring to accomplish the same end. But instead of being placed back to back, like the first instrument of Levret, or connected like his second, they are detached from each other; being threaded with the same ligature, they are applied separately around the base of the tumour, where they form a strangulating

noose. David, Herbiniaux, and Desault constructed their instruments upon this common basis.

14. The advantages which these kinds of instruments generally have over those of Levret, are, 1st. To render the operation more easy and less painful to the patient. 2d. To penetrate into the womb and apply the ligature there. 3d. To make the employment of a silver thread unnecessary. 4th. Of not leaving in the vagina a body which is too inconvenient from its size, during the days that precede the fall of the tumour.

15. But if these instruments, compared with those of Levret, merit the preference, they do not all possess the same advantages when compared with each other. Several of them are embarrassed by useless complications. The *serre-nœud* or constrictor of the noose, for which a simple stalk was sufficient, has, no doubt, been made in different ingenious ways, but they are useless and even inconvenient. Axle-trees, pullies, &c. have been adapted to it. Art, like nature, should simplify its means and multiply its results. The simplicity of an instrument is almost always the measure of its perfection. Upon these principles Desault endeavoured to found all his operative processes, and these directed him, when he invented that which is intended for the ligature of polypi of the womb and of the vagina. The knowledge of it will be sufficient, without doubt, to show, that he has not missed the object which he proposed.

Desault's Process.

16. The instruments required by this process, are three in number: the two first (fig. 1) and (fig. 2) are intended to push into the vagina or the womb the noose of the ligature, which the third (fig. 3) must keep constantly tightened until the fall of the polypus. This last

is called the *serre-nœud* or constrictor of the noose. The two first are the *porte-nœuds*, or conductors of the noose.

17. The *porte-nœud* (fig. 1), is a simple canula of silver, about seven inches long, slightly curved backwards, to adapt itself to the convex form of the polypus. Two rings are placed at its lower extremity, either for the ease of the operator, or to secure the thread at the moment when the instrument is pushed into the vagina. The other extremity is terminated by an oval button, hollowed like a funnel, and whose sides are polished and rounded.

18. The *porte-nœud* (fig. 2) also has a canula, five inches long, with a slight curvature and enclosing a stalk of silver or steel, bifurcated superiorly, and terminated by two half rings, which make a complete ring when the branches are closed. When nothing compresses them, their elasticity separates these branches, and they are made to re-unite by slipping upon them the canula of the *porte-nœud*. At the other extremity of the stalk we may remark a cleft, that is intended to secure one of the ends of the ligature, during a part of the operation.

19. The *serre-nœud* (fig. 3) is a silver stalk, terminated superiorly by a ring, through which are passed the two strings of the ligature, which are then to be attached to a cleft that is found in the inferior extremity of the instrument. The surgeon must have *serre-nœuds* of a different length, according to the different heights at which the base of the polypus may be situated.

20. The preparation of the apparatus is simple and easy. It consists, 1st. In re-uniting at the edges the two half rings (*dd*), and in pushing the canula upon the branches (*ee*) of the stalk; from thence results a complete ring, into which is passed one of the strings of a ligature made of a waxed thread, a little twisted, and

two feet long. 2d. In then fixing the extremity of this string in the cleft (*f*) of the stalk. 3d. In making the second string, which is to be carefully left longer than the preceding, pass into the canula (fig. 1), and in securing it inferiorly at one of the rings of this canula.

21. Every thing being thus disposed, we proceed to the operation in the following manner. The patient is laid upon a raised bed, the thighs being separated from each other and secured by assistants. If it is feared that the polypus, having descended into the vagina, might rise up during the operation, we must engage in its lower extremity the hook of an *érigne*,* which is then entrusted to an assistant; then

1st. The surgeon introduces the two porte-nœuds, the one parallel with the other, between the tumour and the coats of the vagina, on the side where he finds the least resistance, and causes them to slip, by slight lateral movements, up to the superior part of the pedicle, whether it be inserted in the vagina, the os tincæ, or the womb.

2d. He detaches the string of the ligature, that is fixed in the ring of the canula, takes with his left hand the porte-nœud, (fig. 2), which he keeps immoveable, whilst seizing the canula in his right, and making it describe the circumference of the tumour, he forms a noose round the pedicle, with the string of the ligature which he detached.

3d. The canula having been brought back towards the porte-nœud, the surgeon changes the two instruments in his hand, and makes them cross in such a manner that the end of the noose which the first draws after it may pass above that which the second retains. This first end, being thus secured both by the second and by

* *Une érigne* (Fr.), a small double-hooked instrument used in dissecting.

the ring (*dd*) of the porte-nœud, cannot descend, while the canula is withdrawn.

4th. He withdraws the canula and detaches the end of the ligature, which is fixed at the cleft (*f*), and which is then only retained by the ring (*dd*).

5th. The surgeon chooses a serre-nœud, of a length proportioned to the height of the polypus, and having introduced into the ring (*g*) the two loose ends of the ligature, he pushes the instrument up to the superior part of the pedicle, where these two ends cross each other.

6th. He withdraws a little downwards the canula of the porte-nœud, whose branches (*ee*) separate from each other; the ring (*dd*) opens, suffers the escape of the thread which it retained, and thus permits the withdrawing of the instrument that has become useless.

7th. The porte-nœud being disengaged, he pushes the serre-nœud still higher, at the same time that he draws to himself the two ends of the ligature; and when in this manner the noose is sufficiently tightened, he fixes the two ends in the cleft of the serre-nœud, which remains in the vagina until the falling of the tumour.

22. In proportion as the strangulated pedicle withers, and as the noose, become relaxed, exercises no more constriction upon it, in order to tighten it, it is sufficient to detach from it the ends that are fixed in the cleft of the serre-nœud, and then to proceed as at first.

23. By employing this process we may always ascertain, either the size of the pedicle of the tumour or the successive progress of its strangulation. In fact, if we know the length of the thread, intended for the ligature, that of the serre-nœud, and that of the portion of the two ends of the ligature which exceeds the inferior extremity of the serre-nœud, it is evident that the bigness of the noose, and consequently the size of the pedicle, would be determined by the excess of the length of the thread of the ligature over the sum, both of the doubled

length of the serre-nœud and of the simple length of the portion of the two ends, exceeding the extremity of this instrument; so that if the thread is two feet, the serre-nœud six inches, and the extremity of the two ends eleven inches, the pedicle of the polypus will be an inch in circumference. If we once knew the size of the pedicle, we might determine its successive strangulations, by the length which the two ends of the ligature would gain, every time that it was tightened.

24. Such is the process of Desault, with all its details, for the ligature of polypi of the womb and vagina. If we take a review of the different inconveniencies attached to the other methods of making the ligature, we will see that most of these inconveniencies are avoided in this. The instruments which it requires, have all the advantages that are common to those made upon the same basis (12), such as those of David, Herbiniaux, &c.; advantages which, as we have seen, give these instruments in general a decided preference over those of Levret. They have also particular degrees of perfection, which perhaps are not possessed by the others.

25. In the employment of those, in tightening the noose of the ligature, they cause it sometimes to ascend or descend upon the pedicle, which it strangles; inconveniencies equally pernicious: for, if it ascends, the constriction, which is already made below, becomes useless; if it descends, the portion of the pedicle comprised between the original strangulation and that made below, remains in part disorganized after the fall of the tumour, and keeps up an inconvenient ulceration for a longer or shorter time. Here, on the contrary, the noose being pushed upward by the serre-nœud, at the same time that the two strings, by which it is formed, are drawn down, it will necessarily remain immoveable between these two opposite motions.

26. In the other processes, the two ends of the ligature remaining loose in the vagina, while they are carried round the tumour, may meet a prominence or a fold, which will stop them and cause the ligature to fail. In this, the end intended to go round the polypus, is enclosed in a canula, which secures from the inconvenience just mentioned. Experience had made known this inconvenience to Desault, who proved it in making use of the first process which he invented. This process differed from that, which we have described in this respect, that, instead of employing the canula (fig. 1) to conduct the noose round the tumour, Desault made use of a *porte-nœud* similar to that in (fig. 2). When the noose was formed, the two ends of the ligature were passed into the *serre-nœud*, which was then made to slip towards the pedicle of the polypus. The *porte-nœuds* were withdrawn, by opening their rings, and when the strangulation was sufficient, the two ends were fixed, as in the preceding case, in the inferior cleft of the *serre-nœud*. The inconvenience, which we related, banished from Desault's practice one of these *porte-nœuds*, for which he substituted, as we have seen, the canula (fig. 1).

27. To the advantages, offered by this method of tying polypi, we may add, without doubt, that of great simplicity, both in the instruments and in the operative process. From thence the facility of this process, which has constantly succeeded with Desault, in the frequent occasions which he had to employ it, to examine its results, and to collect observations upon it.

28. When the tumour has its seat in the vagina and near the inferior orifice of this cavity, it is frequently useless to employ the apparatus of instruments just described. The simple *serre-nœud* is then sufficient. We must insert into its ring the two ends of the waxed ligature, with which we form a noose and attempt to

engage in it the base of the tumour by conducting it to that, through the assistance of the index and middle fingers. When it has reached there, the *serre-nœud* is pushed upward and the thread drawn downward; the constriction takes place, the thread is secured to the cleft of the *serre-nœud*, and the treatment becomes the same as that in the preceding case. If the polypus is inserted too high, its inferior extremity must be seized with an *érigne*, and drawn downwards. Then the noose is slipped along the instrument unto the pedicle of the tumour, which it embraces.

Another Process.

29. However simple and easy the process that has been pointed out, may seem, I think that we may still add to it a new degree of simplicity, by retrenching an instrument, and by making use, at the same time, of one stalk both for the *serre-nœud* and the *porte-nœud*. This is the process proposed.

30. The instruments which it requires, are a canula (fig. 4) similar to that of Desault; moreover, a *serre-nœud* (fig. 5) which differs from his, in this respect, that it is divided in the middle, and may thus be lengthened or shortened, by adapting to it a lower piece, more or less long, which becomes necessary, because it serves at the same time for a *serre-nœud* and *porte-nœud*.

31. The preparation of the apparatus consists, 1st. In threading one of the ends of the ligature (*a a a*) in the canula, the other in the *serre-nœud*; and in fixing the first to the rings of the one, the second to the cleft of the other. 2d. In passing into the *serre-nœud* a thread of different colour (*b b b*), so that it may form a noose equal to the length of the instrument, and which remains free while its ends are fixed to the cleft.

32. Every thing being arranged, we proceed to the operation in the following manner:

1st. The two instruments, thus armed with threads and united together, are placed upon the pedicle of the tumour, between it and the sides of the cavity, on the side where it finds least resistance.

2d. The *serre-nœud* is held fast by the left hand, whilst with the right the surgeon carries the canula round the pedicle, and thus embraces it in a noose, of which one end is passed into the *serre-nœud*, and the other into the canula. But in order to make the constriction, we must also pass this last into the ring of the *serre-nœud*.

3d. To accomplish that, the *serre-nœud* being secured by an assistant, and the canula fixed by the surgeon, he passes the noose of the thread (*b b*, fig. 7) under this canula. The ends of the noose are detached and drawn downward; it rises up along the canula, and meeting above the thread (*a a*), which the canula contains, draws it into the ring of the *serre-nœud*.

4th. The canula is then withdrawn; the *serre-nœud* remains alone, containing the two ends of the noose, which may be tightened at pleasure upon its cleft (fig. 8).

5th. If the polypus is situated in a shallow cavity, we must unscrew the lower piece of the *serre-nœud*, whose length, although necessary in the operation, may be embarrassing in the treatment. A shorter piece (fig. 6) is screwed upon it. The constriction is made, and the ends of the ligature are fixed in the cleft. This constriction is renewed every day until the fall of the tumour.

33. In this, as in the other processes, we may always ascertain, either the size of the tumour or the successive progress of the strangulation, by comparing together the supposed known length of the ligature with the length of the two ends which surpass the cleft of the *serre-nœud*. It is evident, in fact, that the sum of the length of the two ends, being more than twice that of the *serre-nœud*,

when subtracted from the total length of the ligature, will give the size of the pedicle.

34. I state this process only in a general manner, an abstraction also being made of all the changes, relating to the situation of polypi in the different cavities; its application will be easy to the reader, who will also compare it with that of Desault, without my pointing out the parallel.

§ V. *Of the Ligature of Polypi of the Rectum.*

35. The polypi of the rectum are found under three different aspects, according to the point of their origin. 1st. Situated sometimes near the margin of the anus, they remain constantly without. 2d. At other times included in the rectum, they come out occasionally in the efforts that are made while at stool. 3d. They may be deeply situated and remain constantly concealed in the intestine. The ligature does not offer similar advantages in all three of these cases. Desault added excision to it in the two first, but adopted it exclusively in the third.

36. In the first case (29), take a thread of hemp or silk, strong and waxed, and form a noose, into which the thread is to be passed twice to make a double knot of it. Cause the polypus to pass into this noose, which is to be conducted even to its base, so as to comprehend a little of the skin from which it originates, in order to be more secure from its reproduction. Tighten the knot strongly without being afraid of causing pain, it will be less from a great constriction, which will suddenly annihilate the nervous influence. Make also one turn round the base of the tumour with the ends of the ligature, which must be secured by a new knot upon the opposite side; then amputate the tumour one line below the ligature being free from all dread of hemorrhage and pain, cut the thread and apply upon the amputated spot,

a little lint, supported by a compress, which is itself to be sustained by a T bandage. By this process we avoid the gangrene of the tumour, and the injury of the neighbouring parts by the sanies which would flow from it. The cure is more speedy, is obtained with less inconvenience, and is as certain as by the simple ligature.

36. In the second case (29), we may wait for the protusion of the polypus, which is produced occasionally either by the sharp pains of the patient or by violent efforts in going to stool. If this protusion is only partial, or if it should be too slow, draw the tumour downwards, either with the finger or with an *érigne*; place a ligature upon its base, as in the preceding case, with the precaution of comprising in it a portion of the internal membrane of the rectum, and then perform the section. A simple bistoury is sufficient, if the base of the tumour is naked; but if, by drawing it down, you cannot bring it outwards, make use of the kiotome; slip the sheath of this up to the base, which must be engaged in the slope below the spot where it is tied, push the blade and make the section. When it is practicable, this process has much the greatest advantage here; as, by leaving the tumour in the rectum after the ligature, the size which it acquires before falling is very painful to the patient, and causes tenesmus and frequent inclinations to go to stool. The previous ligature secures from hemorrhage; but if the thread should be cut in the section and blood should flow, the method pointed out in the article of fistula in ano, will always be sufficient to stop it.

37. In the third case (29), the ligature alone is practicable, and here it differs nowise, in its execution, from that described in the article of polypi of the womb and the vagina. The use of the canula, porte-nœud and serre-nœud is exactly the same, and we may employ

either the process of Desault, or that which I proposed. The following case will furnish an example of the treatment that is then to be used.

CASE I.

Claude Viltard, a labourer, of a strong and sanguine temperament, was habitually subject to the external bleeding piles, until he was thirty years old. At this period they became inflamed in consequence of a blow, gave rise to an abscess, and in consequence to a fistula, which was operated upon, with the precaution of removing all the surrounding varicous dilatations.

Being cured, by these means, of his hemorrhoids and of his fistula, Viltard had no other sensation, during one year, but an anxiety about the anus, at the periods when he used to have the hemorrhoidal flow. At the end of this time he felt tenesmus and wringing pains, which were slight at first; but returning at intervals, they soon became more severe and more frequent, and at length habitual. From that time, he always discharged bloody, glairy matter in the violent efforts which he made in going to stool. He was distressed by a constant constipation. The sensation of anxiety about the anus became more sensible and more inconvenient. Frequent desires to make water, but which were generally fruitless, also supervened. The expulsion of the fæces was troublesome and painful. Being solid, they had a concave and flattened form, as if they had been pressed between the sides of the intestine and a round body contained in them. Such was the state of the patient, when he came to the Hotel Dieu to consult Desault, who, from the recital of the symptoms which he felt, suspected the existence of a polypus in the rectum. He was assured of it by introducing his finger into the anus, and he immediately proposed to the patient to put a ligature upon it,

without those frequently useless preparations which precede most operations. In this case there was nothing particular, but a great deal of difficulty in the execution; a difficulty that arose from the height of the polypus, which originated six inches above the anus; from its size, which was equal to that of a large egg; and from many prominences which its surface presented, and which impeded the passage of the instruments.

The polypus, being separated at the end of eight days, came away, reduced to one third of its size; a tent, being then introduced into the rectum, was kept there for fifteen days, at the end of which no more suppuration was perceived, and the patient was entirely cured.

§ VI. *Of the Ligature of Polypi of the Nares.*

38. The ligature of polypi of the nares is made by a process essentially different, accordingly as the tumour has its seat in the anterior or posterior nares.

39. The ligature of polypi of the anterior nares is, with plucking away, the only methodical manner of destroying these tumours. There are some cases in which one of these processes is exclusively applicable; others, where both of them may be used indifferently. In general, the ligature is to be preferred to plucking away. 1st. With timid patients, upon whom the fear of the pain, produced by this, may have a pernicious influence. 2d. When the tumour offers on one side a narrow pedicle, accessible to our porte-ligatures; on the other a bulk, which, filling all the nostril, makes it difficult to be seized by the teeth of the forceps. 3d. In certain sarcomatous polypi, in which the irritation, that is the effect of plucking away, may produce dangerous consequences. 4th. In some mucous polypi, with a pedicle, where it is to be feared that the plucking away may be followed by a distressing hemorrhage. 5th. When, after the extrac-

tion of several of these tumours, there are still some to be found in the nostril, which is already distressed by the too frequently repeated introduction of the forceps. 6th. In certain polypi, which, being sustained by a narrow pedicle, have a prolongation before, and another behind, and which on that account can only be partially torn away, whilst the ligature of the pedicle procures, by a single operation, the fall of the whole of the mass. The ligature is to be rejected in cases where the tumour has a large base; where the patient is not afraid of instruments; where the pedicle, too deeply situated, is inaccessible to the *serre-nœud*; where the polypus, being small, may be easily laid hold of with the forceps; where we seek to obtain a speedy cure; where there seems to be no dread on account of the hemorrhage or irritation of the pituitary membrane. In other cases both processes may be used indifferently.

40. The ligature of polypi of the anterior nares has varied singularly in the mode of its execution: which is less astonishing in this than in other operative processes, because the disease itself is subject to such variations, that scarcely two polypous tumours are to be found under the same form, the same size and the same appearance. Some have, simply with their fingers, placed the ligature upon the tumour, previously drawn out with an *érigne* or forceps. This process, most frequently impossible in practice, on account of the depth of the insertion of the polypus and the narrowness of the opening, is always uncertain in its result, because it is difficult thus to carry the thread to the base, and because a more or less considerable portion remains constantly without being tied. Others form, in the middle of a long ligature, a noose with a running knot, and making one of the ends of this ligature pass through the posterior

nares and the mouth, they leave the other to come through the anterior nares, carry the noose into the nasal fossa where the polypus is, attempt to engage it in that, and when they have done this, draw the two ends in opposite directions, and thus constrict the pedicle. The process is ingenious, but in how many cases is it possible thus to engage the base of the tumour in the noose? To do this, shall we employ, with Heister, a crooked needle, mounted upon a handle, and terminated by a cap, in which the ligature is threaded, and thus carried round the tumour? We may perhaps succeed by this mean, when the polypus is near the anterior opening of the nares; but how shall we reach it, when it is deeply situated? Shall we then have recourse to the instruments of Levret? Recollect what has been said of their inconveniencies in the article of polypi of the womb (10 and 11), and it will be easy to judge, that these inconveniencies are equally applicable here.

41. Desault had applied to the ligature of polypi of the nose, the apparatus of instruments which we have mentioned (16 and 22). The following case exhibits to us the example of his practice in this instance.

CASE II.

Maria Adans entered into the Hospital of Humanity, on the 27th of January, 1791, to be there operated upon for a polypus, of long standing, in the right nostril, whose progress had been slow at first, but for some days had increased rapidly. Already the breathing and articulation of sounds were very much impeded; the tumour being situated forward, pushed back in this direction the anterior side of the nose, which formed a considerable projection upon the face. Desault, having examined with a probe the environs of the tumour, found that being loose on every side, it had its root above and before,

at the superior part of the external coat of the nasal fossæ, where it adhered by a narrow pedicle.

The ligature and the plucking away could equally disengage this patient of her polypus. But the aversion which she had for instruments, and her excessive fear of seeing her blood flow, caused Desault to prefer the former process.

The patient being seated upon a high chair, with the head supported upon the breast of an assistant, he introduced along the anterior part of the tumour and between it and the posterior part of the nose, the canula and the porte-nœud, armed with a common ligature. When he had reached the pedicle of the polypus, he confided the porte-nœud to an assistant, who kept it fast; whilst taking the canula himself, he carried it first between the tumour and the septum, between it and the posterior side, then between it and the external side, then brought it back before, grasped the porte-nœud with the left hand, crossed upon it the canula, which in its passage had drawn the thread, and had made it describe a noose around the tumour, withdrew the canula, and thus left one end at liberty, disengaged the other from the cleft of the porte-nœud, passed both of them into the ring of the serre-nœud, which he pushed upward, then withdrew the porte-nœud, and finished by securing the ligature to the cleft of the serre-nœud.

The tumour, which at first was increased in size, soon began to wither, and on the third day it became necessary to tighten the ligature; the second constriction of which was sufficient to make it fall on the seventh day. Some injections were then made into the nostril, from which there oozed, during some days, a little pus. On the fifteenth, the patient went away, perfectly cured.

42. The polypi which pass through the posterior opening of the nares, or which have their insertion in

the coats of the fauces, in general, present the characters of those of the anterior nares, of which they are most frequently only an appendix. But their situation places between them and these last an essential difference, relative to the treatment of which they are susceptible. Situated in a deep cavity, concealed behind a thick fold, which almost always hides their base from us,—placed above parts whose injury would be dangerous—these kinds of polypi can hardly ever be removed by any other means than the ligature; and if sometimes the plucking away with twisting is possible, the lighter pain in the ligature, the certainty of avoiding by it a hemorrhage, which is inconvenient and perhaps dangerous, always assure to this second method a marked superiority over the first.

43. But here art is not so rich in means of applying ligatures, as in cases of polypi of the womb or of the anterior nares. Levret, whose researches enlightened the theory and treatment of the former, wished to generalize the application of his different instruments, by making them serve for polypi of the womb, nares and throat. But their inconveniencies, still more sensible in the last than in the two other cases, have almost entirely excluded them from practice in this; and their author himself has often experienced their insufficiency. To supply them, Brasdor invented a process, which is still in use: A thread, being introduced into the mouth through the nasal fossæ, by means of the instrument of Bellocq, serves to conduct a noose of silver thread upon the tumour, whose base is strangulated by the double tube of Levret. If we do not succeed at first in engaging the tumour in the noose, another thread, attached to the extremity opposite to that where the first was fixed, serves to draw it back, and the process is recommenced.

44. But the inconvenience which is generally attached to all ligatures made with a silver thread, the want of a conductor for the noose, and consequently the difficulty of the operation, which the process itself supposes, are great objections to this process, and their justness is confirmed by daily experience. If we wish to employ it, it must be done with the following modification: 1st. Pass into the nostril, on the side of the tumour, an elastic probe, which must be brought back through the mouth. 2d. Fix to the end of this probe, passing through the mouth, the two ends of a ligature, which will thus form a noose, into which a second thread must be passed. 3d. Let an assistant withdraw the probe through the nares; at the same time conduct the noose, which, being drawn by the probe, rises upon the base of the tumour, by holding its two ends separated with the fingers placed in the throat. If the first attempt does not succeed, withdraw the noose through the mouth, by means of the thread which is fastened to it, and begin the operation again. 4th. When the base of the polypus shall have been embraced, let the probe be withdrawn through the nose, and with it the two ends of the ligature, which you must engage in the *serre-nœud*; and this being pushed up to the tumour, serves to strangulate it, by the successive constrictions which it performs. Although the process of Brasdor, thus modified, has, over the original manner of executing it, the precious advantages, of a ligature of thread being substituted for one of silver; of not requiring a twisting to tighten this ligature; and of not leaving so large an instrument in the nostrils;—still there are many cases in which its execution is impossible, and where we must recur to another.

45. The hazard and insufficiency of this process suggested one to Desault, which seems applicable to all cases, and the advantages of which have been confirmed

by experience on many occasions. It is founded on the same idea, as that invented for the ligature of polypi of the womb. The apparatus being still more simple and easy, contains, 1st. A canula similar to that represented (fig. 1), with this difference, however, that its curvature is more marked. 2d. A *serre-nœud*, such as that already described; an elastic tube, of a very small caliber, and armed with its stylet; a ligature a foot and a half long, and formed of two threads, waxed and twisted together; and a noose of a single thread, a foot long.

46. Every thing being thus prepared, we proceed to the operation in the following manner.

1st. The elastic tube, armed with its stylet, is introduced into one of the anterior nares; it is carried behind the *velum palati* and then into the fauces, by raising up the *pendulum*. The extremity of it is then seized and brought outwards, after having withdrawn the stylet.

2d. The two extremities of the tube, passing, the one through the mouth, and the other through the nostrils, are confided to an assistant, and to the first are fixed one of the ends of the ligature and the two ends of the noose.

3d. The surgeon resumes the tube, withdraws it through the nostrils, and with it the threads, that are attached to it.

4th. He detaches the threads, and causes them to be held without the nose by an assistant, who at the same time fixes, at the commissure of the lips, the noose that passes through the mouth with one of the ends of the ligature, which it leaves at liberty.

5th. He passes this end into the canula (fig. 2), which he slips behind the *velum palati* to the base of the polypus; then carrying the extremity of the *porte-nœud* all round this base, he describes, with the ligature, a noose, in which the base is included.

6th. He takes the noose that is retained at the commissure, and makes it pass under the porte-nœud; then seizing its two ends, which go out through the nostrils, he draws them back to himself. The noose, being drawn upwards, slips along the porte-nœud, meets at the base of the polypus with the end of the ligature which was used to circumscribe it, and draws it outwards with it through the anterior nares.

7th. He withdraws the canula, now become useless; the two ends of the ligature are passed into the ring of the serre-nœud, which he slips upon the surface of the nasal fossæ, up to the pedicle of the polypus, which is strangulated with more or less force.

8th. The serre-nœud, remaining in the nasal fossæ, serves, as in polypi of the womb and vagina, to tighten every day the noose of the ligature, which soon procures the fall of the tumour.

47. In this, as in the cases of uterine polypi, it is always easy to determine both the size of the base of the tumour, and the successive progress of its strangulation. The same method suits both cases.

48. The instrument of Bellocq may be applied here and replace the tube. But why embarrass again the arsenal of surgery with an instrument, whose use cannot at least extend beyond the particular case now treated of, whilst with another method, that is indispensable in most other cases, we may attain the same object? The great art is not to invent new methods, but to make the application of those already known very general.

§ VII. *Of the Ligature of Polypi of the Ear.*

49. Polypi of the ear present, with relation to their form and the depth of their insertion, differences which must have an essential influence upon the manner of

tying them. When the base of the tumours is near the anterior opening of the auditory canal, it is sufficient to form, with a waxed thread, a noose with a surgeon's knot; the polypus is engaged in this noose, which is then pushed up to the base, either with the fingers or a forceps with rings. When it has arrived there, the two ends are drawn in opposite directions, by fixing one of them with one hand, and by making the other turn round the united branches of the forceps, which have previously seized it. The constriction is performed at pleasure by these means; when it is sufficient, the forceps is withdrawn, and the tumour, being abandoned, soon falls.

50. If the polypus is more deeply seated in the coats of the auditory canal, if it is loose in this canal, and if, so to speak, it recedes before the ligature, in order to draw it outwards, employ an *érigne*, whose double point will hook it, and which you must confide to an assistant; then slip upon this *érigne* the noose of a waxed thread, whose two ends must be passed into the ring of the *serre-nœud*, and which must be conducted by small lateral movements to the base of the tumour; draw to yourself the thread, which will thus perform the constriction, which is kept at the same degree by fastening the two ends to the cleft of the *serre-nœud*.

51. When the polypus is seated in the membrane of the tympanum, it would be dangerous thus to draw it outwards with an *érigne*. The stretching of this membrane might have pernicious consequences. In this case, if the size of the tumour is not such that the whole of the canal is filled by it, the use of the canula, *porte-nœud*, and *serre-nœud* might here be applied with advantage, and then the process does not differ from the ligature of polypi of the womb, except that, instead of

carrying the instruments perpendicularly, and making the canula turn round the tumour in this direction, they are introduced, and the canula moved horizontally. See the description of the process (20, 23).

Explanation of the eighth Plate.

INSTRUMENTS OF DESAULT'S PROCESS.

Fig. 1. Canula intended to carry the ligature round the base of the polypus. *a a*. Rings fixed to the inferior extremity of the instrument. *b*. Inferior orifice. *c c*. Superior orifice terminating in a drop.

Fig. 2. Porte-nœud, intended to fix the ligature at the base of the tumour, while the canula makes the turn round it. *d d*. Half-rings forming, when the branches are brought together, a complete ring. *c c*. Branches, separated by their elasticity, and brought together by the canula being pushed upon them. *f*. Cleft, intended to retain the thread.

Fig. 3. Serre-nœud. *g*. Rings, into which the two threads are passed to form the noose. *h*. Cleft to fix the thread.

Instruments of the other Process.

Fig. 4. Canula similar to that of Desault.

Fig. 5. A metallic stalk, made into a cleft below, with a hole above, serving for a porte-nœud and serre-nœud, and unscrewing in the middle (*d*) to receive inferior pieces of different lengths. *a a a*. Ligature intended to strangulate the tumour. *b b*. Noose of thread, passed into the stalk, to draw the ligature on it.

Fig. 6. Inferior piece of the preceding instrument, shorter than the other, and intended to be screwed on it, when it is employed as a serre-nœud.

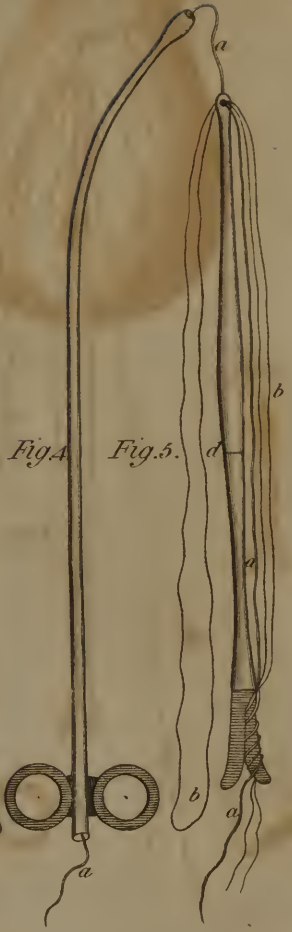
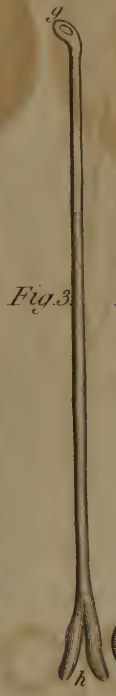
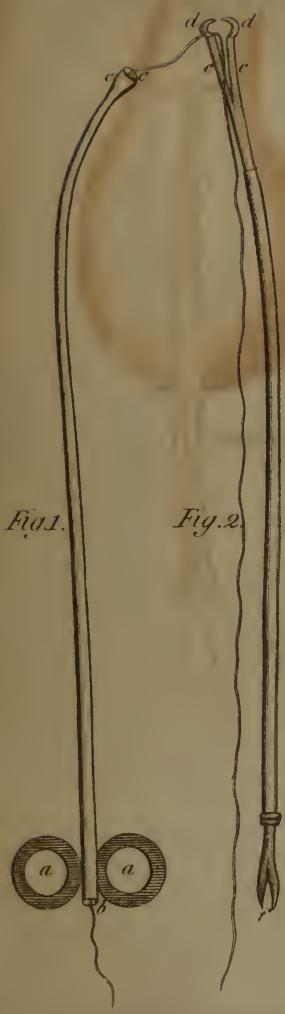


Fig. 7. Assemblage of the instruments, seen in the moment of the operation, where the pedicle being already embraced by the ligature carried round it by the canula; the noose *b b* placed under this is drawn upwards, so as to draw the string *a a* of the canula into the ring of the stalk, and thus to form the noose which must strangle the tumour.

Fig. 8. Last part of the operation. The two strings of the ligature having been engaged in the metallic stalk, this fixes them upon the pedicle and serves as a serre-nœud, the inferior shorter piece (*a*) having been screwed upon it.

SECTION FIFTH.

DISEASES OF THE LIMBS.

Memoir upon the Treatment of Varicous Ulcers.

§ I. *General Considerations.*

1. **T**HERE are no points of surgery, in which more variations are remarked, than in the classification of ulcers. Every author has had both his expressions to designate them, and his characters to distinguish them. Amidst their multiplied divisions, it is often difficult to find varicous ulcers. We must search for them in the callous and phagadenic ulcers of some, in the chironian and telephian ulcers of others, in the malignant and inveterate ulcers of most. From whence proceed so many different manners of viewing the same object? without doubt from the different opinions which authors entertained of their nature. These opinions may be referred to two principles. The greatest number have regarded these ulcers as a symptomatic affection, which is the index of an internal fault of the humours. Some have considered them as an idiopathic and purely local affection. We may conceive here how much influence this point of doctrine must have upon the treatment.

2. Those who have considered varicous ulcers as depending on an internal disease, have founded their opinion principally upon the difficulty of curing them, a difficulty so great that they almost constantly resist all our means of treatment. They supposed that in them

nature opened an excretory, by means of which she dis-embarrasses herself of the impurities of a blood, too thick according to some, too fluid according to others, acrimonious according to the greatest number. The varices, commonly spread upon their circumference, appeared to be themselves the deposit of a portion of the blood that is injurious to the functions, which Galen and others have called the *fæces* or dregs of the blood, and which for the benefit of health, ought, according to them, to be evacuated by the suppuration of the ulcers, around which it is collected. From thence the opinion so generally received, that so far from being a disease in the view of nature, varicous ulcers are on the contrary a resource which she uses to remove from the centre of life the deleterious substances, that might act upon it. From thence the precept so universally received of respecting these kinds of drains, whose suppression cannot fail to involve a crowd of inconveniencies, such as cough, pleurisy, hemoptysis, the hemorrhoidal flux, dysentery, pain of the loins, idiocy, apoplexy, &c., according as the morbid matter, prevented from its evacuation, is carried upon the lungs, the intestines, brain, &c. From thence also, the cases where we would attempt a radical cure, the precaution of establishing an artificial drain elsewhere, to supply the place of that which nature had formed.

3. Some authors attribute the permanence of varicous ulcers to another cause than that just examined. The almost constant swelling of the legs which accompanies them, and the varices that circumscribe them, have caused them to suspect an obstacle to the circulation, which obstacle they attributed sometimes to the enlargement of the liver or the spleen, sometimes to the obstruction of the mesenteric glands: from thence the practice

of these authors, who attempted to cure these kinds of ulcers by discutients and alteratives.

4. The manner related above (2, 3) of considering varicous ulcers, both rest upon a false principle, namely, that the disease is only a symptom of another more severe affection. It appears, on the contrary, that it is absolutely independent of every kind of internal disease, and is owing only to a local relaxation of the part, a loss of elasticity in its venous and lymphatic system. The actual treatment of this kind of ulcers proves this assertion. In fact, on the one hand we perceive that all the means which are proper to increase this diminished elasticity, favour the cicatrization of the ulcer; and that compression, the most potent of these means, almost always accomplishes this cicatrization: on the other hand, we do not remark, in consequence of the cure of these ulcers, those metastases, which authors have so much dreaded (2). The practice of the Hotel Dieu, during the time that Desault was surgeon there, never exhibited any. Besides, we know at this time that varices are a disease purely local. But they alone keep up the ulcers of which we speak; by removing the one the other is destroyed. Some, considering that the *saburra* of the *primæ viæ* always acts in a marked manner upon the state of ulcerated parts, which then assume a fungous and sanious aspect, think that they can establish the existence of an internal disease upon this remark. But who does not know that this phenomenon is common to all external affections, which all constantly receive the influence of the bilious disposition and of all the derangements of the stomach? We must conclude, therefore, that in the classification of ulcers, these ought to be ranked amongst those which have no connection with any kind of internal cause.

5. Whatever may be their nature, varicous ulcers generally have the following appearance. Being constantly seated at the lower part of the limb, towards the ancles or at the back of the foot, they have a more or less considerable extent, are more or less numerous, present edges that are hard, elevated, callous, painful to the touch, with a reddish brown colour, which is commonly propagated to a considerable distance from their environs. The leg is the seat of an habitual enlargement, which is increased by exercise or standing too long, and diminished and even effaced by rest. Upon its circumference small varicous tumours are observed, sometimes detached, at others forming an uninterrupted series. From the ulcerated surfaces flows a sanious humour, sometimes bloody, whose quantity varies according to a number of circumstances.

§ II. *Treatment of Varicous Ulcers.*

6. The treatment of varicous ulcers has been as various as the opinions of authors respecting their nature. We may conceive that the natural consequence of the greatest number being persuaded, that a disease existed in the mass of blood and kept up these ulcers, must be that we should combat this pretended disease by general means. Many have confined themselves to these means, thinking that, by removing the cause, the effect would soon be destroyed; but experience having taught the contrary, they sought, after purifying the humours, as they speak, to combat the local malady. Now, in this the history of art offers to us three methods of treatment; 1st, topical means: 2d, the destruction of the varices: 3d, compression.

7. The choice of topical means has varied. Some, considering that there is always a manifest relaxation in the part, have employed spirituous, ferruginous, cold

baths, &c.; others, paying no regard to any thing but the enlargement of the leg, thought of destroying it by increasing the suppuration: from thence the long series of suppurative ointments and plasters. Some, in order to oppose incessantly the development of fungous flesh which most frequently covers the ulcer, had recourse to caustics of every kind.

8. The effect of the preceding means, which seldom prove curative, has caused an inquiry after more potent remedies for the ulcers under consideration. The varices, that are constantly situated in their environs, appearing to be the cause of their permanence, it has been supposed that, after they were destroyed, the ulcer would soon be cured. Now, three principal means have been opposed to the varices: 1st. Aëtius and Paul of Egina advise that these bloody tumours should be removed by excision. The first allows, however, that this cruel operation, so far from always attaining its end, often leaves after it a new ulcer, which itself becomes incurable. Avicenna has made the same remark. Neither has this observation escaped those of the moderns, who have cut off varices; and the work of Bidloo, quoted by Manget, offers a striking example of it. 2d. To spare the patient a portion of the pain, that is always very severe in this operation, some practitioners have contented themselves with making a ligature above and below the dilatations, and then emptying them by a simple puncture. This is the method adopted by Fabricius de Aquapendente. Scultetus, who employed it without success, rejects it absolutely; and, in fact, the wounds which must be made in this case, although smaller than those from excision, are not less difficult to be cured. The varices generally return; besides, the veins that run into the varicous sac, between the two ligatures, make them almost always useless, and give rise to a hemorrhage that is frequently

very difficult to be stopped. Fabricius had occasion to make this remark in his practice. 3d. Some have also combated varices with caustic and even with the actual cautery. Celsus, who proposed to cut off the skin, and to apply a red hot iron immediately upon the tunics of the varicous vessel, seems never to have seen this operation performed, or at least he has not an accurate idea of its manner of acting; and Fabricius de Aquapendente, who relates his opinion, asserts with reason that the fire would not only dry up the vein, but that it would disorganize it entirely, and form an eschar whose separation either brings back or produces hemorrhage.

9. The last method that has been employed in the treatment of varicous ulcers, is compression. The Arabians in general were acquainted with its advantages in varices. Avicenna describes a compressive bandage, which should be extended from the inferior part of the leg to the knee. This method, which Fabricius de Aquapendente, Scultetus, Fabricius Hildanus, had probably borrowed from Avicenna, is nearly the same with that employed by us at this day; but the Arabians had not, as to varicous ulcers, drawn all the advantage of which it was susceptible: less bold and less experienced than we are, they did not dare to make use of it when the varices were accompanied with ulcerations. However, the compression of ulcers was not a new thing. Hippocrates knew the good effects of it. It is upon the authority of this illustrious observer that Paré rests the precept of making a tight bandage upon ulcers, which however must not be extended but a few inches beyond the diseased place. Scultetus and Fabricius Hildanus have gone further; they have adapted, to the treatment of varicous ulcers, the bandage which Avicenna opposed to the dilatation of the veins and the enlargement of the legs. The practitioners, who came after, neglected this

method; and if Theden, who in our day drew it from oblivion, did not merit the credit of its invention, it cannot be disputed that he has that of extending its use, and of enlightening us upon its mode of operation, and the effects of its compression.

10. We have said (4) that the local relaxation of the part, was the cause of the permanency of varicous ulcers; from whence it follows that all the means, which are suitable to destroy this relaxation, may be efficacious in combating these ulcers. Now, no means fulfil this indication more advantageously than compression exercised upon the limb, and upon the ulcerated part itself. It is the best resolvent that we can employ in this as in a multitude of other external affections. Under this view, Desault made use of it with great success, in a great number of cases: by it he was able to resolve, as we have seen, scirrhusities of the rectum, to dissipate callosities of the urethra, to disperse a number of œdematous swellings which constantly resist topical applications, to destroy a great number of chronic enlargements, such as those of the internal membrane of the intestines, in prolapsus ani, in preternatural ani, &c. Most internal hemorrhoids yielded, in his hands, to the same means, of which, with Theden, he here made the most happy application, and from which he obtained much more happy results than this practitioner, who does not seem to have sufficiently observed the influence of compression upon the callosities of old ulcers. This symptom is frequently found in the multitude of patients, who are treated at the Hotel Dieu of Paris, and yet they were never obliged there to have recourse to incisions, scarifications, caustics, and other means, which all authors propose and all practitioners employ. Compression alone, aided by cleanliness and methodical dressing, is constant-

ly able, and often in a few days, to destroy these callosities.

11. We must consider compression, not only as a mean of cure, but also as a mean proper to prevent the return of the disease. The laced stockings of skin, which are commonly employed for this purpose, after cicatrization, are not a new invention. They were employed by Fabricius de Aquapendente, Wiseman, Scultetus; and the dog-skin, known to be very supple and very elastic, was then, as it is at the present day, dedicated to that service.

12. The following case, in offering an example of the success obtained by the method of treatment which we propose, presents the details of this method, both in the manner of applying the bandage, of dressing the ulcer, of preparing it for compression, and in the internal treatment, which must sometimes be simultaneously employed.

CASE. Recorded by Bouillaud.

Maria Elizabeth Ducoudray, aged sixty years, came to the Hotel Dieu at Paris, the 25th of December, 1790, for a slight contusion on the thigh. This woman had, at the same time, on the left leg, two very considerable varicous ulcers, with which she believed it to be useless to trouble herself, inasmuch as celebrated surgeons, after having for a long time bestowed useless cares upon her, had announced to her that this disease was incurable. She consented, however, to be at rest and to submit to the treatment that was proposed to her. The patient had had these ulcers for eighteen years; they had supervened, in consequence of a considerable swelling, about the cessation of the menses. They were situated on both sides of the leg, above the ancles; the internal one was six inches long and three lines deep; the external, still

deeper, had a circumference of eight inches; the edges of both were hard and callous. A small quantity of sanious and bloody matter oozed from their surface. The size of the leg and foot was one third larger than in the natural state. These parts were pasted and strewed with those kinds of very hard nodosities, which often accompany varices. The skin was of a brown colour, and covered with scaly crusts, unequivocal proofs of old ulcerations.

On the first day, the ulcers were filled with soft lint, and in order to clean the leg and foot more easily, and to detach the crusts from it, these parts were covered with a cataplasm. A ptisan of patience and fumitory was prescribed for a drink, and at this time only light food, and in small quantity, was permitted. From the third day, the suppuration was abundant, thicker, of a whitish colour, and the edges of the ulcers began to soften and to diminish. The cataplasms were then suppressed and compression employed. For this purpose, the edges of the ulcers were covered with small strips of fine linen, smeared with cerate, to prevent the apparatus from sticking. Coarse lint was then applied, upon which nothing but a simple linen cloth was placed, to serve as a compress; and over the whole of the part a tight bandage was made, by a band six ells long and three inches wide. The end of this was fastened near the toes by circulars. Over the whole of the foot were placed trusses, disposed in such a manner that the turns of the bandage nearly covered each other in three quarters of their width. The bandage was continued in the same manner upon the inferior part of the leg and from thence to the knee, observing to tighten it equally every where, and to reverse it as often as necessary, in order that the band may be applied accurately in all its width.

The patient supported this dressing very well, which was afterwards renewed every day. The next day the suppuration was more abundant, and of a better quality. It had diminished much by the twelfth day; the edges of the ulcers were sunk down almost to a level with its bottom. The quantity of food was then increased. The ulcer on the internal side was cicatrized on the eighteenth day. That of the external side was three fourths smaller, but it was not cured until twenty-two days after. There then formed, upon the anterior and inferior part of the leg, an ulceration whose progress was so rapid, that in three days it had a diameter of two inches. Other smaller ones were also formed upon the back of the foot. This incident made no change in the treatment, and the new ulcers went through the same period as the former, but much more slowly, since they were not entirely cicatrized seventy days after their appearance. At this time the patient lost her appetite; the tongue became foul and the mouth bitter, as happens almost always to persons who are a long time at rest, and especially when they breathe a bad air. A grain of emetic tartar, in a pint of decoction of dog's-tooth, with oxymel, was sufficient to destroy this bilious disposition; it procured abundant evacuations, and with the appetite all the signs of good health soon returned. After three months and a half the leg and foot had resumed their natural state; a little rigidity only remained in the articulation, which was dissipated in a few days. The woman went away cured on the one hundred and twenty-second day. The use of the laced stockings of skin was recommended to her, so as to prevent the swelling to which the leg was disposed, and whose return could not fail to open the ulcers afresh.

REFLECTIONS

UPON THE

Growing of the Nail of the Great Toe into the Flesh.

General Observations.

1. **CAUSES**, apparently slight, often give rise, in the animal economy, to serious consequences. There can be few surgeons, residing in populous cities, whose practice has not afforded some examples of the accidents occasioned by the entrance of the great toe nail into the flesh, in consequence of wearing too tight a shoe.

2. Very sharp pains, a swelling more or less considerable, fungosities formed upon the fleshy border which covers the nail,—a consequent difficulty, and sometimes impossibility of walking, are some of the accidents, for which art has not yet discovered effectual remedies.

3. Its remedies has consisted, sometimes in destroying by caustic the fungous excrescences, sometimes in scraping with a glass the uncovered part of the nail, sometimes in plucking it away entirely. But the fungosities regenerate as fast as they are destroyed, the scraping of the uncovered portion of the nail is useless, since it is not that which occasions the disease, the nail when plucked away grows again, and with it recur those consequences which were thought to be removed.

4. In this case the curative intention is evidently, to keep separated from the flesh that portion of the nail which has grown into it; so that the cause ceasing, the pernicious effects which result from it may also disappear. Fabricius de Aquapendente accomplished this intention, by first separating with a spatula the nail from the flesh, and then introducing into the vacant space a very tight dossil of dry lint; afterwards he cut and plucked away gradually the part which had grown into the flesh. This mode of proceeding was successful in the hands of its author; but it is tedious, very painful, and cannot always be put in practice.

Desault's method of treatment.

Desault conceived a method more simple and less painful, the results of which, almost always successful, have proved its advantages. The following case presents the detail.

E. D. aged eighteen years, was in the habit of wearing a very tight shoe. This had occasioned several horny excrescences upon her toes; and in March 1795, after coming from a ball, she discovered a considerable swelling on the internal side of the left great toe. This swelling was accompanied with inflammatory symptoms, which at first seemed to give way to repose; some days after, upon E. D. using exercise, it re-appeared, but less painful and smaller than before. She paid little attention to it, continued to wear her ordinary shoes, and to walk every day. In the mean time the tumefied flesh, being compressed by the shoe, and not allowed to extend upon the side, insensibly covered the nail, which penetrated its substance, occasioning irritation and in a little while sharp pain. After this the patient walked with much difficulty, the parts became excoriated, a purulent discharge took place, fungosities arose, and the least touch

occasioned a hemorrhage. A surgeon employed the usual means; he burned the excrescences, scraped with a glass the uncovered part of the nail, and enveloped the whole with a plaster. This treatment was not attended with any advantage; the swelling augmented; the fungosities, continually springing up as fast as they were destroyed, caused a more abundant discharge. The pains increasing, at length confined the patient to her bed, and became so constant and sharp as to occasion spasmodic affections. Mild and soothing applications were used, and in violent paroxysms their inefficacy demanded the aid of opium. It was proposed finally to pluck away the nail. E. D. consented to submit to this cruel operation; when, business bringing her to Paris, she consulted Desault; who, perceiving that her complaints were occasioned by the entrance of the nail into the flesh, judged that they would disappear if the cause could be removed. To accomplish this he made use of the following means.

He took a plate of tin, about an inch and an half long and three or four lines wide, introducing the extremity, slightly bent, between the tumefied flesh and the edge of the nail which penetrated it, he at length raised up the nail by depressing the flesh which served as a point of support to the plate, and which was covered with a small compress, spread with cerate in order to defend it; then bending back the plate from within to without, in such a manner as to embrace exactly the prominence formed by the flesh, he secured it in that position by a small bandage of linen rolled round the great toe. The whole foot was then covered with a large poultice.

A double advantage was obtained by this method: 1st. By keeping the nail continually separated from the flesh, its irritation was prevented and consequently the nervous affections which arose from it. 2d. By exercising a constant compression upon the fungous excres-

cences, it made them gradually disappear. Very sharp pains succeeded this operation, of itself painful. But the patient, being accustomed to experience those which were more severe, bore these with fortitude. During the night they were appeased, and the whole foot became swelled, accompanied with a sensation of unpleasant pricking spreading as high as the knee.

The next morning the plate was removed during the dressing, the compress was changed and the same apparatus replaced. The pains, already abated, diminished during the day. The swelling was arrested and at length diminished, so that at the end of the sixth day there was no trace remaining. With it the pains disappeared, returning only slightly at distant intervals. The fungosities soon perished and the discharge lessened. On the seventeenth day E. D. began to walk, and on the thirtieth she walked with ease, and never had any return of pain. The prominence of the flesh diminished continually and was entirely gone at the end of two months; during which time it was thought proper to use the plate, lest the flesh, freed from compression too early, should again become enlarged.

REMARKS AND OBSERVATIONS

UPON THE

AMPUTATION OF LIMBS.

§ I. *General Considerations.*

1. **I**N the practice of medicine there are cases, where the certainty of death authorises the use of means, which too frequently leave only the probability of life. Such in general are all those external diseases, which placing the subject between the dangers of his situation and the hazard of a considerable operation, give him only the sad alternative of being exposed to the latter, that he might be preserved from the former. Such in particular are those affections, where the preservation of the whole depends upon the loss of a member. But, in such more than in all other cases, a prudent delay ought to precede the employment of these means. Amputation is a last resort, where the ill success that is experienced often effaces the advantages to be obtained; where even these advantages, always gained at an extravagant price, impose upon us the duty of not seeking them, until every other resource has been tried in vain. In cases of this kind art is most generally injurious, when it is too solicitous to be salutary. This was the maxim of Desault, who confined himself, before amputation, to a long trial of medicine, and who always experienced the happy effects of such conduct. Many patients at this day enjoy

their limbs, who would have languished under mutilation, if contrary principles had directed him. Such, however, is frequently the progress of accidents, that in a little time amputation is the only obstacle left to oppose them. In such cases we present the practice of Desault, exemplified in the two following cases.

§ II. *Circular Amputation of the Fore-arm.*

CASE I.

On the 1st December, Nicholas Tubœuf, aged twenty years, fell upon the left wrist, which was bent at the time of the fall, in such manner as to occasion a violent distension in the articulation. This man suffered little at first, but the next morning the swelling and pain compelled him to apply to the hospital at Martinique, where he used in succession different remedies, whose constant inefficacy determined him to go to France. During the voyage an abscess from congestion was formed between the first bone of the metacarpus and the radius, which was not opened until after his disembarkation, and poured out a greenish sanies. The opening became fistulous and was so when the patient applied to the Hotel Dieu, on the 2d of June, 1790, eight months after the fall. At the same time a considerable and very painful lymphatic engorgement around the articulation was remarked. He used at first poultices of sal ammoniac and fomentations of the decoction of walnut leaves, made sharp by adding two drams sal. tart. to each pint of the decoction. These remedies seemed to produce some good effect, but after some time a fever came on; the pus became copious and sanious, and notwithstanding the administration of emetics and purgatives, acquired such acrimony that it destroyed a considerable portion of the skin, and denuded several bones of the carpus. The patient was then removed to the hospital of St. Louis, which is

situated without the city, surrounded with gardens, and where he could enjoy a more salubrious air than at the Hotel Dieu. No change was made in the treatment; but a considerable portion of the bones of the wrist was discovered to be carious, by laying open with caustic several abscesses, which has formed round the articulation. The glands of the armpit and the neck were enlarged, at the time the patient left the Hotel Dieu. One of them, in the neighbourhood of the jugular vein, had suppurated. The enlargement was scattered in a short time, and the ulcer of the neck cicatrized; but the disease of the wrist continued to increase. The pains now became very severe, deprived the patient of all repose, and threw him into a kind of marasmus. His countenance became pallid and of a leaden hue, and the motion of the fingers was entirely lost. In this state there could be no longer any hope of saving his life, except by amputation, which he had for a long time earnestly desired. Desault being of opinion that the operation could not be deferred, had the patient brought back to the Hotel Dieu, where he underwent a preparatory course during a fortnight, in the use of bitterish drinks, and a cleansing emetic, and at length the operation was performed on the 16th of April, 1792. The patient, having been for a long time tormented with excruciating pains, went cheerfully to the amphitheatre, where he was seated in a common chair. An assistant was directed to hold the hand at a suitable height, and in a middle situation between pronation and supination; another assistant sustained the fore-arm, and embracing it with both hands drew the skin upwards towards the elbow. A third assistant, vigorous and attentive, undertook the charge of stopping the circulation, by compressing the artery with his fingers at the superior part of the arm. Every thing being prepared: 1st. Desault took in his right hand

a straight knife, single edged, with a blade narrow and of a moderate length; then sustaining the fore-arm with his left hand, he divided the skin by two semi-circular incisions, an inch and a half above the articulation, in a spot where it was sound. 2d. He then raised it up, cutting the portions of cellular membrane, which attached it to the subjacent parts. 3d. After this dissection, he cut down to the bone through the rest of the soft parts, by making two new incisions two inches higher than the division of the skin. 4th. He finished dividing the soft parts, that had escaped the circular incision, by passing between the two bones the knife, which the narrowness of the blade qualified to act as an interosseous knife. 5th. When all the soft parts had been divided, the flesh was drawn up by means of a retractor with three ends, of which the middle was passed between the radius and ulna. 6th. The periosteum and the portions of the muscles, that still remained, were divided by a knife with a short and strong blade, and at the same time the two bones were sawed near the retractor, and about three inches and an half from their articulation. 7th. The asperities were removed by the same knife, that was used for the periosteum, the retractor was taken away, and the compression on the radical artery suspended for an instant, that the divided vessels might be discovered. 8th. A pretty strong projection of blood, first pointed out the radial artery, which an assistant immediately seized with the dissecting forceps, and tied with a double thread waxed. 9th. The ligature of the ulnar and interosseous arteries, was made in the same manner. A fourth artery, much smaller, was discovered in the space between the flexors of the fingers, and tied with a single thread cut near the knot. The patient did not lose more than four ounces of blood. 10th. After cleansing the wound and the other parts from the blood, the ligatures were car-

ried to the internal side of the stump, towards the ulna, and covered with a piece of linen to keep them separate from the lint. 11th. Desault then drew down the skin and muscles, and retained them in their position by means of a compression moderately tight, made with a bandage three ells long and three fingers wide. With this he covered the inferior part of the arm from above downwards, and also what remained of the fore-arm to the end of the stump. He had first brought the skin into apposition by approximating it from before to behind. In order to preserve this approximation, he placed on each side a pledget of coarse lint, in the same manner as is done in the union of a simple wound. 12th. The dressing was completed by laying on the end of the stump a cushion of soft lint, which was sustained by two long compresses, crossing each other and secured by a portion of the bandage, left for the purpose. The patient, having borne this operation with extraordinary fortitude, walked to his bed, and was laid on his back with the elbow a little flexed, and the end of the stump slightly elevated upon a pillow. He went to sleep in a few minutes, and did not awake until the evening. The muscles and tendons in the palm of the hand were decomposed and reduced into an uniform mass, of the consistence of lard. The bones of the fore-arm were swelled and a little softened to the distance of three inches above their articulation. From these appearances there could be no doubt of the necessity of amputation. In the evening the patient had no fever nor pain, he complained only of a numbness, which he referred to the fingers of the amputated hand. On the next morning the wound was dressed again, and the dressing moistened with lead water; this was continued on the succeeding days. There was not the least swelling of the stump, and the wound was united in a few days. On the fifth day

a little suppuration was perceived along the ligatures. He was permitted to eat soup on the fourth day, and solid victuals three days after. The ligatures came away on the seventh and ninth. From that time the little suppuration, which had taken place, diminished daily. The patient improved in strength and appearance. The cicatrix was complete on the twenty-second day, and he left the hospital six days afterwards.

§ III. *Amputation of the Thigh, by the Flap operation.*

CASE II.

Francis Canaple, when a child, had the articulation of the right leg violently distended by a fall upon the knee. The swelling and pain in a little while were so great, that there was supposed to be no other resource than amputation. But the parents refusing to consent to this, the child was dressed with emollient poultices, and some time after an abscess was formed, which discharged itself by several openings round the articulation. These openings remaining fistulous, at length afforded a passage for several splinters, which had exfoliated from the condyles of the femur, and the patient appeared to be cured three years after the accident. The knee had then resumed its natural state, and there remained no other disease except some shooting pains in the joint at the change of the seasons, and particularly in moist weather. Canaple lived in this manner until the age of 45. At this period, in the beginning of the spring of 1791, his pains came on more violent than usual; a considerable swelling took place in the knee, the leg was bent upon the thigh and it was impossible to extend it. Emollient poultices were applied over the whole joint. The ancient cicatrices, in number seven, opened afresh and gave vent to a copious and fetid sanies. At length this unfortunate man, finding himself daily growing

worse, was brought to the Hotel Dieu in the month of May, 1791.

Immediate attention was paid to the bad state of the *primæ viæ*. A grain of tartar, dissolved in a pint of water, was administered in small doses and caused copious evacuations. No other topical application, but an emollient poultice, was made to the joint. This procured some ease and repose, of which the patient had been long deprived. At the end of a month only two *fistulæ* remained. In the mean time the progress of the disease was not arrested, and the swelling of the articulation increased continually. Poultices, sprinkled with *sal ammoniac*, which are sometimes of use in these lymphatic engorgements, were employed without effect. A plaster of *gum ammoniac*, dissolved in vinegar, was of more service. Its use was followed by a sensible diminution of the enlargement, which occasioned the discovery of a considerable swelling about the middle of the thigh. Still the patient continued to experience severe pains, so that in a little time he had not a moment of ease. This situation, and the kind of *marasmus* that accompanied it, excited the apprehension of approaching dissolution, from which there could be no hope of saving this unfortunate man, except by amputation of the thigh, which had been for a long time his earnest desire. It was at length determined upon, after having tried for eight months all the resources of art. The patient was prepared for some days by a regimen and diluting drinks, and Desault performed the operation on the 7th of January, 1792, in the following manner.

1st. The patient was placed almost in a sitting posture upon a bed intended for these kinds of operations, low enough to allow the affected thigh, placed in a horizontal position, to be at a convenient height for the surgeon. An assistant was directed to compress the *crural artery*,

below the fallopian ligament, by means of a cushion. 2d. While other assistants secured the patient, Desault, standing on the right side and grasping firmly with his left hand all the soft parts on the inner side of the thigh above its superior quarter, where the enlargement terminated, divided these parts with a straight knife, which he entered in front and drew out the point at the inferior part, making it cut down to the bone. 3d. Then making an oblique incision below, he formed a flap about four inches long, in which were comprised a portion of the crural muscle, the vastus internus, the femoral vessels and nerves, the adductors, the sartorius, the internal gracilis, the semi-membranosus and the semi-nervosus. 4th. The flap being turned up, an assistant seized the femoral artery and vein with the dissecting forceps, and tied them with a fillet formed of four threads waxed. He also tied the trunk of the perforans or small femoral artery. 5th. In the same manner the surgeon made the external flap, comprising the remainder of the femoral muscle, the right anterior, the vastus externus and the biceps. 6th. These two flaps having been drawn up by means of a proper retractor, the two ends of which crossed each other upon the sound portion, the soft parts, which had escaped the two first sections, and also the periosteum, were divided as high up as possible with a blunt pointed knife, and the femur was then sawed in an opposite direction to the base of the flaps. The patient uttered but two cries during the operation, one at the section of the sciatic nerves, and the other when the saw arrived at the cavity of the bone. 7th. After removing with the blunt knife the inequalities on the end of the sawed bone, two external muscular vessels, of some size, were secured by a double thread waxed, and two smaller by a single thread. 8th. The flaps were put into exact apposition and kept so by placing on each side a

quantity of soft lint. 9th. At length the application was completed by covering the extremity of the stump with lint. 10th. Two long compresses were crossed above, and the whole was secured by a bandage, six ells long, the spiral and reflected turns of which covered the rest of the thigh, some of them being made to pass over the extremity of the stump, and some around the pelvis. The patient was laid upon his back, with the extremity of the stump a little elevated, by means of a pillow. An assistant was directed to make a slight compression with his hands, for some minutes, upon the end of the stump and the passage of the crural artery.

The dissection of the amputated part confirmed the necessity of the operation. The skin, cellular membrane, tendons, aponeurosis and muscles, from the superior part of the leg to the superior part of the thigh, were confounded and reduced into a fatty substance, resembling lard. In this mass, several fistulous passages were remarked, which proceeded from the external to the internal part of the thigh, and from which there escaped a fungous substance, that was confounded with the decomposed soft parts. No periosteum could be distinguished; the bone in its inferior part was at least one third larger than in its natural state; it was also spongy in this place, and studded with a number of asperities. The condyles were partly carious, adhering in part to the anterior border of the articular surfaces of the tibia, which was almost entirely luxated behind. The patella was carried to the side of the external condyle, to which it was attached. In fine, the internal part of the articulation, was almost in the same disorder and confusion, as were remarked externally.

During the day, the patient complained of nothing but a numbness, which he referred to the foot and knee of the amputated limb. He passed the following night

and the next day in great ease. On the third, the dressings were removed, and the flaps were found united, with the exception of their edges, which were in a state of suppuration. These were kept more exactly apposite by adhesive plasters. Fresh lint, moistened with lead water, was placed round the stump, and the dressing was finished in the same manner as at first.

On the fifth day, the little suppuration, which exuded in the course of the ligatures and from the edges of the wound, was of a good quality. Several of the ligatures came away on the ninth day, and the last on the thirteenth, on removing the dressings. The suppuration, which had been kept up until then by their presence, ceased three days after; and on the twenty-second day there remained on the end of the stump only an oval wound of about fifteen lines in its greatest diameter. It diminished gradually until the thirty-fourth day, when it was but six lines. From this time the cicatrix was much slower in its progress, owing probably to the bad constitution of the patient, and his errors in diet. The wound was not entirely closed until the ninety-sixth day after the operation. The bone, however, was never exposed nor suffered any sensible exfoliation. The extremities of the flaps adhered over the end of the bone, which was sunk in the centre of the stump and covered over with nearly an inch of the soft parts. The slowness of the cicatrix had not prevented the patient from resuming his good appearance. At length he left the hospital three months and a half after the operation, doing as well as possible, and walking easily with a wooden leg.

§ IV. *General reflections upon Amputation.*

2. The two preceding observations present a view of Desault's manner of operating in the two modes of amputation, which are at present most generally adopted

in practice. Let us recapitulate the details of this manner, particularly those that are peculiar to himself, by considering them before, during and after the operation.

Of the Details preceding the Operation.

3. Before the operation, 1st. The patient must be placed in a proper position. 2d. The circulation must be arrested in the limb that is to undergo amputation. The rules of position, varied, according to the different parts, are generally understood. Practitioners are not equally agreed upon the means of arresting the circulation. Ligature and compression both accomplish this end; but the danger, difficulty, pain and insufficiency of the first has long since excluded its use from practice, in which the other only is made use of, sometimes by means of a cushion, or only the finger of an assistant, sometimes by the bandage of the different kinds of tourniquets. What are the respective advantages and inconveniencies of these different methods?

4. 1st. With the cushion or the finger of an assistant, compression may be made in every place where it is necessary to be applied. Their use is generally applicable. If, on the contrary, the tourniquet or bandage is employed, we cannot avail ourselves of them above the clavicle, or under the axilla; their use is difficult in the ham, on the leg and in the groin; at each of these places they must have a different form; in the axilla and on the clavicle a kind of corset must be employed in order to secure them; a bandage in the form of an inguinal truss, &c. The inconvenience of multiplying machines may be easily conceived. 2d. In any place we may find a cushion or make one. On the contrary, the tourniquet is not always at hand, or there is some part out of order, which is a fresh embarrassment to the operation. 3d. The cushion or the finger make a compression only

upon the vessel where it is requisite to suspend the circulation. The bandage or the tourniquet, on the contrary, make a compression upon the whole limb; by this they confine and impede muscular retraction, and render uneven the division of the flesh; the action of the bands may bruise and injure the parts; the compression, being distributed on more surface, is less efficacious at the spot where it is intended to be made. 4th. If it is requisite to suspend the compression for a moment, in order to let the blood flow, this part of the operation is done more quickly when the cushion is used, than with the tourniquet or bandage. 5th. In a great number of cases, the least motion may derange these mechanical means and disturb the operator, who will be obliged to interrupt the operation, that they may be replaced; an inconvenience which is avoided by the use of the simple means now proposed. 6th. It has been asserted, that the use of the bandage deadened the sensibility and diminished the pain of the operation: but to obtain this effect, it must be drawn so tight as to excite a reasonable fear of the pernicious consequences.

5. It follows, from this cursory parallel between the action of the bandage or tourniquet, of whatever construction, and that of the cushion, that the latter has over the former, advantages which are peculiar to it, in every case, or at any rate a marked preference whenever there was an assistant in whom confidence could be placed. Desault, however, preferred the finger of a strong and intelligent assistant applied simply upon the vessel, whenever it was in his power. The less the intervening space between the operator and the part operated on, the better will that operation be performed.

6. When by some mode of compression the circulation is secured, custom had formerly sanctioned the practice of placing a fillet above and below the place

of incision, with the double view, 1st, of fixing the flesh and directing the incision; 2d, of destroying the sensibility of the part. All our modern treatises on operations recommend this procedure, which is still in vogue with a number of practitioners. But, 1st. When the instruments are very sharp, and directed by a steady hand, there is no cause to apprehend that the flesh will not disappear before them; and as to the other view, what man is there so unskilful in operating, that his eye cannot direct the incision? 2d. It may be conceived what ought to be thought of the deadening of the part, which is said to be produced by the constriction, from its having been already proved that it is either insufficient to answer the wishes of the operator, or is pernicious to the patient who undergoes it. Besides, at the present day, when in amputation the double incisions have been advantageously substituted for the single, an example of which is offered in the first case, it is evident that the use of the fillet can be applicable only to the first part of the operation, the incision of the teguments; and that in the second part, it must be removed.

Details of the Operation.

7. Every thing being prepared for the incision of the soft parts, it must then be proceeded to. For this purpose, a crooked knife was formerly employed, but its inconveniencies have long since excluded it from practice. Among the first, Desault pointed out its general disadvantages:—too much width in the blade; a great difficulty in giving it an edge; in cutting, the necessity of grasping at once a large portion of the soft parts, and thereby making the incision less easily; the impossibility of using this instrument in the operation, by the double incision; the embarrassment of the operator, in being obliged to employ both hands to divide the parts. These

considerations are more than sufficient to justify the preference now generally given to the straight knives, which Desault has especially contributed to bring into use.

The knives which he used were made with a handle short, and cut in the figure of diamonds; a blade long, narrow and thick at the back; the cutting edge very sharp. This form has a greater advantage, which was not noticed in the second case; that of dispensing with an interosseous knife, generally employed by practitioners, and here entirely unnecessary, because the narrowness of the blade permits this always to pass between the tibia and fibula, the radius and ulna, and by turning its edge alternately against either bone to divide the flesh between them. To retrench an instrument from an operation, makes it more complete. Besides, the interosseous knife often divides the parts obliquely, and thus makes the ligature of the vessels comprised in the incision very difficult.

8. The incision of the soft parts was made in different ways, which succeeded each other in practice; but now only the two mentioned in the preceding cases, remain, confirmed by their numerous advantages over the others. Desault employed them indifferently for the arm or thigh; but for the fore-arm or the leg, he always preferred the first. According to him, it has the advantage of a section in the form of a hollow cone, in which the bone making the summit can never project beyond the divided flesh. The English surgeons, to whom we are indebted for this method of proceeding, were of opinion, that in order to produce the effect, the instrument should be conducted obliquely, so as to turn the point upwards in cutting the flesh; but in order to attain the desired end, it is sufficient to cut the muscles by layers, suffering the first to retract before the second was divided, then cutting that at the level of the retraction, and so on in suc-

cession down to the bone. By these means, there will be a real hollow cone, of which the skin turned up before the division of the flesh, forms the base; then gradually continued by the different layers of muscles, and terminated at length by the bone situated at the summit. It is true, that this mode of operating, renders the operation more tedious and more painful to the patient; but what great advantages result from these slight inconveniencies?

9. The incision of the muscles being completed, the periosteum must be divided. For this purpose, Desault employed a blunt knife with a short blade, thick back and strong edge. The flesh, being then drawn up by a retractor with one or two heads (accordingly as the operation is performed on the thigh or arm, fore-arm or leg), does not impede the division of the bone, whose rough edges must be removed with the same knife that served to divide the periosteum.

10. The bones being divided, the vessels interested in the section of the soft parts, must be secured by ligatures. These may be applied in two ways: 1st, indirectly; 2d, directly. Which of these modes is the most advantageous?

11. The indirect ligature causes a great deal of pain, because in making it, there is a necessity for piercing very sensible parts with a sharp needle; from thence there is more inflammation and suppuration in the stump after the amputation.

12. The direct ligature does not occasion this inconvenience, because it acts only upon the artery, and not upon the neighbouring parts. The one is liable to be relaxed by the perishing of the small vessels and the shrinking of the flesh, comprised in the knot of the thread. There is no cause to apprehend similar effects in the other. This does not expose to hemorrhagies of

the vessels in the neighbourhood of the one that is tied. In that, on the contrary, the needle penetrating into the flesh, may in its passage wound the collateral vessels; an accident the more dangerous, from the vessels being so deep seated that they cannot be secured. In the first, the ligature of the nerves, which accompany the artery, may be attended with unpleasant consequences. In the second, there is no room for apprehension on this account. It has been objected, that the direct ligature cuts through the artery; the same objection is equally applicable to the indirect ligature, as is proved by the well known case reported by Petit. If the constriction is moderate, and only sufficient to arrest the circulation, there will be no ground for uneasiness. The thread never drops off until the tenth, fifteenth, or twentieth day, a period of time that is requisite for the obliteration of the arterial cavity. On the first occasion, when this mode of ligature was resumed in France, by the advice of Desault, Louis was curious to see the result. He apprehended that the threads would come away too speedily; but after waiting twenty-five days, it was necessary to cut them, that they might no longer retard the cicatrization.

12. From this comparison between the two modes of making ligatures, it results, that the direct has advantages over the other, which intitle it to an exclusive preference in practice. The manner of making it is as follows:—The surgeon, taking a forceps, whose end being divided into slender and rounded legs, can easily be introduced into the arterial tube, seeks for the vessel, the anatomy of which ought to indicate its position, rather than the flow of blood which is caused by a slight relaxation of the compression, and introduces one end of the forceps into the artery, while the other remains without. The surgeon pulls the vessel towards him,

while an assistant passes a turn of a thread below, and makes the ligature with a double knot. By this manner of proceeding, a slight relaxation of the compression, without abandoning the vessel, may always assure us of the sufficiency of the ligature. On the contrary, when the outer coats of the artery are grasped with the ends of the forceps, as is done by some practitioners, the cavity is obliterated; but in order to ascertain if the vessel is secured, it must be abandoned, and if it is not secured, must be again seized with the forceps, which is often difficult, and sometimes impossible, on account of the retraction.

13. There is an essential precaution, to which authors have paid but little attention; the including the vein in the same ligature with the artery. If it remains open, and a strong compression is made by the bandage on the superior part of the limb, the blood flows back inferiorly, and an hemorrhage takes place, as Desault has frequently observed. When the two vessels are near to each other, as is generally the case, introduce one leg of the forceps into the artery, and the other into the vein; draw them outward at the same time, and secure them by a common ligature. When they are at a distance, tie them successively.

Of the Dressing.

14. After securing the large blood-vessels, attention must be paid to the smaller, which have not been tied. With this view, Desault sprinkled with colophony the lint which was applied immediately to the stump. This powder absorbs moisture, gives tone to the parts, contracts the open mouths of the arterial and venous branches, facilitates suppuration, and prevents the lint from adhering to the flesh.

15. Practitioners employed different bandages to retain the dressings. The inconvenience of pushing up the flesh, and thus adding to the conical figure of the stump, has for a long time excluded the cross of Malta, which was formerly in general use. Louis substituted advantageously for it his bandage of four bands, whose effect is to draw down the teguments and flesh, and thus to favour their approximation and cicatrization. With the same view Desault contrived a kind of purse, six inches long, wide enough to go round the limb, and having at its opening a groove, through which a ribband was passed. This purse was applied upon the limb, which it covered for three or four inches, by embracing the dressing of it; secured at first by the circulars, it was afterwards done so by drawing the ribband, which drew its groove together and applied it against the limb. But this bandage wrinkles the flesh from the circumference to the centre, so that it must unite in a cleft. This consideration induced Desault to renounce this method, which at first he had extolled, and to confine himself to the use of adhesive plasters, which have the advantage of bringing the parts together in a transverse direction, of being always in our power of not being tedious in their application, and of being as solid as our common bandages.

16. In general, in this as in other operations, let the dressing be superficial, and let it exercise no compression. If the ligature is accurate, there is no danger of hemorrhage; if it is insufficient, some degrees of greater constriction would not prevent the blood from flowing. Besides, the compression of the dressing has here the greater inconvenience of irritating the part, of determining an abundant suppuration to it by the inflammation, and of causing, by the wasting of the cellular membrane, the conical form of the stump and the projection of the bone.

REMARKS AND OBSERVATIONS
UPON THE
OPERATION FOR ANEURISM.

§ I. *Operation for the false Aneurism in the Axillary Artery.*

CASE I. *Recorded by Derrecagaix.*

ANTHONY BÉON, aged thirty years, received on the 15th of January, 1795, in the superior and external part of the thorax, a sword wound, which traversed the pectoralis major an inch above its inferior edge, penetrated into the axilla and came out behind the shoulder. A prodigious quantity of blood was immediately effused. A tumour was rapidly formed under the axilla, extending in front under the pectoralis major and minor, behind under the great dorsal, below upon the parietes of the thorax and abdomen. The patient, having fainted, was carried home, where a surgeon confined him to some resolvent applications. Two days passed without other assistance; then a considerable inflammation came upon the whole extremity; the anterior wound discharged much blood, which was stopped with difficulty by plugging; fever was high, and the patient was tormented by cruel pains. On the fourth day the fore-arm became cold, its surface was covered with a yellowish tint, the pains increased, and became such that they produced convulsions. A fresh hemorrhage took place. The tumour also increased; the skin which covered it became

red and tense, and it presented obscure pulsations. Such was the state of the patient when he entered into the Hotel Dieu on the seventh day.

The direction of the instrument, the manner in which the tumour was formed, the great quantity of blood that immediately escaped from the wound, indicated evidently the opening of the axillary artery. Amputation at the joint, or the simple ligature of the artery, were the only means of snatching the patient from imminent death. Desault resolved upon the second, influenced by the hope of perhaps saving the limb, and by the danger attending amputation in the state of extreme weakness to which the patient was reduced. He performed the operation in the following manner.

1st. The patient being laid horizontally upon a mattress, which was furnished with cloths folded in several doubles, the head a little raised, the arm separated from the body, two assistants made compression upon the artery by means of very hard dossils of lint, applied upon its passage into the hollow, which is found behind the clavicle, above the first rib and without the sternocleido mastoideus.

2d. With a sharp bistoury, and below the external third of the clavicle, Desault began an incision which he prolonged below and outwards for the space of six inches, and which only divided the integuments and the cellular membrane. Two considerable branches of the thoracic, which were opened in this first incision, were secured immediately.

3d. In a second incision, the two inferior thirds of the pectoralis major were divided by a bistoury carried upon a grooved director. A great quantity of clots was immediately pushed violently outwards by the blood, which escaped through the orifice of the artery. The compression was then redoubled, but the celerity of the

operator soon made it useless. In fact, he seized immediately with the index finger and the thumb, the artery and the brachial plexus, and thus made himself master of the blood.

4th. The elastic needle, usually employed by him in the ligature of arteries deeply seated, was passed under the bundle of vessels and nerves, which he embraced, by this mean, with a noose of waxed thread; the two ends of it were passed through a flat-headed canula, an assistant seized them, drew them moderately to him, pushing the instrument upon the artery, with which he thus performed the constriction, and supplied the place of the surgeon's fingers, now become necessary to him for the completion of the operation.

5th. The surgeon having then disengaged the vessel from the nerves which surrounded it, found the opening made by the sword a little above the common origin of the scapulary and the circumflex; he remarked also that the middle thoracic had been cut.

6th. The elastic needle being then passed again immediately above the opening, served to conduct a ligature three lines wide, which was tightened by means of a flat silver canula, wide above, more narrow below, and in which a small wooden wedge, engaged between the threads, served to fix them both; the noose of thread, by means of which the assistant stopped the flow of blood higher up, being then become useless, was abandoned for the ligature, after disengaging the nerves which it embraced.

7th. Two similar ligatures were placed below the orifice, and that which was nearest to it, was tightened by an instrument analogous to the preceding.

8th. The whole wound having then been carefully cleansed of the clots of blood which it contained, he

employed a superficial dressing, so that, at the first hemorrhage, he might become master of it, without deranging any thing. Dossils of lint, gently pressed into the deep wound, which resulted from the operation; fine compresses placed upon the edges; the canulæ being fixed to one side, as also the securing ligature, and a compress covering the whole, constituted the dressing.

This severe and tedious operation was not very painful to the patient; two hours after he slumbered and even slept for some time. He awaked covered with a profuse sweat; he was wiped, and the fore-arm covered with warm cloths. Towards evening the pulse of the opposite side was raised; on the diseased side obscure tremblings were felt at the radial artery; the extremity had recovered a little of its natural warmth. The veins on the back of the hand and the fore-arm were filled with blood, proving that the circulation began to be re-established. Ten hours after the operation the dressing was renewed, and the ligature above tightened a little. The patient did not complain of any pain until the second day; the inferior ligature was then tightened. A little broth was given every three hours, and ptisan in the intervals: on the third day the wound was dressed to the bottom. Suppuration was almost established, and some gangrenous eschars were formed at the lower part of the axilla. After the dressing the patient slept for three hours. On awaking he was seized with a difficulty of breathing, which seemed to wear off in a little while. On the fourth day this difficulty appeared again more severe than at first. There was also an oozing, which compelled the tightening of the superior ligatures. Two hours after, the blood still escaping, the inferior were tightened; in the evening an erysipelatous redness came upon the fore-arm; the next day the

extremity began to lose its warmth; an ecchymosis appeared under the nails; purple blotches spread over the arm; on the sixth day blisters appeared on the fore-arm; sphacelus came on, and the patient died, after having exhibited, during the first days, much hope of a cure.

REMARKS.

Although the operation for aneurism, the history of which was given in the preceding case, was not crowned with success, it does not the less merit a place in the annals of art, both on account of the boldness of the process, and for the manner in which it was performed. A profound knowledge of the anatomy of the parts, could alone authorize the ligature of an artery so deeply situated, and near to such a great number of important organs, as the axillary. This knowledge would itself be of little consequence, if skill in operating and coolness in the operator were not united with it. Until now only two or three practitioners have ventured to undertake an operation, which might become suddenly mortal to the patient, in the hands of him who performs it, from the enormous quantity of blood that might escape in an instant. Thus it is essential to exhibit to pupils the route which the great masters have followed in these difficult cases, where the extreme state of the disease authorizes the extreme means of art. Let us, therefore, resume the operative details, and especially those which are peculiar to Desault.

We are indebted to Camper for the ingenious idea of compression upon the first rib in aneurisms of the axillary artery; this method, which is no doubt advantageous, is not, however, so much so as it seems at the first glance. In reality, the extreme mobility of the clavicle, the agitation of the patient, the inadvertence of the assistant might derange the means of compression, and in

the middle of the operation give rise to a hemorrhage, as pernicious to the patient as it is inconvenient to the surgeon. Do not rely, then, upon this compression, except during the section of the integuments and of the pectoralis major. As soon as you come to the plexus of vessels and nerves, hasten to stop the bleeding, by seizing it with the fingers; embrace them with a ligature, which must be secured by means of some instrument, the flat-headed canula, for example, as in the preceding case.

This previous constriction gives the facility of seeking, without being hurried, the orifice of the vessel, of separating it, and of then tying it above this orifice; when it is placed too high on the first rib, we perceive that this precept could not then be applied; from thence the dangers and uncertainty of the operation in this circumstance. Those who attended Desault in the latter years of his practice, will recollect, without doubt, having seen a patient perish suddenly, on whom he operated for an aneurism in the superior part of the axilla, from its being impossible to stop the bleeding. When the artery is well secured, the nerves are disengaged from the previous ligature; the artery alone is embraced by it, and remaining in its place, it serves for a securing ligature.

Authors have employed different instruments to pass the thread, intended for their ligature, under arteries that are deeply seated, such as the axillary, the popliteal, &c. Our common needles have the inconvenience of presenting at their heel a straight direction, which impedes their passage in the curved track which their anterior extremity has opened; from thence the necessity, either of raising up the artery with difficulty, or of pressing strongly against the flesh, to make it penetrate

the opposite side. This essential fault has been remedied, by giving to the needles a form exactly semi-circular; however, in spite of this improvement, it is difficult, when the artery is deep, to go in search of its point to draw it to one's self, and then to make the thread pass. To render the operation more easy, some practitioners have employed needles, mounted upon a handle, and pierced at their extremity with a hole, destined to receive the thread. We find a similar instrument engraved in the observations of M. Deschamps upon aneurism. M. Sabatier attributed the invention of it to one of his pupils. But, in general, these needles are always useless, when the arteries are superficially seated; in this case, our new semi-circular needles are constantly sufficient, provided we take the precaution of making them blunt at their extremity and upon their sides. On the contrary, when the arteries are deeply seated, an inconvenience is applicable to these kinds of needles;—in fact, when they have passed below the vessel, we must, in order to project outwards the extremity that is pierced with a hole destined to receive the thread, press strongly, on the opposite side, the handle against the corresponding edges of the wound, in order to impress upon the needle a kind of see-saw motion; but this pressure is always painful to the patient, and with regard to the surgeon, adds to the difficulty of the operation. It was to shun this inconvenience, that Desault invented an elastic needle, composed of a silver sheath, straight on one side, bent back at the other extremity into a semi-circle, containing an elastic shank, one of the ends of which, projecting without the sheath, is accurately fitted to its opening, and is pierced with a transverse cleft. The instrument is introduced, as has been said, in the preceding case, below the artery, and when the point has arrived

at the opposite side, the sheath is kept fixed, whilst an assistant pushes the elastic shank, which thus proceeds from the bottom of the wound, presents its opening to the surgeon, into which he passes the ligature; the shank is then withdrawn into the sheath, which is also itself in its turn, together with the thread which the cleft draws after it.

The see-saw motion, of which we have spoken, and consequently the painful pressure of one of the edges of the wound, are avoided by the use of this instrument, which Desault adopted exclusively in the latter years of his life. There is no necessity to make a painful insertion of its extremity to the bottom of the parts, in order to pass the ligature there. If we may so speak, it causes this to offer itself; the shank gliding in the sheath, which is kept fixed, cannot injure the neighbouring parts during its motions.

The noose of thread being passed below the artery, we must make the constriction of it. The surgeon's knot, usually employed with this view, has, in deep seated arteries, the inconvenience of being very difficult to be suitably tightened at the moment of the operation, more difficult still to tighten it anew, when the shrunken artery, at the end of a few days, permits the blood to escape. The reason of these difficulties is, that we must, 1st. Plunge the fingers and forceps deeply upon the artery, in order to tie it. 2d. That the motion impressed upon the threads for their constriction being obliged to be horizontal, the very elevated edges of the wound are necessarily opposed to it. We must, therefore, have a method by which we may, on the one hand, tighten the artery without acting immediately upon it; and on the other hand, draw the threads in a particular direction. In this view, Desault had, as has been seen above, advantageously substituted, to this mode of tightening the

ligature, a small canula of silver wide above, narrower below, into which he passed the two ends of the noose, which, being drawn upward, whilst the canula was pressed against the artery, made the constriction of it; then being separated from each other, they were reversed upon each of the sides; between them he engaged a small wedge of wood, which was exactly fitted to the cavity of the canula, fixed them invariably, and thus made the constriction sure. To increase it at pleasure, whenever a hemorrhage supervened, it was sufficient to take away the wedge, to draw the thread to himself, and then to replace it between them. We are indebted to M. Deschamps for an instrument, whose form and mechanism are different, but which produce a nearly similar effect.

§ III. *False Aneurism of the Brachial Artery.*

CASE II. *Recorded by Maunoir.*

Desault was called on, the first of January, 1791, at midnight, to M. ***, who, about two hours before, had the left brachial artery opened in bleeding. The blood leaped in jets to a considerable distance, was of a vermilion red, and flowed in great quantity. At the bend of the arm he already perceived a tumour, that was large, deep, soft, without any change of the colour of the skin, having pulsations synchronous to those of the arteries, and extending itself from the centre to the circumference.

Convinced by these signs, of the existence of a false primitive aneurism, Desault thought that he would first employ compression. He applied upon the puncture graduated processes, which were very thick, and secured them by a band, with which he made a bandage similar to that used for bleeding, but tighter and extending more above and below the bend of the arm; at first the sharp-

est pains resulted from this method, and the fore-arm became swelled; the bandage was slacked and then prolonged over the whole limb; the swelling then disappeared, but the pains were constant, and compelled him to have recourse to another mode of compression.

Desault constructed a concave piece of tin, lined with cushions in its concavity, and forming upon its length a very obtuse angle, so that the arm and fore-arm were kept by it in a slight flexion. This machine extended from the superior part of the arm unto the wrist, and covered the posterior half of these parts. Upon this concave piece he re-applied the bandage.

This mean, without diminishing the compression upon the orifice of the artery, made scarcely any upon the other parts, by distributing it over a more enlarged surface, so that without endangering the swelling of the fore-arm, a very strong pressure might be made. But the health of the patient destroyed, in part, the effect of this mean; and the effusion, which was at first imperceptible, soon extended itself along the fore-arm, in which it became considerable; it was smallest at the lower part of the arm. The skin, which was livid at the bleeding spot, became yellow in the environs. The puffed hand performed the slightest motions with difficulty. In this state the operation was the only resource for saving the limb. The patient wished for it, and Desault determined upon it on the fifteenth day.

The bed was placed in such a way that the light came obliquely from the feet towards the head. The patient was laid upon it, with the head and breast a little raised and the sound arm turned from the light. That on the affected side being separated from the trunk, the fore-arm was held extended, and the part to be operated upon turned upwards. An assistant standing on the surgeon's right hand compressed the axillary behind

the clavicle and above the first rib, by means of a cushion held in his right hand, while at the same time with the left he pressed another cushion upon this same artery, under the axilla. A second assistant supported the fore-arm, and a third had the charge of the instruments and dressing. Every thing being ready—

1st. The surgeon, standing upon the outside of the diseased arm, made upon the course of the artery, with a very sharp bistoury, an incision four inches long, beginning two inches below the puncture made by bleeding and continuing it upwards, along the internal edge of the biceps. The subcutaneous cellular membrane was found infiltrated with blood.

2d. The aponeurosis was cut with precaution, after being assured that it was glued to the artery, as happens when the effusion is made behind the vessels. The blood then leaped with impetuosity to a great distance. The assistant redoubled the compression, whilst the surgeon finished the laying bare the artery, by cutting above and below the aponeurosis and the cellular membrane, upon a grooved director.

3d. Having cleansed the wound of the clots, that were spread about its edges and especially about its inferior angle, he disengaged the artery, a little above the spot where it was opened; then, having separated it from the nerve, he raised it up with the thumb and left index finger, and passed under it a strong crooked needle, blunt at the point and sides, and armed with two ligatures waxed and spread out in the form of a ribband.

4th. After cutting and separating these ligatures, with that which was nearest to the opening, he made a surgeon's knot, which he tightened sufficiently to stop the bleeding and then secured by another simple knot. He reunited the two ends of this ligature, and placed those

of the second upon the edges of the wound, that they might be a securing ligature.

5th. In the same manner he passed two other ligatures below the orifice of the artery and tied the highest.

6th. These ligatures being made above and below the artery, were tightened sufficiently to stop the circulation; yet, after the compression was removed, a little blood still escaped, which was no doubt furnished by some collateral branch, arising between the two ligatures; this was stopped by a third placed upon the orifice itself.

7th. The surgeon cleaned out the blood and clots that were collected in the inferior part of the wound, and after having washed the arm and fore-arm, and cleansed the wound accurately, he distinguished the knotted ligatures from those of security, placed them all upon the edges of the wound and covered them with small pieces of fine linen.

8th. He then made a gentle dressing, by filling the whole of the wound with pledgets of coarse lint, sprinkled with colophony. Above he placed layers of lint, two square and two circular compresses, which were supported by a band moderately tight.

The patient was laid in his bed in such a way that the affected arm laid upon soft cushions, and so disposed that the elbow was lower than the hand and the superior part of the arm; these parts were covered with warm cloths.

The rest of the day was tranquil; towards evening there was a slight pricking in the elbow. In the night there was a bloody oozing, which is common after these kinds of operations. In the evening of the next day the pulse was a little raised, there was a harassing cough and a painful constraint of the patient, produced by the horizontal position and the immobility of the trunk.

On the third day there was an odorous oozing, the

usual precursor of suppuration; slight fever, and easy rest during the night. On the day following the agitation produced by the cough was so violent, as to excite a slight spitting of blood, and by an indigestion, which was the effect of a simple rice cream.

On the fifth day the suppuration was established; and the pledgets being detached from the bottom of the wound, they were replaced by similar ones. The next day the superior ligature came away without a drop of blood; the suppuration abundant and of good quality, the swelling of the fore-arm almost gone, the motions of the hand more free, the pulsations of the radial artery almost restored to their natural state.

On the tenth day there was a section of the middle ligature, which was moveable; the inferior remained until the thirteenth day, the cicatrization was rapid at the upper part of the wound, slower towards the inferior angle where the pus discharged itself; when the superior part of the fore-arm was pressed from below upwards, the pus was prevented from lodging there, by interposing a pledget, which kept the edges of the wound apart. In a little while there was a sensible diminution of the suppuration; the dressing was reduced to once a day; the compresses laid aside, and the bandage applied immediately upon the lint.

At this period, a disturbance taking place in the abdomen, drinks of herbs were administered: there were bilious evacuations; an emetic diluted was given; and a purgative emulsion two days after; and these remedies were followed by a complete discharge from the gastric viscera. In a few days after, the suppuration in the superior part of the fore-arm ceased; and the cicatrization began in the inferior angle of the wound.

On the twenty-third day, the patient went out for the first time; he then extended and flexed the fore-arm with

case; the motions of the hand were free; the puffing in this part slight; the cicatrization slower in the latter stage; it was frequently necessary to destroy the fungous flesh and to give it tone by touching it with the lapis infernalis. Finally, on the forty first day the cicatrix was complete.

§ IV. *Operation for true Aneurism, in cases where the artery cannot be tied above the tumour.*

In the operation for true aneurism, practitioners are at this day balanced in their choice of two methods, which are essentially different. In the one, the artery, being previously laid bare throughout the whole extent of the tumour, is embraced above and below by a double ligature. In the other a single one is applied above the aneurismal sac. This is supported only by a certain number of cases, published by French and English surgeons; that is consecrated by the agreement of all the moderns. Desault's practice offers nothing new, with regard to the first; in the second, art is indebted to him: 1st. For being the first to revive this process in France, by applying, in 1785, to the aneurism of the poplitæus, the process followed by Amel in an aneurismal tumour of the brachial artery; a process until then buried in a work that is almost itself in oblivion. 2d. For having enlarged this method by many new and luminous views. One of these views especially merits our attention, not because it presents itself as marked with the seal of experience, but because it offers to practitioners a new field for investigation.

True aneurisms have always appeared to be beyond the limits of art, when their superior extremity is inaccessible to our instruments. From thence the custom of abandoning to nature those of the axillary artery, of the external iliac, &c. or at least of opposing to them

only internal aid, which is always, as we know, more or less impotent in this case. Is this generally adopted practice irrevocable? May not a bolder treatment be employed? Behold what Desault proposed: cut the integuments in the direction of the artery and lay this bare; then make the ligature immediately below the tumour, which may afterwards be abandoned to nature. The blood, being stopped by this mean, will flow back through the collaterals; this being collected in the sac, will there condense itself into a thick clot, which will soon contract adhesions with the parietes constricting it, and the artery will be obliterated from the ligature to the first superior collateral. Let us examine this project of operating under different aspects.

The dangers of the operation for aneurism are relative, 1st. To the interruption of the passage of the blood in the lower part of the limb; from thence the precept of saving as many of the collaterals as possible. 2d. To the division of the parts; from thence the precept of making the least possible laceration. Now, if we compare the proposed operation with this double precept, we will perceive that it is exactly adapted to it. 1st. All the superior collaterals of the tumour remain evidently untouched, and on this account it is more advantageous than the method of Anel or of Hunter, and even than that formerly practised, since in that, at the very spot of the superior ligature, vessels may exist which are then necessarily destroyed. 2d. In this the laceration is always inconsiderable, since we can only lay the artery bare in order to tie it; and under this view this method partakes of the advantages which Hunter's has over that of the ancients. We perceive then already two important considerations why we should adopt it. For its rejection, the first consideration that presents itself, is the impetus of the blood against the parietes of

the sac, which is sufficient perhaps to break and tear it, when there is an obstacle below. But on the one hand, we may remark that this impetus can only be momentary; that the blood of the tumour, coagulating in a little while, will make a body with it and consequently a resistance; there will then be only the first shock to be supported. Now, can we not, in some cases, prevent this shock? At the axilla, for example, what is to hinder us from keeping a compression upon the first rib during some hours after the ligature, so as to give time to the blood to condense itself, by preventing the tumour from receiving a new supply? On the other hand, we may observe that the parietes of aneurismal sacs, when they are not in their last stage, always present a thickness, which is a security against this fear. Shall we then dread this mass of blood remaining in a clot in the tumour? But the consequences of the operation of Anel and of Hunter answer this objection in a decisive manner, and in fact we see this mass dissipate gradually, and at length disappear; or if a little hardness remains, the patient does not suffer from it.

From these different comparisons, we may conclude that, in true aneurisms of the axillary and of the external iliac, which have not arrived to their last stage, the practitioner is constantly authorized to attempt the extreme means which we propose; besides, if the patient should fall a victim to it, it would only be some days snatched from pain and despair. Is the choice doubtful between the certainty of a death that is yet remote, and the probability of life, or a more speedy death? As to the rest, abstain from performing this operation, when the parietes of the sac, being too much thinned by the long standing of the tumour, may occasion the fear of a speedy rupture. This motive prevented Desault from

performing it in the only case which offered itself to him,—that of the axillary artery.

The operative process would be simple and easy. If the tumour is in the external iliac, 1st, cut the integuments below, and a little before the tumour, in the direction of the artery: 2d, separate the inguinal glands; lay the aponeurosis bare; make a small incision in it with the point of the bistoury; then enlarge it on both sides by means of a grooved director: 3d, disengage the artery from the cellular membrane, which surrounds it: 4th, with a blunt needle pass two strong ligatures below the tumour; tighten the upper one, and leave the lower one as a ligature of security: 5th, dress, as in the operations for aneurism. Such would be the details of the operative process; it is easy to make application of it to the axillary.

§ V.

Since the publication of Desault's works, in which the abovementioned article was inserted, the operation, which is there proposed, has been performed by M. Deschamps. Its unfortunate result seems evidently to weaken a part of the reasonings, upon which Desault founded the hope of his success. It is true that a detached fact ought not to give rise to general consequences; but we must agree that it would be a very strong prejudice against this process. Whatever may be the case, I will here relate this important case, exactly as M. Deschamps has himself published it.

M. Albert Brondex, aged sixty years, a man of letters, of a constitution rather aqueous than sanguineous, entered into the hospital of Charity on the 10th of Vendemiaire in the year 7. He had on the upper part of the left thigh a circumscribed tumour, of the circumference of four decimetres and a half (near seventeen

inches), extending itself to the bend of the thigh, and appearing to leave between it and the crural arch only the distance of a finger's breadth. This tumour was easily recognized to be a true aneurism; it had all the characters of it. It was of six months standing, and in its commencement it was manifested, without any known cause, by a small tumour situated upon the course of the femoral artery, at five fingers breadth from the bend of the thigh.

On the fourth day from the entrance of the patient into the hospital, the tumour continuing to progress, I assembled nine consulting physicians; MM. Allan, Brasdor, Boyer, Corvisart, Callorier, Marigues the surgeon of the patient, Pelletan, Percy and Thouret. After the examination of the disease, I proposed the ligature of the femoral artery below the aneurismal sac, observing how difficult it was to compress the artery above the tumour in a sure and firm manner, during the time that the operation would last, and to extend the incision as much as was necessary, especially at the superior part near the point of compression, that the artery might be laid sufficiently open to make a ligature of such importance between two arteries so near to each other; and the fear of a considerable loss of blood in a cacochymic patient, feeble and sixty years old—hoping also that the blood, being stopped in the femoral artery by the ligature, would coagulate itself in the tumour, notwithstanding its motion and approximation to the deep artery.

After an hour's discussion, I took the votes; three were for the incision of the tumour, and six for the ligature below the aneurismal sac without including it.

The patient being prepared for the operation and the apparatus ready, I proceeded to it upon the spot in the presence of those who were consulted.

I made, upon the course of the femoral artery, below the tumour, about the middle of the thigh, an incision of seven centimetres (about two and a half inches). The integuments and the fascia lata being opened, I proposed to raise up the sartorius muscle, which we know covers the artery in this place. I sought it for some time without finding it. I prolonged the incision a little more forward, and pushing away the muscular fibres towards the internal part of the thigh, I followed the great adductor, along which lies the plexus of vessels, and separating the parts I found the sartorius muscle thrown forwards. We sought for the artery, which we expected to find in the place which it commonly occupies; but we did not perceive there the smallest pulsation, and it did not present a sensible size. Several assistants made as useless attempts to discover it. Supposing that we must search for it elsewhere, one of the assistants introduced his finger into the bottom of the wound towards the tumour, and he thought, in following it, that he recognized this artery towards the internal part of the thigh under the sartorius muscle, which ran there. I then disengaged this muscle, which I separated in the whole of its circumference; but this was useless. No pulsation manifested itself to the fingers wherever they were applied. In order to view the bottom of the wound more accurately, it was proposed to cut the sartorius across—in spite of my repugnance to it I yielded, and our researches were not the less fruitless. Finally, we resumed our first idea, that the artery had not changed its place. A nervous thread, which we know accompanies the plexus of vessels in this part, and which I had cut, with the design of saving the patient the sharp pains which he experienced in the knee every time that I touched him, determined me. I passed a needle, with a handle, under the spot which we were persuaded that

the plexus of vessels was; and for greater security I comprised in the noose a small portion of the great adductor muscle. The band being passed, I drew its extremities upwards, and I applied the finger to the parts which it embraced, so that by pressing it, the blood, being stopped, might fill the artery and make it sensible; but we did not perceive any change, any swelling above the pressure. By the assistance of the tourniquet the parts were compressed, and I placed a securing ligature above.

The patient did not lose three ounces of blood during this operation. I put a very small quantity of lint into the bottom of the wound; two slight pledgets preserved the edges of it from the impression of the tourniquet; two or three slit compresses were placed upon a pledget smeared with the balm of Arcæus, which covered the wound. I did not employ any circular dressing; little sacks, filled with warm sand, were laid along the leg and foot. These parts did not experience the least change in their warmth and sensibility; but the patient was extremely fatigued by the length of the operation, which had lasted near an hour, and by the sharp pains, the distensions and tearings that were occasioned by the different researches.

The progress of the tumour had been very sensible from the tenth to the fourteenth day of the operation; it was not arrested at this period, and the pulsations were the same. The fifteenth and sixteenth, its bulk had almost reached the crural arch; we remarked at its summit a small violet spot, which could not be perceived unless much attention was paid to it; the thigh and leg preserved their natural warmth; there was very little pain in the thigh, which however appeared to be slightly swelled. On the sixteenth, the first pieces of the dress-

ing were raised, and the ligature, which had become a little relaxed, was tightened. On the seventeenth day, the nature of things was not changed; the pulse was frequent, small and locked. In the night of the seventeenth and eighteenth, the patient experienced much pain in the thigh, and more particularly a dull pain in the aneurismal tumour, whose size increased. I saw the patient at one in the morning, and observed a sensible enlargement, which was a little painful, along the external surface of the thigh, without hardness, and the tumour did not cease to be circumscribed. On the eighteenth, which was the fourth day from the operation, we examined the patient with all the attention which his situation demanded; the tumour, as has been said, continued to progress; the pulsations were perceptible at the same degree; the thigh and leg were swelled. All these circumstances proved in an evident manner, that the ligature, which was placed below the tumour, had not produced the effect which we expected from it: we were confidently persuaded, that the artery had been tied, although several of the assistants doubted it. The appearance of the patient was very unfavourable; his pulse small, locked and frequent; his age, and all the fears which I had manifested before the operation, were not calculated to assure us of the success of a second operation, which the circumstances of the patient demanded imperiously, if we did not mean to abandon him to a certain and speedy death. All these considerations being maturely weighed, we decided to open the aneurismal sac.

On the same day (eighteenth), at four o'clock in the afternoon, we proceeded to this operation, in the presence of MM. Marigues and Valentin, our associates. We prepared a narrow cushion, which was a little elongated, firm and solid, and fixed upon a handle, that it

might have the double advantage of occupying little space, and of being held firmly, by a strong and intelligent assistant; another assistant being ready to second and replace the first. This cushion being placed upon the artery at its egress from the abdomen, and pressing against the pubis, I plunged the bistoury into the superior part of the tumour, and down to the lower part. The sac and the skin, comprised in it, which was perfectly sound, and the first lymphatic layers, were an inch and a half thick; a great quantity of fluid arterial blood escaped immediately, and I took out a mass of clots and lymphatic concretions, of a size exceeding that of the fist. The sac sinking and leaving more room between the superior angle of the incisions and the compressing mean, I cut upwards to the hand that compressed, in order to find precisely the arterial crevice, which I could see only for an instant, being every moment inundated by the blood, in spite of the care which was taken to compress the artery; a thorax probe was passed into the superior tube of this canal, which was raised up as quick as possible; the enormous loss of blood making me accelerate the ligature.

Directed entirely by the touch, and taking the arterial tube and the probe between my fingers, I passed the needle under the raised artery; the cord being introduced, I drew its extremities upwards, and placing a finger between them, upon the artery, the compression was suspended; no more blood appeared. I raised up the artery by means of this noose, and thirteen to eighteen millimetres (six to eight lines) higher, I passed a flat cord under the artery, in case it might be needed. I then placed the tourniquet, and compressed the arterial tube; the blood appearing to come from below upwards, I made a ligature below the sac, by means of a waxed

thread, tied with a double knot. After these two ligatures were made, there appeared no more blood in the aneurismal sac, which was lightly dressed with soft lint and covered with a pledget, smeared with balm of Arcæus, upon which I laid some compresses supported only by the long pieces, which embraced the thigh, without compressing it. The tourniquet, which was applied to the first wound, having become useless, was withdrawn.

As I had foreseen, at the time of the consultation, the patient, in spite of all the haste which I could make to tie the artery, lost such a quantity of blood, that he fell into a swoon, from which he could not be revived, notwithstanding all the assistance that was given him. His pulse could no longer be felt, he expired gradually, and died at midnight, eight hours after the operation.

The anatomical dissection being made the next day, at the amphitheatre of the hospital, in the presence of our colleague Allan, and of a great number of pupils, demonstrated,

1st. That the deep artery, which is usually a part of the femoral to the distance of four or five centimetres and a half (an inch and a half to nearly two inches) from its egress from the abdomen, took its origin at twenty-three millimetres (ten lines); that, according to the usual order, it gave out almost immediately the two circumflex; that these canals followed their ordinary direction; that the subaltern arteries had a considerable diameter; that the trunk of the deep artery, before its division, almost equalled the diameter of the femoral artery; that the superior articulars were also sensibly dilated; that the deep artery was attached to the aneurismal sac by such an adhesion, that it followed the sac when raised up by a probe introduced into the arterial

tube, as may be seen in the anatomical preparation, in such a manner, that it was almost impossible to pass the needle between it and the femoral, without incurring the risk either of wounding it, or including it in the ligature.

2d. That the ligature, which was made in the first operation, embraced the artery, the femoral vein and a small portion of the fibres of the great adductor muscle; that, in the second operation, the superior tight ligature was placed at six millimetres (three lines) from the aneurismal sac; that it embraced the femoral artery and a third of the deep artery, which was pierced by the needle; that the security ligature, which was placed above this, had passed precisely between the deep and the femoral artery, and that this last was embraced accurately; that the inferior ligature comprised the artery, six lines below the sac, and that the vein had been wounded by the needle. We may observe, that notwithstanding both these punctures, the blood had ceased to flow into the wound.

3d. That the artery was lacerated to the extent of five centimetres and a half (two inches) to seven centimetres two millimetres, (two inches, eight lines), from its origin; that the entrance and egress of the sac had the shape of a funnel; that the width of the artery in the centre could not be ascertained precisely, its edges being confounded with the cellular membrane, which made the greatest part of the aneurismal sac; that twenty-seven millimetres (or one inch) below this sac, there was a dilatation, or cul de sac, in the arterial tube at its posterior part, that is to say, there was a true aneurism commencing, whose interior was smooth, polished and without any alteration; that the rest of the extent of the arterial tube, as also the femoral on the right side, were in their natural state.

4th. That the diseased thigh was already affected with a purulent infiltration, extending upon the surface of the muscles, from the anterior and external part of the thigh, under the fascia-lata; that this suppuration had not been remarked between the muscles, except at the spot of the first incision.

REMARKS AND OBSERVATIONS

UPON

ERYSIPELAS.

§ I. *General Considerations.*

1. **I**N general, erysipelas is an inflammatory, superficial, uncircumscribed tumour, with sensible heat, and sharp and pungent pain. All the affected parts are of a lively red, clear, and shining, which disappears under the finger, and returns as soon as the pressure is removed. These general characteristics apply to every erysipelas; but, being more or less marked in each, they offer themselves with different symptoms, which circumstance determines the different kinds of erysipelas.

2. The first and most simple, is that which Suavages and Cullen call erythema, a name employed by Hippocrates to designate every erysipelatous redness; but this term is not general, and the idea which is attached to it, is indeterminate. It appears to be more suitable to appropriate to this kind the name of bilious erysipelas, which is employed by the greatest number of authors: not that we ought to adopt the metaphysical theory of the Galenists; but because it seems that this term includes the idea of the bad disposition of the primæ viæ, which is one of the principal symptoms, and especially

distinguishes this erysipelas from others. Its symptoms are these: the tumefaction is slight, most frequently insensible; the skin has a rose colour bordering upon yellow; the sensation experienced by the patient, is less of a drawing or pulsative pain, than a painful smarting, similar to that of being scalded with hot water or the rays of the sun. When it is coming on, most frequently the appetite is lost, the mouth becomes bitter, the tongue is moist and covered with a yellow fur; nausea supervenes and sometimes bilious vomiting. The patient, being dejected, feels lassitude, wandering pains, and a sharp sensation of heat, without having, however, a great dryness of the skin or much thirst. Frequently the disease commences with a fever more or less ardent, preceded by chills, and accompanied by a violent headache. This kind is the true or bilious erysipelas, or rather the erysipelas, properly so called, of the ancients; and it is also the simple erysipelas of some moderns.

3. The other kind, which we call phlegmonous erysipelas, corresponds to the erysipelatous phlegmon of the ancients, and in part to that which they also called phlegmonous erysipelas. It is the erysipelas, complicated with phlegmon, of modern elementary books. In this the skin is more elevated, the tumour deeper, harder, and presents a more durable colour. There is but little tension in the skin; the pain, which is constantly pungent, becomes throbbing at intervals. The patient at first has neither bitterness nor nausea; he has a dry skin and tongue, an ardent thirst, a full and hard pulse, indicating a sanguineous plethora. At the end of a few days, especially when bleeding and the antiphlogistic regimen have been employed, the tongue becomes foul and moist at the edges; bitterness and nausea supervene, and the disease then becomes a bilious erysipelas.

4. All erysipelas may be naturally referred to these two classes; and we should especially pay attention to the original state of the primæ viæ, to place each in the class to which it belongs.

5. There is, however, a kind of erysipelas which differs from the others, in that it demands a local treatment, although its symptoms do not exhibit any thing extraordinary. It is that which supervenes to wounds, contusions, &c.

6. The prognosis of erysipelas, whatever may be its kind, must be regulated by its extent, its intensity, the part it affects; the most dangerous is that of the head and the neighbouring parts. Aëtius, Paul of Egina, Oribasus, apprehend, in this case, that the inflammation intercepts respiration, and that the patient may perish from suffocation. Paré regards the erysipelas of the womb as mortal. Hippocrates also gave an unfavourable prognosis of the erysipelas, which abandons the external surface suddenly, and is translated to the internal. Obstinate ulcers and even gangrene are also, according to the ancients, frequent consequences of erysipelas; although these accidents depend, without doubt, most frequently upon the want of care, or upon the manner of treatment, rather than upon the nature of the disease. We may say as much of the erysipelas, following wounds, ulcers, fractures, and luxations, the consequences of which authors describe to us as greatly to be dreaded.

§ II. *Treatment.*

7. The treatment of erysipelas has varied much in the different periods of art. We may consider this treatment under two views: 1st, with respect to the internal means; 2d, to the external,—employed by practitioners.

Of the internal means.

8. The internal means have been extremely multiplied by authors. Celsus recommended bleeding indiscriminately, when the strength of the patient permitted it. Aëtius employed it only in cases of sanguineous plethora; he treated the bilious erysipelas by purgatives. Paul of Egina had recourse to these last, only when there was some obstacle to bleeding, for which he gave a general precept. Oribasus and Avicenna recommend nothing but evacuants of the bile. Guy de Chauliac, Thevenin, Munnick, Sydenham, &c. on the contrary, prescribe bleeding for all cases of erysipelas that are rather severe, and they are followed in this by the most of moderns, of whom some, determining by the appearance of the pleuritic crust of the blood, repeat the use of it three or four times.

9. Thevenin sometimes employs a slight emetic, but only after having found other means insufficient. Paré remarked that the disease commonly terminates itself by bilious vomitings and purgings; but he did not then make use of emetic tartar, which is so well adapted to aid and accelerate this termination. And now that we know the effect of this remedy so well, there are many practitioners who are afraid of it; and Stoll himself did not employ it, until after he had prepared the patient by incisives and dissolvents. Richter advises it from the first moment, except in rare cases, which require previous bleeding. Cullen adds to this mean what are called cooling purges. He is inclined, however, to the method of Selle, who, regarding erysipelas as a kind of putrid fever, associates, with evacuants, kino, wine, and other antiseptics. Bell prefers the antiphlogistic regimen and bleeding, forbidding, however, topical bleeding, which, in this case, produces ulcers difficult to be cured.

10. Fresh air has also been an important remedy in the treatment of erysipelas. Alexander of Tralles recommended it. Paré also looked upon it as of consequence, when joined to cooling and moistening applications. It is with the same view that Sydenham advised the use of small beer, and some others have employed red wine and water; that Thevenin, in obstinate erysipelas, prescribed baths, milk-whey, veal broth, and cold mineral waters.

Of the external means.

11. External means have been for a long time in general use in the treatment of erysipelas. However, Hippocrates says nothing that can authorize the presumption that he ever had recourse to them; but the physicians, who succeeded him, have been prodigal of liniments, fomentations, cataplasms, and even ointments of every kind. It was not that they did not soon perceive their inconveniencies. Galen had remarked it, but this did not prevent him from also using the diapalma plaster. Fabricius Hildanus saw the use of oil of roses, continued for some days, produce gangrene in a phlegmonous erysipelas.

12. The stupefying and narcotic applications, recommended by Galen, Paul of Egina, and many others, have also induced mortification frequently.

13. Resolvents and repellents have been advised very generally. But, besides that they may occasion fatal metastases, they often produce induration or gangrene of the diseased part. Paul of Egina observed it, and therefore rejected astringents and spirituous resolvents. From thence also the practice of Avicenna, who preferred the effusion of cold water upon the part, to the most active topical applications. From thence the use of oxy-

crat, of a little salt of lead dissolved in much water, as recommended by Thevenin, &c.

14. Emollients have also had their partisans. Celsus made use of cataplasms, covered with compresses soaked in cold water. Galen made them resolvent by oxycrat. Paul of Egina advises a cataplasm of barley meal; Thevenin one of rye meal; Diemerbroeck one of oak leaves and the meal of beans.

15. Cullen, persuaded of the inutility and danger of all kinds of topical applications, rejects them absolutely. He only permits the sprinkling of the affected part with fine flour, as has been since done in England, to absorb the acrid humour, which escapes through the skin and tends to ulcerate it. Bell, agreeing with Cullen respecting the bad effects of topical applications, applies however upon the skin, when the pain is very sharp, a light layer of the extract of lead. Richter, far from approving this mean, places it upon the same footing with all the astringent remedies, which, he says, have often occasioned fatal accidents; he applies nothing, absolutely nothing to the tumour. It seems that Actuarius was not very far distant from this method; since he has observed, with respect to herpes, that local remedies were absolutely useless.

16. Besides the remedies that have been mentioned, there is another, which has been much employed since the time of Thevenin. These are vesicatories, which he thought suited to evacuate or turn the erysipelatous humour, when they were applied at a distance from the diseased part. An observation of Alix, proves in what estimation this remedy should be held. He applied vesicatories to the legs of a peasant, on account of a shifting and obstinate erysipelas, which had successively occupied the back, the breast and the face. The erysipelas

was immediately translated to the feet and followed directly by gangrene.

17. Such is nearly the substance of what has been said upon erysipelas. It will perhaps appear a little confused; but the distinctions established between the different kinds of erysipelas, having almost always been neglected in practice, and most authors having in all cases, pointed out but one and the same treatment, we cannot make the history of the remedies correspond with the division of the books. As to the rest, this summary is sufficient to enable the judicious reader to compare what authors have written, with the practice of Desault, a view of which will be presented in the succeeding articles.

18. In the bilious erysipelas, whatever heat there might be upon the skin, and however considerable the fever, Desault gave, in the first instance, a grain of tartar emetic diffused in much fluid. The symptoms usually diminished immediately after the operation of this drink; and he has even seen them cease entirely, although the remedy produced no other effect than the increase of the perspiration and urine.

19. Sometimes, however, the symptoms were obstinate, notwithstanding these evacuations. He then repeated the emetic draught once, twice, and even more. When the erysipelas had disappeared the fever ceased, and there remained no more bitterness in the mouth; in order to finish the cure, he employed one or two purges of cassia, manna and a grain of tartar emetic. During all this time, the patient drank abundantly of a diluting ptisan, acidulated with oxymel. As soon as the first symptoms were abated, some food was given; because Desault remarked that too strict a regimen increased the acrimony of the humours and often reproduces the bilious disposition, especially in hospitals, where in

general the air is insalubrious. The bilious erysipelas, however considerable it may be, and whatever part it may affect, yields usually in a few days, to this treatment. Desault never met with a case, which was not finally dissipated. He has also constantly observed, that the disease was more obstinate and severe, when the patients had been bled before their arrival at the hospital, and especially when this had been done several times.

20. In the phlegmonous erysipelas, emetics and other evacuants would still increase the irritation, which is already considerable. Therefore Desault never had recourse to evacuants, until after he had destroyed the irritation, and diminished the sanguineous plethora, by one or more bleedings, according to the severity of the symptoms and the strength of the patient. The bilious disposition, which then manifests itself, indicates the necessity of evacuants and the time for administering them. During the treatment he also gave nothing but a diluting drink, such as milk-whey, or dog's-tooth tea, with oxymel.

21. No topical applications were used in either kind of erysipelas, proceeding from an internal cause. The affected part was exposed, as much as possible, to the air. But when the erysipelas, either bilious or phlegmonous, supervened to a contusion, wound or ulcer, regimen and internal medicines would be insufficient, if we did not add to them topical applications, suited to destroy the local irritation and to recall the suppuration. It was with this view that Desault employed cataplasms, whose good effects in these kinds of cases, are proved by numerous observations. But he regarded it as an essential precaution, not to extend this topical application far beyond the bruised part, or the edges of the wound or ulcer. If some application is permitted upon the rest of the erysipelatous surface, it must be only an aqueous

and very slight resolvent, like the vegeto-mineral water, as it has been constantly used at the Hotel Dieu; that is to say, made with only a dram of the extract of lead to a pint of water. Let us confirm, by some examples, the doctrine established above.

Bilious Erysipelas from an internal cause.

CASE I.

Ad. Goyde, aged twenty-seven years, of a bilious temperament, in consequence of a violent head-ach, ardent thirst, and difficulty of breathing, was attacked with an erysipelas in the upper part of the face and especially about the eye-lids, which she could not separate. When she arrived at the Hotel Dieu, she had a furred tongue, bitter mouth, fixed loathing, desire to vomit, a burning heat, and a full, hard and frequent pulse. The menses, which were then present, compelled a delay of the use of the remedies, that were proper for combating these symptoms. A grain of the emetic, given in a pint of water, on the third day, procured several bilious stools, which relieved the patient a little. The same remedy was repeated, and on the fifth day the redness and swelling were almost entirely dissipated. Three laxatives, composed of an ounce of the pulp of cassia, two ounces of manna and a grain of the emetic, which were taken on successive days, completed the cure.

Erysipelas in consequence of Wounds.

CASE II.

Marie Framay, aged sixty years, came to the Hotel Dieu on the 7th of September, 1789, with an erysipelas on the left leg. The tongue was furred and moist, the mouth bitter and the pulse a little feverish. A grain of the emetic was administered to her and produced an

abundant evacuation of bile. Notwithstanding this remedy was continued for three days, the erysipelas extended over all the posterior part of the leg. The cicatrix of an old wound, which was ready to break out, was then perceived near the internal ancle. This circumstance produced a change of the treatment. The whole leg was enveloped in an emollient cataplasm, and the administration of the emetic continued. A slight suppuration was formed in the wound; the erysipelas diminished sensibly, disappeared on the twelfth day, and the wound was closed, some days after, by a solid cicatrix.

Wandering Erysipelas.

CASE III.

Louisa Chevalier, aged forty-eight years, having been operated upon at the Hotel Dieu, for a cancer in the right breast, appeared to be nearly cured, when the wound, that was almost cicatrized, became covered with a glairy suppuration; the tongue was furred and the mouth bitter. Towards the right elbow there appeared a swelling, which was dissipated after several bilious vomitings and stools, procured by a grain of the emetic. A cholera supervened some days after, and there was a slight ulceration in the edges of the wound. These new symptoms disappeared and the cicatrization recommenced; but, in a little time the pulse was raised, the suppuration became abundant and serous, the face red and the mouth clammy. The same day an erysipelatos disposition was perceived in the right arm, which on the next day was swelled, red and painful in two thirds of its lower parts. The patient had nausea and a bitter mouth; and the cicatrix was already destroyed in part. She took a grain of tartar emetic in the watery solution, which diminished the swelling for three days. On the fourth an issue, which had been made in the left arm,

ceased to suppurate, and there appeared above it an enlargement, which was dissipated as soon as the suppuration of the issue was restored, by covering the pea with a little basilicon stimulated with powder of cantharides. The erysipelas then attacking the lower part of the same arm, it was soon driven away by the use of emeticised milk-whey; but, in proportion as it disappeared, the right fore-arm swelled and became painful. A few days after it had acquired a considerable size; the skin was tense, of a clear and shining red. The cellular membrane yielded however to the impression of the finger, and did not re-establish itself but slowly. The redness and pain were not dissipated totally, until after repeated emetics and purges. The wound of the breast cicatrized speedily; but the fore-arm remained œdematous for a long time, and notwithstanding a compressing bandage, it did not entirely resume its natural size, a month after the disappearance of the erysipelas.

