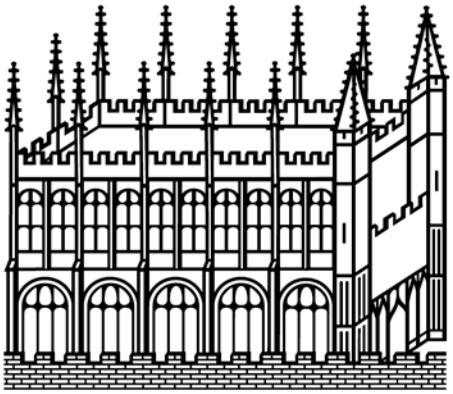

THE

SYDENHAM SOCIETY

INSTITUTED

MDCCCXLIII

LONDON

MDCCCXLVIII.

OBSERVATIONS

ON

SURGICAL DISEASES

OF THE

HEAD AND NECK.

SELECTED FROM THE

MEMOIRS OF THE ROYAL ACADEMY OF SURGERY OF FRANCE.

TRANSLATED AND EDITED BY

DREWRY OTTLEY.

LONDON

PRINTED FOR THE SYDENHAM SOCIETY

MDCCCXLVIII.

C. AND J. ADLARD, PRINTERS,
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PREFACE.

The present small Volume, which the Council of the Sydenham Society did me the honour of appointing me to translate and edit, consists of a Selection from the Memoirs of the French Academy of Surgery. It seems desirable, while taking this opportunity for acknowledging the obligation thus conferred upon me, also to avail myself of it, for adding a few words respecting the original work and its authors, as also concerning the grounds on which the present selection has been made.

The Royal Academy of Surgery, established in 1731, under the auspices of Louis XV, continued in action up to the commencement of the French revolution, and included in its ranks the ablest surgeons in France during that period, amongst whom we may enumerate Mareschal, J. L. Petit and his son, La Peyronie, Quesnay, Morand, De Garengeot, Le Dran, Foubert, Bordenave, Levret, Brasdor, Louis, and Sabatier.

This Society owed its origin to the zeal and influence of Mareschal and La Peyronie, the king's surgeons, who, with some other leading members of the profession in Paris, aimed at obtaining for the practitioners of surgery, that social position which had been hitherto denied them, but which their improved education and the importance of their pursuits well entitled

them to claim. Considerable opposition was offered by the Faculty of Medicine of Paris to this endeavour of the surgeons to emancipate themselves from their subordinate position in connexion with the barbers, and hostilities were carried on with much acrimony between the contending parties. After copious ink-shed, the surgeons succeeded in their object, and the establishment of the Academy of Surgery was a first-fruit of their success, and a means by which it was rendered permanent.

A few years later, the surgeons of London, led probably by the example of their brethren in Paris, applied for a charter of incorporation, apart from the barbers, with whom they had been long allied; they obtained their request, and thus was established the Corporation of Surgeons, the parent of the existing College.

Historically then, the establishment of the Royal Academy of Surgery formed a somewhat important epoch in the annals of Surgery, and its Memoirs, the production of the contemporaries and rivals of our Cheselden, Douglass, Monro, Gooch, and Pott, having always held a high position in medical literature, seemed well entitled to a place in the series of Volumes edited by the Sydenham Society. On examining the work with a view to republication, it was at once evident that many of the memoirs contained in the five quarto volumes to which it extends, especially those of a theoretical character, had become too entirely obsolete to be worth translation, and the Council therefore decided on issuing a selection, merely, of some of the more important papers; it seemed further desirable to give the proposed volume a some-

what more definite character than that of a miscellaneous collection of Surgical Tracts, and it was consequently determined to confine the selection to those memoirs in which Diseases and Injuries about the Head and Neck are treated of.

A sub-committee of the Council was appointed to examine the memoirs more fully, and to recommend such as it seemed desirable to include in the proposed volume. Those here presented are the papers selected and approved of by the Council.

Many other memoirs on allied subjects, a list of which is appended, are contained in the original volumes. The reasons for omitting these from the present volume varied in different cases. In some papers the practice recommended was so entirely at variance with what subsequent experience has shown us to be correct, that little if any good could have been obtained by their republication. Other memoirs, as those on Fistula Lachrymalis, are decidedly inferior to treatises on the same subjects by contemporary authors; while to others an extension had been given so much beyond what the importance of the subjects treated of demanded, that, though they would be probably consulted by persons especially devoting their attention to those particular parts of surgery, their addition to the volume in hand, while it would have greatly increased its bulk seemed by no means likely to add proportionately to its value. On this latter ground were omitted the treatises on Hare-lip, Salivary Fistulæ, and Excision of the Tonsils.

While, therefore, it can scarcely be expected, that in a matter of this kind all should be satisfied with the choice made, it is hoped that most of those who may refer to the present

volume will be prepared to allow that the papers contained in it are the best that could have been selected on the several subjects from the Memoirs of the Royal Academy of Surgery.

The plan hitherto followed by the Sydenham Society in its republication of the works of past authors, did not permit of the addition of notes in correction of practical errors, or of any attempt to bring up the author, as it is said, to the present standard of knowledge. The members of the Sydenham Society are understood, themselves to furnish the "granum salis" with which to season the writings of those who have preceded us in an advancing science like that of medicine, and I feel that I have therefore no apology to make for abstaining from any attempt to supply it: I shall be content if I be not found to have fallen short of my simpler duty as translator.

D. O.

London, Jan. 20, 1848.

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By M. QUESNAY.

I.

Among the various signs which may determine a surgeon to employ the trepan, none is considered more clearly to indicate it than fracture or depression of the skull. In certain cases, indeed, fractures are not merely signs indicating this operation, but are themselves the causes which necessitate it; for if there be a depression or displacement of the bones, or fragments of bone wounding the brain or its membranes, and if the opening caused by the fracture do not afford sufficient room for the removal of these, the trepan would then appear to be indispensable for the purpose of replacing or removing the bones, were not examples to be found of persons recovering even from such wounds without the use of the trepan.

Observation 1. M. Avellan reports the case of a girl, of fourteen, who received a blow on the head, followed by stupor, efforts to vomit, and delirium, in consequence of a depression of the right parietal bone. These symptoms required the use of the trepan; but the mother of the girl absolutely refused to permit it. The stupor and delirium lasted three months,

and kept the patient in a state of imbecility; the bone, however, gradually recovered its level, and the symptoms at length disappeared entirely.

Obs. 2. M. Duprey has communicated a similar case, in which the patient recovered more quickly, though the wound was a more complicated one. A child, 10 years of age, fell on its head from a height of thirteen or fourteen feet; two swellings formed at the top of its head, in part over the frontal, and in part over the parietal bones, one to the right, as large as a hen's egg, the other to the left, of a still larger size. M. Duprey opened those tumours, and found the two parietal bones bare, the right to the extent of an inch, the left to a still greater extent, with fracture. One of the edges of the fracture was so depressed and separated from the other as to leave room for a spatula to be passed into the skull; and, in addition, the coronal suture was forced open sufficiently to allow a probe to be passed in. The depression of the bones and an effusion on the dura mater required the trepan, and its employment was at first decided on; the operation was, however, deferred, and, by this delay, became unnecessary. By placing the patient in a proper position, M. Duprey obtained the discharge of the extravasated blood through the opening, the bone recovered its level, and all the symptoms disappeared. On the fiftieth day a considerable portion of the entire thickness of the external table of the left parietal bone separated by exfoliation, and the wound shortly after healed. The separation of the bones here served in place of the trepan to give issue to the extravasated blood; but for this the operation would have been inevitable. The fracture and separation of the suture allowed the bone to recover itself the more readily, for, being detached from the neighbouring bone, it yielded more readily to the efforts of the brain, and to the action of the dura mater; which favorable circumstances afforded a substitute for the trepan.

We see that in M. Avellan's case, the depression was also removed without the trepan; but the symptoms lasted so long, and were so dangerous, that, so far from inducing us to forego the trepan in a similar case, they would seem to prove the necessity of our having recourse to that operation.

Obs. 3. M. de la Peyronie also relates the history of a

fracture cured without the trepan, in which, though nature supplied the place of the operation, the recovery was less favorable than if the trepan had been used. The patient, who was more than 80 years old, had been struck in the centre of the parietal bone by a door, which made a wound, bruising and laying bare the skull. The wound was dilated, and dressed with remedies for producing an exfoliation. M. de la Peyronie was called into consultation about the thirty-fifth day; he found a sinus, which he dilated, and discovered a fissure in the skull. There had been no symptoms, nor were there any then present, which could lead to the suspicion that an extravasation existed; and, as so long a time had elapsed, it was thought better not to trepan the patient, but to wait for exfoliation. Instead of an ordinary exfoliation, however, an irregular piece of bone, as large as a twenty-four sous-piece, and of the whole thickness of the skull, separated at the end of three months, removing the fracture, and leaving the dura mater bare. This extraordinary operation of nature supplied the place of the trepan, which would certainly have been applied had the fracture been discovered in the first place, and with propriety; for, besides that the period of cure would have been greatly shortened, the removal of a portion of bone by this sort of natural trepanning, though neither depression nor extravasation of blood on the dura mater were present, shows that the injury to the skull may of itself render this operation necessary, a remark which the following observation seems to confirm.

Obs. 4. A man received a blow on the head, which caused neither wound nor apparent contusion, but which was followed by severe symptoms; an incision was made on one side of the head, but no fracture nor other lesion of the bone was discovered; recourse was had to bleeding from the arm, foot, and throat, and to other ordinary remedies: these mitigated the severity of the symptoms; but soon afterwards the patient was seized with convulsive startings, followed by such depression as rendered him quite insensible, and he died three months after his wound. On opening the body, a fracture was discovered at the base of the skull, without any effusion; the fracture commenced in front of the mastoid apophysis, and extended through the extremities of the petrous portions of

the temporal bone and the sella turcica. The bones were about a line apart at the fracture, and nature appeared to have made no effort to reunite them, which leads one to think that fractures, although unaccompanied by extravasation, may of themselves prove fatal for want of reunion; and that in a similar case the trepan would be the proper remedy if the fracture were in a situation where it could be applied, and seems to favour the opinion that, as a general rule, we should apply the trepan whenever there is a fracture.

We are, however, convinced by a number of facts, related by ancient and modern authors, that many fractures and depressions of the skull are cured without the use of the trepan. Such examples have for a long time led some practitioners to believe that more fractures would be cured without the trepan than with it. Amongst these are some surgeons of high reputation, but this only renders their opinion the more dangerous to practitioners who are guided by authority alone, for it has no solid foundation in reasoning. How, then, are we to be guided in our treatment—by symptoms? But these furnish far less certain data than the signs we reject, namely, fracture, or depression of the skull; for the immediate symptoms are often unimportant, or there may be none, even when there is effusion under the skull, or injury of the membranes or of the brain itself; whilst frequently very serious symptoms accompany a simple concussion of the brain, in which it would be useless to trepan, as we shall shortly adduce many examples to prove.

Again, there may be no immediate symptoms, or should these be dispelled by low diet and bleeding, we shall still have to fear the consecutive symptoms; and frequently, when these appear, the warning comes too late for the trepan to be of service. It is therefore only in cases where we have nothing but the symptoms to depend on, that we ought from them to decide on employing the trepan, and for this very reason that, there being no apparent lesion of the skull, we have nothing else to guide us; but when there is a fracture or depression, we ought not to depend on symptoms nor to wait for them, because we have already sufficient data, and less dangerous ones than those consecutive symptoms which such surgeons would have us look to.

Those who believe that we may often avoid the operation of the trepan in fractures and depressions of the skull, can found their opinion only upon those cases which, as we have said, prove to us that many blows on the head, causing fracture or depression, are cured without the use of the trepan; but such cases, when the success only is mentioned without the indications which led to it, give us but little assistance in practice, especially when they are opposed by others greatly exceeding them in number, and in the security afforded to the patients by an opposite line of treatment. Such cases therefore can only be regarded as due to accident, or to some master-stroke of treatment out of the ordinary rules, and are so extraordinary and so difficult to decide about, that one cannot even propose them as exceptions.

There are, however, cases which may be said of themselves to direct the conduct of an intelligent surgeon, and engage him at least to suspend the use of the trepan in certain fractures where no accident occurs, but where, on the contrary, certain favorable circumstances are present which may afford a substitute for this operation. We shall see in the following case that, in fact, if we act circumspectly, the trepan is not always inevitable in fractures of the skull; but these cases are rare, and demand a great deal of discernment and prudence on the part of the surgeon.

Obs. 5. A child, 5 years old, fell from the height of twelve or fifteen feet on a barn floor. M. Gallait, who was called, instantly perceived that the two parietals were fractured, and it appeared to him that each was fractured separately, as the fontanelle, which was not closed, would probably have prevented the extension of the fracture from one bone to the other. At all events there was no appearance of fracture at the fontanelle, whereas the fracture was very evident in the ossified portions of the parietal bones, for one portion of the bone was sensibly elevated above the level of the other, and readily yielded to the pressure of a finger, rising again when this was withdrawn. A swelling had formed at the lower end of each fracture, as large as an egg. M. Gallait opened these tumours without laying bare the fractures, his object being only to evacuate the extravasated blood contained in them. These fractures were unaccompanied by any severe symptoms, which led M. Gallait

to defer the trepan; but what most weighed in leading him to postpone this operation was the separation from each other of the fractured portions, which he thought would allow any blood that might be effused on the dura mater to escape, and to collect in the tumours at the lower end of the fractures, and that the laying open these would suffice to give vent to it. He therefore contented himself with gradually depressing the portions of bone which had risen beyond their level, and confining them by a bandage. The child during the cure appeared always in perfect health, and was quite well in three weeks.

This case shows that skilful practitioners are often justified in not following servilely the rules of art even when they are the most fixed; nevertheless, it is only great knowledge and judgment that can justify this; for a surgeon would not escape from blame by adducing such examples, should the patient die after he had declined to trepan him, since, in these cases, the safety of the patient requires that he should be trepanned, unless the fracture be of such a kind as to leave sufficient room for raising and removing the depressed or displaced portions, or for affording vent to extravasated blood, whether the opening be caused by the removal of a portion of bone, or by the separation of the sides of the fracture. Even here, however, we may in some cases be disappointed. The space may indeed suffice for the discharge of blood effused on the dura mater, but there may be effusion under the dura mater, and the opening in the bone may not be always sufficient to allow us to discover this, and we may then be only warned by the symptoms, which may show themselves too late.

Obs. 6. A carpenter's lad fell from the second story of a house to the ground, holding a joist in his hands; he did not lose his senses, but vomited immediately, and bled from the mouth and nose; on the following day he was brought to the Hôtel-Dieu in Paris. M. Boudon examined a contusion he had on his head, and felt an inequality, which made him think the skull was fractured; he made a crucial incision over the centre of the right parietal bone, and discovered two fractures crossing the bone obliquely. One of these fractures allowed the blood effused on the dura mater to escape in large quantity through a little space formed by the separation of the

fractured portions of bone, without there being any portion depressed. This fracture appeared sufficient for the escape of effused blood without the use of the trepan. M. Boudon ordered a bleeding, the fifth which the patient had undergone, seeing that he had been bled four times on the day of the accident. In the evening vomiting came on, and he was again bled on the day following; for three days the patient had no fever nor any important symptom; on the fourth, which was the seventh since the accident, fever came on, with bilious vomiting; he was again bled four times in two days, and the fever decreased.

The tenth day was passed tranquilly, but after that the patient complained of severe pains in the head; he fell into a stupor, profound, yet frequently broken; he had also irregular shiverings. All these symptoms led to the opinion that there was blood effused under the dura mater, requiring to be evacuated. Two applications of the trepan were made on the fourteenth day, and an incision was made in the dura mater, which gave issue to a spoonful of blood, that had been extravasated under that membrane, and consequently could not escape by the fracture. The patient was bled four times from the arm and once from the foot after the operation; he remained restless and wandering in mind; pain in the right side then came on with considerable fever, followed by irregular shiverings, which caused a suspicion of suppuration of the liver; the patient fell into a lethargic state, and died on the seventeenth day after the fall. The body was opened, and it was observed that the pericranium round the wound was livid and inflamed. The fracture of the skull consisted of several cracks or fissures, the most considerable of which extended obliquely from the lower and posterior part of the right parietal bone to the sagittal suture, where it formed an elbow, and extended to the back part of the left parietal; the dura mater was thickened, and, as it were, callous, opposite to the openings made by the trepan, and fungous along the course of the fissures; the pia mater appeared a little inflamed, the brain was in a natural state. An abscess was found in the large lobe of the liver.

Separation of the sutures, like separation of a fracture, may give issue to the blood extravasated under the skull;

but this case calls for particular attention, for the extravasation may take place on both sides of the suture, and then the evacuation can generally only be effected from one side, in consequence of the dura mater remaining attached to one of the borders of the separated bones, and thus the effused blood may be retained under the bone to which the dura mater is attached.

Obs. 7. M. Mouton mentions an instance in which he was called to see a man eleven days after a fall. The patient was insensible and almost dying; he examined his head, and found only a small tumour or longitudinal elevation extending the whole length of the sagittal suture, into which he made an incision three inches long, and found the suture separated. By means of this incision, a portion of the blood effused on the dura mater flowed away through the opening in the suture; fever and delirium, however, came on the following day. The trepan appeared indispensable, and it was applied on each side of the suture; the blood had indeed escaped from the left side, but there was a good deal accumulated under the right parietal bone, to which the operation gave vent, and the threatening symptoms immediately ceased.

In all probability the dura mater, which always adheres firmly at this part, had remained attached to the right side, and had impeded the escape of the blood; hence, independently of symptoms, we ought to be very attentive to this circumstance; for Marchetti[1] speaks of a similar separation of the lambdoidal suture, which, although considerable, did not allow of the escape of blood effused on the dura mater, and the patient died.

II.

The surgeon can generally decide readily on the course to be pursued when there is fracture, depression, or apparent contusion of the skull, but there are cases more embarrassing even to the most able surgeons; these are cases of blows on the head without evident lesion of the bones, often indeed without wound or apparent contusion of the flesh. Sometimes these blows cause extravasations under the skull, and sometimes not, although they may be attended by circumstances

[1] Obs. 15.

or symptoms which give ground to suspect it. The adherence of the pericranium to the skull after blows on the head is considered by some as a certain sign that there is no fracture of the skull nor indications for the trepan. On the other hand, when that membrane is detached, they suppose there is always fracture or contusion of the skull, and that it is necessary to trepan. Often, again, the operation is decided on from conjectures founded on the supposed force with which the blow was inflicted. The symptoms following wounds of the head where there is no fracture, if severe, lead many practitioners to employ the trepan, whilst others content themselves with combating them by bleeding, and such other remedies as may serve to dispel them.

Both parties are often successful, but both also are often deceived. We shall endeavour to discover in these very instances of success the circumstances, or peculiarities, which may assist us to distinguish the cases in which we can attain most certainty as to the course to be followed.

Obs. 8. A man fell from the height of fifteen or sixteen feet so violently on his head, that the right eye started from its socket, and hung on the cheek; the man lost his senses immediately on receiving the blow, and remained in a state of lethargic stupor; he had a considerable contusion over the right parietal bone; the right clavicle was broken; the eye recovered its position soon after the blow. M. Gallait examined the contusion; it did not appear that there was any effusion on the skull, nor that the flesh was separated from the bone, which led him to conjecture that no fracture existed; he was inclined to make certain of this by laying bare the bone, but, as the stupor appeared to him to be due merely to concussion of the brain, in which case the trepan would be useless, he determined to trust to bleeding, and bled his patient fifteen times in forty-eight hours; the first nine were made at intervals of two hours. The patient did not become sensible until the ninth day, and he was well at the end of a month.

This observation brings to our remembrance a very appropriate remark of M. Petit's respecting insensibility and stupor, which deserves great attention. That able practitioner thinks that these affections are due only to concussion of the brain, when they occur immediately after the blow; and that, on the

contrary, when they come on at a later period they are due to an effusion which has taken place under the skull in consequence of the blow. We shall not enlarge on this remark, as it is readily understood, and because it will be found more fully explained in M. Petit's 'Treatise on Operations,' which he is preparing to give to the public, and on which he is in fact so assiduously engaged as to lead us to hope that the work will shortly appear. We shall content ourselves with relating here some cases, to show that the loss of sense which immediately follows the blow is not a sufficient ground for determining to apply the trepan when there is no fracture of the skull; but we must, nevertheless, remember that the stupor caused by concussion may be followed by another, which is due to effusion, and that the one may sometimes run into the other.

Obs. 9. A young man, 25 years of age, fell on his head from a height of eight or ten feet, producing a small wound on the left side of the frontal bone. He instantly became insensible, and remained in a state of lethargic stupor, with almost entire absence of sensation. M. Boudon examined the wound, and perceived that the pericranium was contused; he dilated the wound, laid bare the bone, and found no fracture. The patient was bled from the arm three times the first day, and three times the following day; the third day he was bled from the foot; the loss of sensibility and stupor continued notwithstanding these bleedings. The urine passed only in a very small quantity, and the dejections were entirely suppressed. Two purgative clysters were administered without effect; on the following day six grains of emetic powder were given in two doses, and the day after, an ounce of tobacco in an injection: these remedies did not diminish the symptoms. The patient remained in the same state until the eighth day, on which he began to give some signs of sensibility; he heard, opened his eyes, and even answered when he was spoken to very loud and shaken at the same time, but his answers were incoherent; and these trifling appearances of intelligence disappeared as soon as he was let alone. In the evening he fell into his former state, that is, into the same state of insensibility as before. This species of relapse was embarrassing, and seemed to be a certain mark either of effusion or inflammation, or even of suppuration under the skull. M. Boudon, how-

ever, would not upon these conjectures, though nearly decisive, hazard the trepan, which seldom succeeded at the hospital, on account of the unwholesome state of the air. He returned to the use of purgative injections and emetics, but without success. M. Boudon, however, persisted in the same line of treatment; he prescribed the tobacco injection, and a purgative potion with cassia, which caused several evacuations; two bleedings were made from the throat, the latter on the eighteenth day after the wound. At length, whether the stupor had been due simply to concussion, or had been caused by an effusion which had been absorbed, that symptom began to disappear, the pulse rose, the breathing became freer, the patient recovered the use of his senses, and shortly after the wound was entirely healed; there remained only deafness and an entire loss of memory; but these symptoms were also beginning to be much relieved at the time the observation was communicated to us.

Concussion and effusion, as we have said, may often jointly contribute to the insensibility and stupor, when these symptoms last several days. Such a case is very difficult to distinguish from one in which these symptoms are due to concussion only. M. Boudon's case, which we have just reported, seems to increase the difficulty, by throwing doubt on a symptom which appeared to mark pretty clearly the difference between those two cases; for if the stupor yields at least partially to bleeding and other remedies, and again returns, ought we not to presume that the former state was due to concussion, and that the latter is the result of an extravasation which has gradually formed since the blow; and, according to this reasoning, should we not always employ the trepan in a similar case? We see, however, in the preceding observation that the second attack of stupor was dissipated by repeating the bleedings and other evacuations, which appears to prove there was no extravasation. But such success is not sufficiently common, and the indication for the trepan is too well founded to allow of our abstaining from its use, unless there are some particular reasons which may decide us to adopt another course; this is the safest practice, the most approved, and the best established by experience. To impress this on young practitioners we shall relate a case.

Obs. 10. The corner of a mantel-piece, which was falling, struck a child four years and a half old on the upper part of the right parietal bone, causing a contusion as large as a hen's egg. The child became insensible on the instant of the blow, and blood issued from the mouth. M. Dru found her motionless and insensible, pulseless, and not breathing perceptibly; a teaspoonful of spirits of balm was given, which excited vomiting, and the child threw up some blood which it had swallowed. M. Dru bled the child, the blood at first spirted out, but afterwards flowed only by drops. The sensibility returned a little at the end of two hours, and the pulse recovered itself gradually; a little broth was given to the child, which it rejected again along with some chylous matters. M. Dru suspected a fracture of the skull; M. Guyard, a physician, and M. Picard, a surgeon, who were called in, agreed with him that it was right to lay bare the bone; he made an incision in the tumour parallel to the sagittal suture, and a second forming a T with this, and raising the corners, found the contused integuments separated from the pericranium. This membrane was adherent to the skull, and preserved its natural appearance. M. Dru thought it prudent not to detach it, but at least to wait until the following day, in order the better to judge of the necessity or otherwise of laying bare the bone. The infant entirely recovered its senses after the incision, took its broth readily, but vomited again soon after.

On the following day M. Dru found the child with fever and with convulsive movements of the under jaw; these symptoms led him to consider the trepan necessary. The child's father begged M. Dru to hold another consultation, and four other surgeons were summoned. After the dressings were removed, M. Pineau, one of those called in, on examining the wound, and not finding the bone bare, seemed surprised that the pericranium had not been detached, which, from the state of the patient, he considered necessary. The incision was extended towards the suture to render it crucial, in order the better to expose the bone, and the pericranium was detached; but the blood which escaped, and the form of the sagittal suture, which was irregular, caused this to be taken for a fracture. The application of the trepan was deferred to the following day, that the state of the fracture might be better

made out, and the child was bled for the third time. On the morrow the surgeons perceived that what they had supposed a fracture was part of the sagittal suture, which, instead of keeping a straight course, stretched over to the right; and instead of being dentated was squamous, so that the left parietal encroached on the right about two lines. Having made out this irregular formation of the sagittal suture, and satisfied themselves that they had been mistaken as to the fracture, it was thought right to delay the use of the trepan. On the following day, the fourth since the accident, Messrs. Guyard, father and son, physicians, Messrs. Dru and Picard found the patient in a comatose state, with fever and convulsive movements; they determined on the use of the trepan, and M. Dru operated immediately; a coagulum, of a brown colour, and consisting of about a teaspoonful of blood, was found first. The line where the dura mater was attached to the sagittal suture afforded a means of judging of the extent to which the left parietal bone encroached on the right. The patient was bled in the evening for the fourth time, all the threatening symptoms disappeared, and the infant slept well that night. On the following day another half teaspoonful of blood was found in the opening of the skull, of the same colour and consistence as what had escaped on the preceding day, and in the evening some more came away. On the sixth and seventh days the discharge was mixed with blood, but after this only healthy pus was discharged, and the treatment ended favorably. The indication to employ the trepan, though deduced from the symptoms only, was decisive in this case, because the insensibility arising from the concussion and that which was subsequently caused by the effusion appeared separately; but sometimes that caused by the extravasation comes on before the other has begun to disappear; in this case the two are so mixed up together as not to be distinguishable, and we may suppose the insensibility to be due to the concussion, since in fact this is sometimes of considerable duration. In this confusion it is difficult to trace the indication for the trepan when there is no fracture, and the insensibility is followed by no symptom which can lead one to suspect extravasation. We shall relate an example where these two forms of insensibility were united, and where they were distinguished only

because the existence of a fracture had led to the use of the trepan.

Obs. 11. In June 1725, M. Pineau was called to see a lad, 12 years of age, whom he found insensible; he had had a bilious vomiting, and had passed his urine and excrements involuntarily. He had just before received a kick from a horse on the right side of the forehead, which had driven in the two tables of the frontal bone at its lower part, two fingers' breadth above the frontal sinus; the blow struck him to the earth as if dead. M. Pineau had him bled, and proposed to trepan him; but a quack having told the parents that their child could not recover from the injury, and that it was useless to trepan him, they left him for more than eight days in this state without applying anything but a simple dressing as for a common wound. At length they committed him to the care of M. Pineau, who made an incision, and laid bare the fracture, which consisted of a depression of the two tables of the frontal bone, of the size of a crown-piece; he applied on the following day one crown of a trepan, and with a *tire-fond* drew up the depressed portion of bone. There escaped from the opening in the skull about half a pint of blood. M. Pineau dressed his patient with linen dipped in honey of roses and spirits of wine, the pledgets dry, and the compresses steeped in wine; an hour after the operation the boy recovered his senses, and the severe symptoms ceased. On the seventh day of the operation an ill-disposed person gave him food, and fever came on increasing by accesses, and attended by pain in the right hypochondrium. M. Pineau had him bled twice, and prescribed several cooling injections. The fever ceased, and the pain in the side was much relieved at the end of a week, but the patient suddenly swelled greatly from head to foot. M. Pineau made him drink an aperient ptisan, and purged him every third day with manna and Epsom salts; this swelling lasted a month, the pain did not entirely disappear until the end of three months, by which time the cure was complete.[1] M. de Garengeot has communicated to us a very remarkable observation on the same subject.

[1] Perhaps in this case the insensibility may be attributed to the depression of the fractured bone rather than to the concussion of the brain; but depressions which are not opposite to some sinus which they may compress do not always cause coma:

Obs. 12. He was called on to open the body of a woman who had received a blow with a fist on the temporal muscle; the blow had been immediately followed by stupor, and the patient had survived ten days in that state. He examined attentively the bone and all the parts which covered it in the situation of the blow; he remarked in the body of the muscle only a little extravasated blood which had penetrated between the fibres, but on the dura mater he found a considerable effusion; this occurrence may be looked on as uncommon, nevertheless various observers, and amongst others Hippocrates, relate similar cases.

Fortunately, in the case communicated by M. Pineau, the fracture afforded a complete indication for the trepan; for the insensibility which occurred at the instant of the blow, and which continued unchanged, would not without the fracture have afforded a sufficient indication for that operation; for though there are many instances of such a loss of sense being attended by extravasation, the great majority of cases prove that it is almost always due to concussion, and we may observe that this cause sometimes gives rise to very serious symptoms along with the insensibility, for the relief of which the trepan would be useless.

Obs. 13. A woman, about 40 years of age, fell backwards from her full height in going up stairs. She was found pulseless and senseless; she afterwards vomited much blood. M. Manteville examined her head, and found only a little redness at the posterior and inferior part of the right parietal; compresses steeped in brandy were applied, and she was bled several times. On the fifth day the patient tossed and moaned at times, but remained insensible. Messrs. Arnauld, Malaval,

the blow was sufficiently violent to cause a concussion capable of producing insensibility, which occurred so suddenly that the patient fell as if dead at the instant he was struck; hence there is good reason to think that the concussion was the principal cause of that state. It is also certain that an extravasation so considerable as that which existed in the case we have just described would be sufficient to reproduce this state, and to maintain it in its original severity. M. le Dran in his Observations (tom. i, p. 132) has related the history of a blow on the head, where it was perfectly certain that at first the insensibility was produced by concussion, and that coma followed in consequence of extravasation; yet the two were so mixed up together that they appeared to form a single phenomenon commencing at the moment of the accident.

and Guerin, senior, who were called on the following day, found the patient suffering with violent convulsive movements, and delirious. This state induced them to repeat the bleeding, notwithstanding which the symptoms became aggravated. M. Arnauld then recommended the use of the trepan; but the other surgeons confined themselves to making an incision, to ascertain the state of the skull before deciding on the operation. The pericranium was found adherent to the bone, from which they concluded that no effusion had taken place on the brain, and that there was no fracture; in fact, no lesion of the skull could be discovered, and they therefore satisfied themselves with applying a simple dressing, and again having recourse to bleeding. One hundred and sixty ounces of blood were taken in nine days, sensibility was gradually restored, but two years elapsed before she was quite well again. Although these severe symptoms, supervening on the loss of sensation which had immediately followed the accident, yielded without the use of the trepan, we are not of opinion, setting aside for a moment the conclusion to be drawn from the adhesion of the pericranium, that this course should be followed in a similar case. On the contrary, we think that such an increase in the symptoms denotes a corresponding increase in the cause, and that that increased cause is almost always an effusion under the skull or in the interior of the brain. The former is the more frequent; it may be removed by the use of the trepan, and in truth often we can only remove it by this operation. These considerations are sufficient, as it would seem, to justify the use of the trepan whenever severe symptoms supervene on the insensibility which immediately follows a blow; for we should employ the same reasoning in these cases as in those where an effusion manifests itself by symptoms only—symptoms which will not inform us whether the blood is poured out above or below the membranes of the brain, or in the substance of the brain itself, yet on which the most experienced practitioners decide to employ the trepan.

M. le Dran speaks, in his Observations, of a wound on the head, in which, as in the preceding case, the pericranium was found entirely adherent to the skull. The patient was only made a little giddy at the moment by the blow, but some time after became insensible and was convulsed: these symptoms

continuing, notwithstanding he had been bled, a consultation was held and the use of the trepan was decided on, but it had no beneficial effect. The skull was healthy, and no effusion was found on the dura mater. The symptoms were due to a violent disturbance of the brain, which caused the death of the patient on the eighth day. When the head was opened, blood was found effused on the dura mater; but several extravasations existed in the interior of the brain.

We have seen in the tenth case, page 12, that the adhesion of the pericranium ought not to be considered a certain sign that there is no effusion under the skull. Nor is it a proof of the non-existence of fracture.

Obs. 14. M. Sarrau saw a wound in the head with fracture of the skull, in which the pericranium was so adherent at the very part fractured as to be with difficulty detached. This circumstance, therefore, is not one from which in wounds of the head we can determine that the trepan is unnecessary.

Nor, on the other hand, is the detachment of the pericranium to be depended on as indicating either a fracture, or so severe a contusion as to render the trepan necessary; for there are many observations to prove that very frequently this membrane is detached without the bone being damaged, and without danger to the patient: of this we shall relate some remarkable examples.

Obs. 15. A lad, 12 years of age, got a kick from a horse on the frontal bone, just where the hair begins, which made a wound almost from one ear to the other, laying bare the bone to the extent of four finger-breadths in length by an inch in breadth. The pericranium, stripped from the bone, remained attached to the integuments, which were lacerated and turned back. M. Malaval replaced the flap, and kept it in contact by means of a tolerably thick compress and strips of plaster, which were so applied as to keep up the skin of the forehead, the whole being supported by a handkerchief folded triangularly: this apparatus served instead of sutures, and the wound was healed in a week without any unpleasant symptoms. M. Malaval did not consider the trepan required, because he felt persuaded that the blow had only glanced across the bone without striking it violently; for had it fallen perpendicularly, the bone, he presumed, must have been fractured.

In the following observation is described a form of contusion which is very apt to deceive young practitioners. The circumference, which is firm and generally somewhat elevated, and the centre, which is soft and conveys the sensation when pressed on of a cavity in the integuments, leads them to think that the bone is depressed; on opening this contusion, however, blood is found effused between the bone and the pericranium, giving rise to this fallacious appearance of depression.

Obs. 16. A button-maker's apprentice got a blow with a stick on the crown over the sagittal suture; a swelling formed of the size of an egg. Compresses steeped in brandy and vulnerary water were kept applied for a fortnight without any effect. At the end of that time M. Malaval was called, who concluded, from the hard circumferencc of the swelling, that blood was effused under the pericranium; he opened the swelling and the blood sprung out, though partially coagulated; the skull was found bare over the whole extent of the swelling, and the pericranium, which was separated from it, adhered to the integuments, and had been cut through with them. M. Malaval reapplied them to the bone, covered them with compresses steeped in spirit of wine, and secured them with a bandage; he bled the patient, and did not remove the dressings for three days; the wound was already nearly healed, and was quite so at the end of a week.

Obs. 17. M. Malaval also relates the case of a child, 5 years old, who fell on its head, and caused a contusion over the right parietal bone as large as an egg; the child was dressed and bled by M. Ponce, who afterwards opened the tumour in the presence of M. Malaval; the blood which had been extravasated under the pericranium escaped, and the bone was found bare over the whole extent of the tumour, as in the former case: the wound was dressed in a similar way, and with the same success.

We will merely remark by the way, that these three observations of M. Malaval may serve to give confidence to some who may hesitate about reapplying to the bone the detached flaps of integument, especially when contused; for we see that this practice, which has for a long time received the approbation of the highest authorities, succeeded perfectly here, although the wounds were contused ones.

Obs. 18. Lastly, M. Malaval relates another observation on the same subject, but still more remarkable than the preceding ones. A footman was struck by a piece of rough stone of about twenty pounds weight, which fell perpendicularly on his head from the second floor. He was felled by the blow, and remained insensible. The surgeon who first saw him found a large swelling, which he immediately opened, and thinking that because the pericranium was detached, and the blow was a violent one, the trepan would be required, he cut off the angles of the flaps. On the following day M. Malaval was called in also; they saw their patient together, and found him tranquil, without fever, and quite sensible; they discovered neither fissure nor depression in the skull; no symptom indicated the use of the trepan, and it was therefore thought right to defer that operation. The patient was bled six times in three days, and a strict diet was insisted on, which was, however, not long attended to by the patient, for having made good his entry into the apple-store, he ate about a thousand apples between the eighth and fortieth days of his confinement, and without any bad consequences. He was, however, about three months recovering, in consequence of exfoliation of the bone which had been laid bare, and which delayed the healing of the wound.

There are few practitioners who have not met with many similar cases of wounds in the head, when the bone has been laid bare without being fractured, and when the trepan has been dispensed with; such cases are so common, that we may perhaps be thought to have discussed them at too great length; we, however, thought it desirable to relate these cases, because there are practitioners of good repute who consider the detachment of the pericranium as an indication for the trepan; those we have mentioned are more worthy of notice than many others of which we possess the details, and will suffice to prove that the detachment of the pericranium is not a sufficient reason for employing the trepan.

The force of the blow which caused the wound in the last case necessarily rendered this more formidable; but as the stone gave way in the shock, and broke to pieces on the man's head without damaging the external table of the skull, it was thought that probably it had not broken the internal

table, a result which might have happened, as the following case will show.

Obs. 19. A soldier was struck so violently with a stone that he fell to the ground in a state of insensibility; this soon passed off. Two contused wounds were found close to each other over the parietal bone, one of which penetrated to the bone. An incision was made and the two wounds were laid into one, and repeated bleedings and a strict diet were prescribed. On the following day the patient was able to walk about the ward; he continued three days in this state, but on the fourth was confined to bed and began to suffer with pain in the limbs, especially the legs, and was feverish. M. Soulier consulted with the physician of the hospital, they re-examined the wounds, but finding nothing suspicious in their appearance, had recourse again to bleeding, and dressed the wound superficially. The wound afterwards emitted a disagreeable odour, the symptoms above noticed continued, the patient's right leg and arm became paralysed, delirium came on with rigors, and at length death ensued on the eleventh day.

The body was opened in the presence of several physicians and surgeons. About a spoonful of pus was found on the dura mater; this membrane was livid, and beneath it was found a small abscess, the contents of which extended between the falx and the brain. The skull was afterwards examined; nothing particular was seen on the outside, but within, the internal table exhibited an angular fracture, corresponding to the external blow.

The above observation affords an example of a contre-coup, from one table to the other, and might serve to prove the reality of this kind of fracture, which has been contested, were there not already sufficient proofs in ancient and modern authors, and amongst others in Valeriola and Arcæus. Tulpius[1] reports a case in which several fissures were found in the inner table, although none existed in the external table. The fracture mentioned by Borelli[2] is more singular: that author relates that a porter died from a wound caused by a musket charged with small shot; that no fracture was seen in the outer table, but that a portion of the inner table was found on

[1] Bonet, Biblioth. Chir. tom. i, p. 2. [2] Ibid. p. 79.

the dura mater, entirely detached from the outer. Paré[1] relates an equally remarkable case. A cavalier received a pistol-shot on his helmet, which was only slightly indented by it, and his head exhibited externally no appearance of the blow; he died, however, on the sixth day, and on opening him the external table was found entire, but the internal was broken into several pieces, which penetrated the membranes of the brain. We find in authors also many cases of fracture by contre-coup, from one part of the head to the part opposite; and in honour of the ancients we may cite the case related by Amatus,[2] who applied the trepan to the part of the head opposite to the wound, when he found that the symptoms were not relieved by applying it on the side wounded, and that the patient suffered from severe pain on the other side; this second trepan proved very apropos, for it allowed the escape of pus which had collected under the skull. The success attending this operation and the fortunate cure of the patient caused much astonishment at the time. Fallopius relates a similar case, and Valeriola speaks of a contre-coup, followed on the twenty-third day by a gangrene, which led to the discovery of a fracture on the opposite side to the blow, none existing on the side struck. Bartholin[3] also saw a blow on the head followed by an abscess on the other side.

Not only do fractures by contre-coup occur between opposite sides of the head, but between neighbouring bones, and from one side of a bone to the other side of the same bone: several examples are to be found in authors; M. de Garengeot,[4] amongst others, relates several cases of this nature. M. Feste has lately communicated one which shows how attentive surgeons should be to these contre-coups.

Obs. 20. A youth, 22 years of age, passing near a large vessel which was in the builder's yard, was struck on the head by a piece of wood weighing fifteen pounds, thrown from the height of the vessel: the blow fell perpendicularly on the upper part of the right parietal bone, making a wound, and felling the young man to the earth as if dead; the blood gushed from his mouth, nose, and right ear. The young man not

[1] Lib. ix, chap. iv.
[2] Bonet, Sepulch. tom. iii, de Vulner, Obs. 5.
[3] Bonet, Sepulch. p. 319.
[4] Traité d'Opérations.

only remained speechless and senseless, but fell into convulsions, which lasted some time, and returned every half hour. The surgeon who first dressed him, whilst probing the wound, felt the sagittal suture, which he took for a fracture. M. Feste, who saw the patient soon after, suspected the mistake, and to satisfy himself, laid the bone bare by a crucial incision, and found that, in truth, the suture had been mistaken for a fracture. M. Feste finding neither fracture nor depression at the point struck, whilst he observed that the symptoms were extremely severe, suspected, from the blood issuing at one ear only and at the side of the wound, that the force of the blow might have extended to the lower part of the parietal bone, and have caused a fracture there; this suspicion, which was well founded, induced him to make an incision in that spot, and he found a fracture extending obliquely to the occipital bone, and another which passed obliquely towards the squamous suture; the latter being sufficiently open to allow the discharge of any blood extravasated at that point on the dura mater. M. Feste contented himself with applying two crowns of a trepan along the sides of the oblique fracture, and pressed the dura mater gently with the meningo-phylax, to facilitate the escape of the effused blood, which appeared in large quantities at the openings made by the trepan, and which was removed with a sponge. The convulsive movements, which had continued up to that time, ceased immediately, the other symptoms disappeared, and the case ended favorably.

Those who deny the existence of contre-coups, refer these fractures to a double blow received by the patient, or caused by his fall on the ground; but there are so many cases in which this double blow is evidently impossible, that we can no longer doubt of the reality of the contre-coup; nevertheless, it would be ridiculous to deny that these fractures are often due to a double blow, and that we may find different sorts of fracture in the same spot caused by different blows.

Obs. 21. M. Frumentin was called on to examine a body; he found a large wound over the left parietal, from which the surgeon had extracted a considerable portion of bone, in the centre of which a part had been scooped or cut out down to the diploë; he further found that the first fracture, that, namely, which had detached the portion of bone, extended from one

parietal to the other; the two fractures were made by different blows and by different kinds of instruments, one by a cutting instrument, and this was the first, the other by a round contusing instrument, which had been thrown on the head of the wounded man, already struck down by the first blow; the patient survived twenty-five days.

Such observations should render us attentive to these sorts of fractures, whether they result from contre-coup or from a double blow; for when the symptoms appear to indicate their existence, we should adopt the surer course, and employ the trepan, as Mery,[1] La Motte,[2] and Le Dran[3] did in similar circumstances.

We must observe, moreover, that independently of these concealed fractures, such I mean as are produced by contre-coup, the occurrence of symptoms some time after the wound, like those of which mention was made in the 20th case, or those detailed in the following observation, is always sufficient to justify us in deciding to trepan.

Obs. 22. A young man, of fifteen or sixteen, received a blow from a stick on one of the parietal bones, but felt no inconvenience from it. M. Mareschal contented himself with laying open the integuments, and causing them to suppurate. The patient was bled, and, after it had suppurated, the wound was closed. He got up every day and walked about the ward. When he was pronounced well, and was about to leave the hospital, on the seventeenth day after the accident, he had a rigor; he was bled three or four times; the rigor recurred, and was followed by considerable fever and pain in the head; he was again bled, and vulnerary medicines were administered, but he died on the twenty-second day. M. Mareschal opened the body, and found a collection of pus on the dura mater about as large as a pea, where it appeared to have made no impression; and M. Mareschal observes, that had there been any symptoms at first to cause a suspicion of effusion, the patient would not have lost his life. Such an acknowledgment might be made without hesitation, for when in such cases there are no symptoms, there is no indication for the trepan;

[1] M. de Garengeot, Traité d'Opérations, tom. iii, p. 122.
[2] Obs. tom. ii, p. 307. [3] Ibid. p. 296.

it is probable, however, that, had the operation been performed as soon as the symptoms made their appearance, the patient would have been saved; for we should especially remember, that when consecutive symptoms indicate the use of the trepan, success will chiefly depend on there being no delay in having recourse to it.

Obs. 23. A young man received a blow from a stick on one of the parietals, which was laid bare by it to a small extent; the blow was immediately followed by symptoms which gave reason to suspect an extravasation. M. Mareschal proposed the trepan; but as the wound was suppurating well, and the patient had recovered his senses, those who were consulted did not consider the symptoms sufficiently severe to require this. On the sixteenth day the patient had a rigor, and an accession of fever, and the wound became dry: the necessity for trepanning was then acknowledged. The skull was no sooner opened than a large quantity of pus escaped, which, fortunately, had not affected the dura mater, and the operation proved successful.

This example ought to encourage surgeons always to have recourse to the trepan in a similar case, although the symptoms which indicate it may not arise until long after the accident. Riedlin[1] relates the history of a patient who was trepanned with equal success three weeks after receiving a blow; the blood which had been effused on the dura mater had remained unchanged. Lambswerde[2] trepanned at the end of six weeks with the same good result. Fabricius Hildanus[3] speaks of the trepan being applied two months after the blow, much pus escaped, and at length a large fungus arose, which rendered the case difficult; the event was fortunate, however, notwithstanding other obstacles which served to impede it. Marchetti[4] succeeded at the end of three months. An observation by Scultetus[5] on the same subject is still more remarkable, for it was not until more than six months after the accident that recourse was had to the operation, which, nevertheless, succeeded perfectly. These cases would be truly surprising, if the symptoms which indicated the trepan, and which occurred so

[1] Ephem. An. 1700. [2] Obs. 48. [3] Cent. 9, Obs. 3.
[4] Obs. 7. [5] Arcen. Obs. 13.

late, had depended on an extravasation of blood under the skull, but are less so when depending on suppuration, for we know that suppuration may not take place and manifest itself until long after the blow.

It is evident from all these observations, that in blows on the head which have caused no apparent lesion of the skull, the symptoms are our only data on which to decide whether to use the trepan; for the conjectures which may be formed respecting the force of the blow, the situation of the wound, the state of the pericranium, &c.,[1] cannot of themselves furnish a sufficient indication for this operation; nor, on the other hand, should we be justified in withholding its use on such grounds where these wounds were attended by important symptoms, such as insensibility coming on after a time, or even by insensibility occurring at the moment of the blow,[2] and ac-

[1] We have not spoken of ecchymosis of the eyes, of vomiting, of escape of blood from the ears, eyes, nose, mouth, &c., because the uncertainty of these symptoms has already been remarked on by most writers. Sometimes these symptoms accompany a fracture or an extravasation, but sometimes they are found where neither one nor the other exists; and not unfrequently they are even accompanied by insensibility, or even at times by convulsive movements, &c. M. de la Motte, amongst others, relates several examples of these appearances in his Observations, pp. 242, 266, 274, 303, 333, 340, 346, 363, 364.

[2] Practitioners are not agreed with each other, nor consistent with themselves, respecting the insensibility which immediately accompanies the blow. This self-contradiction is very remarkable in some authors; for instance, Marchetis, in his Medico-Chirurgical Observations, Obs. 12, blames his colleagues for not having consented to the use of the trepan proposed by him in a case where insensibility had immediately followed a blow on the head, and which ended in suppuration under the skull, and proved fatal to the patient. "A rather heavy wooden window," says he, "fell from a height on the parietal bone of a young man, causing a severe contusion, though the skin was not cut, and knocking him down motionless and insensible, in which state he remained, deprived of all his principal faculties, for an hour; a physician of high repute and a surgeon were called, who employed the usual remedies, as white of egg, rose oil, &c. I was summoned on the following day, and immediately proposed division of the scalp and perforation of the skull, to which the other surgeons refused their consent, as also the young man's father; . . . at length I was again summoned on the twentieth day, when, with the consent of all parties, I made a crucial incision, from which a quantity of pus escaped . . . About an ounce of matter oozed through the pores in the skull each day; and after trepanning the patient, a similar discharge of matter occurred from the foramen; the patient, however, died on the sixtieth day. . . . I relate this to prevent others from falling into the like errors, should they have under their hands a patient in whom the symptoms clearly show the internal parts of the skull to be injured." Marchetis relates this

companied by other phenomena, such as convulsive motions, paralysis, violent fever, disturbance of the pulse, more especially if these symptoms should persist, notwithstanding the use of bleeding and such other remedies as might be employed to dispel them. We must observe that the abstractions of blood should be very abundant and prompt in order to prevent extravasation, for they can be of little use when that has taken place, especially if in considerable quantity. We ought to be extremely attentive to the symptoms which may supervene on insensibility produced at the moment of the blow;

case as a sort of victory obtained by him over his colleagues; many remarks might be made respecting this vainglory, which is only too visible in most observers, and which has generally but a weak foundation. In the present case, for example, Marchetis depends only on the result; but a suppuration, which follows a blow on the head, does not prove that trepanning was required in the first instance; a suppuration, especially a purulent one, is not always the consequence of an effusion, for often it is only the effect of an inflammation excited by the concussion; and in that case the symptoms of the disturbance, even the insensibility, do not always come on at the instant of the blow, for sometimes they do not supervene until long after. Marchetis, in the first place, decided for the operation on the symptoms, and these consisted only of insensibility lasting for an hour; but some pages further, Obs. 15, he maintains that insensibility alone is not sufficient, in such a case, to justify our using the trepan: "Respecting which wounds of the head," says he, "there are some things to be observed. First. That if a patient be rendered insensible and motionless by a blow, unless other symptoms enumerated by Hippocrates supervene, he is not in danger of death; and we must forego any operation, such as incision of the scalp and perforation of the skull: for I have seen some who, in consequence of a fall or blow, or other injury of the head, exhibited this symptom alone, who have been quite well again by the next day." We find in M. de la Motte's work cases in which insensibility immediately followed a blow, and where the surgeon, fortunately for the patient, employed the trepan, some of the cases being accompanied by vomiting, bleeding from the nose, eyes, mouth, and ears, and by convulsive movements. The same author relates other instances of blows on the head, which from the first moment were followed by insensibility, and accompanied by the same symptoms, yet where the patients recovered completely without any operation. These contradictory cases, in which the practitioner only ascertains the proper course of treatment at the end of his attendance, and, as it were, in consequence of the event, afford no data for practice, and neither enlighten the practitioner himself nor those who desire to profit by his example. The details of those cases in which one appears to have acted only by chance, that is to say, where the indications to be seized are not pointed out, that they may serve to guide us in cases apparently similar, but where opposite lines of treatment have been pursued with equal success—such narratives I say are not practical, but mere histories of cases, such as might have been given by simple spectators, not instructed in medicine or surgery.

for, as we have already remarked, this loss of sensation often conceals an effusion; and unless we adopt the practice of always trepanning in such cases of insensibility, which would be to perform the operation generally without any necessity, we cannot adopt this course when this symptom only is present, with a view to a supposed effusion accompanying and maintaining the loss of sensibility. In such a case the symptoms, which the effusion will not fail after a time to cause, are our only guide, and they will then afford information to the surgeon, and lead him to perform an operation which may save the patient's life. Although, therefore, mere insensibility does not indicate the employment of the trepan, the patient will not be left to the fatal effects of the effusion when this exists, if the surgeon is attentive to the after symptoms and understands his business. Still less are we to be guided by such conjectures as we have spoken of, even where no symptoms may have at first occurred, should important ones subsequently appear, such as shiverings, fever, delirium, a sharp, fixed pain internally, lethargy, convulsive movements, &c., for then the loss of the patient is certain if the trepan is not employed as early as possible, and before the state of the patient betokens extreme danger.

We do not mean to say that these conjectures are entirely useless in assisting us to come to a conclusion in dubious cases: they may, if favorable, contribute to ease our mind, where no serious symptoms are present, or to assist us, if unfavorable, in deciding on an operation when some symptoms appear to indicate it; but we maintain that they can never alone serve as decisive indications for or against the trepan. How, for instance, can the state of the pericranium lead us to a decision, when we find that this part may be stripped off, and contused without any serious consequences following? or, on the other hand, that it may be attached to the skull and exhibit its natural appearance, although effusion or fracture exist; again, how can we decide from considerations respecting the instrument with which the blow was struck, when we find a blow with a fist causing a fatal effusion, while, in another case, a stone of twenty pounds' weight, falls from a considerable height vertically on the head, without any serious consequences follow-

ing. Throughout we should find the same uncertainty, were we to proceed to examine these conjectures.

We must not forget to remark, however, that a different value is to be attached to such conjectures in wounds caused by firearms, from those which we can draw in cases of wounds caused by other instruments, acting with less violence, for almost all great practitioners assert, that we should always trepan in wounds of the head caused by firearms, although the skull be not fractured, and experience seems fully to confirm this opinion.

Obs. 24. A soldier received a musket shot, which made a wound over the right parietal bone; he did not fall from the blow, and no symptom followed it. M. de la Combe examined the wound, found the bone bare, but observed no other injury, and thought that the use of the trepan might be dispensed with. On the twentieth day he observed the bone getting black, and considered this change preparatory to exfoliation, but on the thirty-fifth day he was surprised on finding a piece of bone of the entire thickness of the skull coming away, which gave vent to about half a glass of healthy pus, from between the skull and the dura mater. M. de la Combe treated the patient as if he had been trepanned. The dura mater soon became clean, the opening in the skull was soon filled up, and the cure was completed in two months. It seems difficult to conceive how so large a quantity of pus could be produced and remain on the dura mater, without giving rise to any symptom during the whole time of its sojourn; this will, however, appear less surprising, if we pay attention to a variety of examples which serve to teach us, that pus frequently forms insensibly on the dura mater in wounds of the head, and that we discover its presence only by its becoming depraved and irritating the dura mater; we may conclude that such symptoms would not have failed to arise in this case, had not the exfoliation of the bone caused its evacuation before it had acquired injurious qualities by long exposure. We perceive in this case that, though the blow caused no concussion, nor any other symptom of importance, the ball, nevertheless, produced so violent a contusion of the skull, as entirely to kill the piece of bone struck by it, and to produce a considerable suppuration; from which

we may conclude, that these missiles act with a violence, which must make them very dangerous, and though they may cause no fracture or visible contusion of the skull, and though no serious symptom may supervene, all, even those which are caused by spent balls, require great attention, as they may produce fatal effects.

Obs. 25. A lieutenant of the regiment of Hainault was wounded by a spent ball, which struck him a little above the right frontal sinus. The surgeon who first saw him thought it right to make a crucial incision to examine the bone; he found no fracture; the blow had stunned his patient a little, but bleeding removed this symptom; he confined himself, therefore, to treating the wound. At the end of three weeks, the patient fell into a lethargic stupor, his pulse became depressed (enfoncé) and hard. M. Petit, jun., and M. de la Martinière, surgeons-major of the army, were called, and found the patient in a hopeless state; nevertheless, as trepanning appeared to be indicated, they thought it necessary to have recourse to it. This operation gave vent to a quantity of pus which had collected under the bone, but being performed only in the last extremity, proved useless to the patient. Such examples show us, that wounds from firearms ought not to be confounded with those other wounds of the head in which conjectures respecting the instrument with which the wound was made, or the apparent force of the blow, determine nothing.

The same reasoning will not hold good in wounds made by cutting or piercing instruments; for such wounds will not only not cause effusions when they do not injure the bone, but even when they do incise or puncture it; young surgeons should, therefore, carefully distinguish incisions from lesions of the skull caused by blunt instruments. Sometimes, however, cutting or pointed instruments cause both a cut or penetrating wound and fractures or contusions, or even depressions of the skull; we ought, therefore, to examine carefully if the lesions of the skull caused by them are simple cuts or punctures, or if they are partly these, and partly fractures or contusions. A fracture is generally to be at sight distinguished from a cut, but to judge of a contusion, we should, if possible, ascertain the state of the edge or point of the instrument with which the wound was made; for when a cut or puncture has been made with an instrument, the edge or point of which is very blunt, we should

consider this as a contused wound, especially if the instrument be a very heavy one; when, on the other hand, they are very sharp or pointed, we may presume the wound to be without contusion, or to be very little contused, in which case, these cuts or punctures are not dangerous. Paré did not hesitate in such a case to replace a portion of bone which had been entirely separated from the skull by a sabre-wound, and which remained attached to the flesh, and this practice was completely successful.

Lastly, we should pay attention to a circumstance which sometimes accompanies blows on the head, namely, the sensation or sound of a cracked pitcher, which is sometimes experienced on striking the bone, and which the patient sometimes perceives at the moment of receiving the blow. This circumstance, and the conjectures to be drawn from it, as regards the use of the trepan, are not to be despised, especially when the patient assures us that the sound was very remarkable and very distinct, and, in addition, that the blow was a violent one; for if we find no fracture externally, there is ground for fearing that the internal table has been broken. M. de la Motte[1] determined, under such circumstances, to perform an operation, and, in fact, found a fracture of the inner table of the skull, and a considerable effusion on the dura mater.

The symptoms which come on after the blow are to be estimated in a very different way from the majority of the conjectures of which we have spoken, for these symptoms almost always indicate the trepan, when they are well marked, and the longer they are in appearing after the blow, the more important they are. Such symptoms suffice, independently of any conjectures, good or bad, to determine the surgeon to trepan. They are often, indeed, the signs of some internal injury, against which the trepan can be of no avail. Such, for instance, are gangrene, suppuration, or effusion in the brain; nevertheless, the uncertainty of the result is not to prevent our having recourse to the operation, as it is the only remedy with which we can try, in such a case, to save the patient; and we have the better ground for hope, from these changes much more frequently taking place between the skull and the brain,

[1] Obs. de Chir. tom. ii, p. 303.

than in the substance of that viscus. Although success, therefore, is very doubtful in such a case, the indication is unequivocal, and the rule of art is fixed; our decision being in favour of that line of practice which affords our patient the best chance of recovery, and which is most authorized by experience.

It does not appear to me that, after a full consideration of the details of the various cases related above, it can be fairly objected that patients are sometimes cured without the trepan, although they may have exhibited symptoms as severe as those which have led to the performance of the operation in other patients in whom it was really necessary; for we should deal with the symptoms which lead us to consider the trepan necessary, as we do with fractures and depressions of the skull, in treating which, the ablest and best-informed practitioners decide in favour of the operation, although these injuries do not demonstrate with entire certainty the indispensable necessity of this operation, seeing we have also many examples of fractures and depressions of the skull cured without the trepan. The precepts of the art are not shaken by a few particular observations, when, on a comparison of all circumstances, it is evident that they prescribe the safest course.

Before proceeding to employ the trepan, however, even where the symptoms are most considerable, it is important we should first satisfy ourselves that these do not depend on the state of the external wound, especially of the pericranium, which sometimes happens.

Obs. 26. A single case will be sufficient to show how wise and necessary is such precaution. A man, sixty years old, was struck by a carriage, which upset him on the stone pavement, and inflicted a contused wound, about two inches long, at the upper part of the right side of the frontal bone, near the coronal suture: on the seventh day, he had a slight pain in the head, with a little fever, which, on the following day, increased; the edges of the wound became pale; on the ninth day, the patient was drowsy; on the tenth, he wandered in mind, and became delirious. M. Manteville bled him several times to quiet these symptoms, and at length determined on dividing the pericranium to the bone, under the idea that the symptoms might depend on irritation and inflammation of that part. The result answered his expectations, and the symptoms disap-

peared. In addition to the above symptoms, the tension of the pericranium sometimes gives rise to an erysipelatous swelling of the whole head; in this case, experienced practitioners readily recognise the source of mischief, and remove it by a similar operation. We should generally first try bleeding, as M. Manteville did; the only resource of the ancients in such cases. The operation of dividing the pericranium was little practised before Pigray. Paré[1] combated such symptoms by abstracting from one of his patients twenty-seven dishes of blood, which is equal to about nine ordinary bleedings, and this was considered a good deal in his day.

III.

It sometimes happens after blows on the head, that a fixed pain remains in the situation of the wound, although this is healed over, and this pain, instead of diminishing by time, continues to increase in spite of all the local remedies employed, and often obliges the surgeon to lay bare the bone. In these cases some surgeons have recommended the rugine, others have waited for exfoliation, whilst others have had recourse to the trepan; and we shall see by the cases we are about to relate that these several modes of treatment have each succeeded in different cases.

Obs. 27. A girl, of ten or twelve years of age, was struck on the head by an iron rod falling on her; the blow caused no wound, and the young lady was soon well, with the exception of a fixed pain of no great extent, which remained over one of the parietal bones. This pain increased from time to time, so as even to cause fever, which was relieved by bleeding, and other general remedies; but as the pain continued for several years, M. Mareschal was at last consulted, and considered it necessary to trepan. He exposed the bone at the painful part, and applied one crown of a trepan; he observed that the bone, when sawed, appeared dry, like a skull that had been long buried. The operation was so successful, that the pain entirely and permanently disappeared. M. Morel has related two examples of similar success.

[1] Lib. ix, cap. xiv.

Obs. 28. A woman received a blow on the centre of the left parietal bone with a log of wood. There was neither wound nor perceptible contusion; she was bled: a slight but constant pain in the spot struck led to the application of various remedies, from which she received no benefit. The pain increased more and more: M. Morel thought it desirable to open the temporal artery, which afforded her relief for about a month, but the pains then returned. A sanious fluid escaped from the ear of the side on which the blow was struck, and afterwards from the other ear; these discharges did not mitigate the pain, which, on the contrary, became more violent, although they returned periodically every month during a year, passing alternately from one ear to the other.

The patient, tired of suffering, requested a consultation. At this, it was resolved to lay open the part where she felt the pain: the bone appeared sound, which induced the hope that suppuration would lead to the cure of the affection; the suppuration lasted a fortnight, but did not produce the effect hoped for. M. Morel thought the trepan might afford better success, being led to this opinion by a case he had seen some years before of a servant girl, who had received a blow on the head, which did not appear to require the use of the trepan; six months after the accident, however, some symptoms remained, which led to its employment, with such complete success, as to lead M. Morel to propose the same operation to the patient in question. The same success attended this operation; nothing was found under the skull, nevertheless the pain entirely disappeared.

M. Vacher, who witnessed the above cure, had recourse to the same remedy in a similar case, but he did not derive the same advantage from it, because, as we shall see, the malady arose from a different cause.

Obs. 29. The daughter of an innkeeper at Besançon was attacked with a pain in the head, which was not severe at first, but increased so much in two months, that she was obliged to apply to a physician, who, during the first six years of the disease, in vain exhausted all the resources of his art. M. Vacher was afterwards called in, who at first employed arteriotomy, but it produced little effect. The patient then put herself under the care of a person who had, by his promises, obtained her

confidence, and who made a crucial incision over the middle of the sagittal suture, and rugined the bone without troubling himself about the suture; but, seeing that the patient derived no benefit from his practice, withdrew after he had cured the wound. The girl then passed into other hands; a consultation was requested, and M. Vacher was called, together with several other physicians and surgeons. M. Vacher, remembering the success that attended the operation in the preceding cases, advised the use of the trepan; his advice was adopted by those in consultation with him. The patient was trepanned; no effusion was found on the dura mater, nor any alteration of that membrane,—it merely appeared somewhat more tense than usual, which led M. Vacher to puncture it some days after the former operation, which had afforded no relief to the patient; this, as well as the trepan, proved ineffectual, the pains persisted, and at times became extreme. Death put an end to them on the eighth day after the operation, and after eight years of suffering.

The skull was opened, and three fungous swellings were found, the largest of which was as big as a pea. These tumours originated in the cortical substance of the brain, and were attached to the dura mater, which was much thickened in that part; on the contrary, the bone opposite to the tumours, had become as thin as paper. The lateral ventricles were full of water, and the third contained thick black blood. In the plexus choroides were found about a score of glandules, of the size and figure of broom-seed; and lastly, on the surface of the cerebellum, there was an ulcer which penetrated to the depth of about three lines into its substance. It is evident, from this account, that the trepan could be of no service in such a case; moreover, as it did not originate in an external cause, it is foreign to our subject. The following case will recall us to it, and will serve to show that sometimes fixed pains, though resulting from external causes, do not require the trepan.

Obs. 30. A girl, of 14 or 15, fell on the back of her head in coming down stairs; she became insensible, and bled from the nose; she felt a violent pain in the head, which lasted some days, and for which she was bled several times, both from the foot and arms. These bleedings afforded her much relief;

nevertheless, there remained a fixed pain at the back of the head, which was supportable enough for a fortnight, but afterwards increased considerably, and came on in regular accessions. Whenever she rubbed the back of her head at all hard, it made her faint; in addition to this, since the pain had increased, epileptic attacks had supervened eight or ten times a day. M. Gervais examined the part in which she felt the pain, and remarked a little blackish spot in the skin, over the middle and upper part of the occipital; the skin was softer in that spot than elsewhere, and appeared somewhat like a contusion. When M. Gervais pressed firmly on the spot with his finger, the patient fainted; but not supposing that this occurrence resulted from the pressure, and wishing to examine well, whether he could discover any disease in the part, he again made pressure, and again his patient fainted; suspecting now that the fainting was in effect the result of the pressure, and wishing to be quite sure of this, he repeated the pressure a third and a fourth time with the same result. Attempts were in vain made to cure her by remedial applications, and it was at length determined in consultation, to lay bare the painful spot. The pericranium was found separated from the bone, which was changed in appearance. The symptoms continued after the exposure of the bone. M. Gervais had then some thoughts of using the trepan, but determined to wait, under the supposition that an exfoliation of the bone might render this unnecessary, as in fact it did, for as soon as the portion of bone was separated, all the symptoms disappeared. Scultetus[1] relates a nearly similar cure. A young lad, seven years old, fell on his head, causing a contusion on the sinciput, which was followed by pain and convulsions. The symptoms, he says, were quieted by the application of a lambskin, freshly stripped off, which was applied to the head of the child; but this pain, and these convulsions, returned with each new moon, which obliged our author, about four months after the blow, to lay open the part which had been struck, from a suspicion that there was a humour effused between the pericranium and bone, which was corroding the parts; he found the bone black and rough, and applied the rugine; the bone afterwards became

[1] Armament. Chirurg. Obs. 16.

covered with healthy flesh, and the child was soon quite cured. Forestus[1] relates a similar case, in which it was not until several years after a wound of the head, that the surgeons determined to expose the bone, for the removal of a violent fixed pain in the head, which had continued since the blow, and which ceased in consequence of the operation.

Marchetis[2] speaks of a wound on the head, which, after it had healed, was followed by epileptic attacks, the cure of which was effected by the use of the trepan. We shall, in another memoir, relate an observation by M. Tursan, junior, of an epileptic who received a blow on the head, for which he was trepanned; the patient had no attack of epilepsy as long as the wound was open, but had fresh seizures as soon as the wound was healed. There are many instances related by authors in which this operation proved successful in epilepsy; but as we are here speaking of the trepan only as it relates to wounds of the head, we shall postpone to another opportunity the further notice of these observations. We may, however, be permitted, as regards the use of the trepan, to relate a fact not strictly within the limits of our subject, because it is not certain that the origin of the affection was a blow on the head; it is nevertheless certain, that a blow might have given rise to such a case. A nun of the Hôtel-Dieu, at Nantes, was seized with a violent pain at the top of the head, with considerable fever, and other severe symptoms. They all caused the suspicion that suppuration had taken place in the painful part, which, together with the desperate condition of the patient, led to the use of the trepan. The operation saved her by giving issue to a considerable abscess which had collected under the skull. I was subsequently surgeon to the hospital, where I saw and learned the particulars from the nun and the medical men who assisted at the operation. We shall have to relate, in the article on the Multiplied Use of the Trepan, an observation by M. Daviel, of a case in which a pain in the head, arising from caries, did not yield to the trepan, but only to the exfoliation which followed it.

We see, by the above observations, that the same end has

[1] Bonet, Biblioth. Chir. Obs. de Forestus, Obs. 79.

[2] Obs. Medico-Chir., Obs. 7.

been attained by different proceedings: we should not, however, have recourse to these indifferently, since it will be readily understood that the operation of trepanning ought not to be employed unless we suppose the bone to be affected throughout its entire thickness, or when some symptoms lead us to suspect that the cause of the disease is beneath the skull, as in a case of caries mentioned by Bartholin, which was on the internal surface of one of the parietal bones, or, lastly, when, after waiting until exfoliation has taken place, we find the symptoms still continue. But when the pain appears to be external, when it is increased by pressure on the spot affected, we have everything to hope from exfoliation, especially if, on laying the bone bare, we discover a slight alteration, or superficial caries. To make sure, we should have recourse to the rugine, which may have the good effect of hastening the exfoliation, or putting an end to the pain before exfoliation has taken place; this latter effect, however, greatly depends on our laying bare all the diseased surface, in order that the disorder may not be transmitted to another part by means of the pericranium.

Remarks on the Use to be made of Observations.

We shall take advantage of the opportunity afforded us by this article to make an important remark on the use to be made of observations. The contradictions to be found in those we have related, may serve to show how dangerous it is to be guided in practice by the observations of others, when each particular observation is considered as a model, when successful cases only are looked at, and when we have undue respect for the opinions of the masters who have recounted them; when we have not ourselves observed the peculiarities, the variations, the uncertainties, to be seen in the practice of our art; and when we have not sufficient discrimination to be able to discover in the observations of others the particular causes of all these variations. Could a young surgeon, for instance, from the thirteenth or the twenty-second observation, come to a decision to trepan or not to trepan in a similar case? when we find that, from the commencement, there were present symptoms which led to a difference of opinion amongst those in consultation on the point? In the thirteenth case we see that

those who decided for the operation decided erroneously; and, on the contrary, in the twenty-second, we find that those who recommended it were right; but in both the one case and the other the event alone cleared up the difficulty respecting the course to be pursued: that which was followed cannot be taken as an example, seeing how different was the result which ensued in the two cases. The tenth and fourteenth observations will show us, that there are cases in which we should expose the patient to the risk of perishing for want of the operation, if, because the pericranium was adherent, we were to attribute the accidents to a concussion of the brain, and were to consider the trepan as useless. There would be equal cause for fearing the result should a young practitioner take the eleventh observation as his guide in a separation of the suture, such as is related in the sixth case. Would it not be equally dangerous in such a case as the thirtieth, to take the practice pursued in the twenty-sixth for our guide, since we should thus improperly employ the trepan? Lastly, would it not be wrong to follow the example set in the thirtieth, in such cases as the twenty-seventh and twenty-eighth, since we should thus allow our patient to die from neglecting to employ the operation. These examples are sufficient to show the importance to young surgeons of the above advice, not to trust too much to particular observations, and especially not to consider them as models laid down by which they are to guide their practice.

Nevertheless, we are well convinced that, when properly employed, nothing is more useful than such observations for affording instruction to young practitioners; since it is evident, that it is by striking examples alone that the nicest and most difficultly appreciable rules of our art are made intelligible, and reduced to the level of all capacities. We only maintain that this advantage cannot attend on detached and isolated observations. Cases related thus, one by one, can be considered only as the necessary materials for forming a solid building, that is, for forming a fixed, exact, and easily appreciable *rule*. It is evident, from the different examples we have brought together in this first article on the use of the trepan, that it is only by collecting many observations, by comparing them, and contrasting them one with another, that we can escape being led into error by them; that, when observations exhibit

opposite and apparently contradictory modes of treatment, and thus offer us an embarrassing choice, we can avoid being led astray by seductive accounts of cases which may favour false or hazardous practices; that we are enabled to discover, even in the commonest observations, or such as are full of errors, peculiarities which may afford us light in discovering or clearing up truths important in theory or practice; that we are able, by a careful examination of several observations which appear to illustrate the same point, to observe peculiarities and circumstances, which show that they have essential differences, and that the same conclusions cannot be drawn from them; lastly, when different observations on the same subject appear, by the contrasts they exhibit, to neutralize each other, that we can perceive how, on the contrary, these very observations serve mutually to correct each other, to limit each other, and to manifest each other's real value, and that they serve to reduce to order the vague and discordant facts which would mislead us in practice.

But this work requires close application; the facts which may serve to further the progress of our art do not generally suggest themselves on simply perusing an observation, they may even escape the most clear-sighted: should they strike us and attract our attention, it is almost always because we are at the time occupied in clearing up some point of doctrine with which they have a connexion, and which gives them an interest in our eyes; and we are then often surprised in finding that we have derived very useful information by a comparison of different observations which at first sight appeared to contain nothing remarkable. Our opinion then respecting the use of observations should be very different from that usually entertained by persons who have not thought much on the subject; namely, that observations are useful for consultation in difficult cases which may occur to us in practice. The advantage looked for in this way is of a very limited character, for we seldom find that the practitioners who have detailed the cases treated by them have risen, by the help of science, beyond the common rules; but that, by way of examples, they have furnished us with accounts of some *coups de maîtres,* which may indeed be followed with advantage where precepts are wanting, and where genius must supply the place of rules.

Were the narratives of cases of no further use, few would deserve to be printed; but as we have observed, their use is much more extensive, and we can scarcely multiply them too much, since we must often look through a great number of cases to find particular facts which may serve to establish or illustrate a truth, or simply to define its limit in one direction, and in these researches we almost always find that our present stock of observations is not nearly sufficient to afford us the knowledge that might be drawn from them. Great researches are therefore necessary, many facts must be collected and exhibited in their bearings on the subject we are examining, in order to elicit from them some rays of light, or to decide, not on an entire mode of treatment, but on a single point of practice: now it is evident that this study is not within the reach of students in surgery; nor even, we might add, of those who are instructed only in the theory of our art, nor of those who are mere practitioners; the one party not being personally cognisant of the manual operations and the resources of art, so as to appreciate the alterations and accessions of which it is susceptible; the other not having sufficient education to penetrate the intricacies of an observation, and from it to throw new light upon practice. Frequently those who communicate an observation do not derive instruction from it, since they seldom look at the facts from the best point of view: the severity of the disease and the success of the treatment are generally what most strikes them; and yet the surgeon has often little to do with the most striking cures, and generally all that we contribute is attention to following the commonest and best known precepts of the art, and it is only because the wonders of nature and of art are readily confounded with the particular treatment of the practitioner, that the latter may always hope to carry off the whole honour of the success. Nature alone should speak to us in these narratives, but her language, even when faithfully rendered, is almost always involved or doubtful, sometimes even deceitful; and we can only interpret it by the combined light of large practical experience and sound theory. It is those only who have acquired the knowledge to be procured from these several sources who can separate the reality from the semblance in such observations, who can detect the faults of proceedings

which an equivocal and temporary success would seem to authorize, and who can recognise good practice even in those cases in which the event has proved unfavorable.

To present a collection of particular cases then to young practitioners as models for them to follow, would be only to deceive them grossly; since what they want is certain and precise directions for their conduct in practice. The best, and indeed the only course for them to follow is, to adopt the maxims and rules established and digested by the great masters, who can properly employ the narratives of cases in reforming precepts which are erroneous; in verifying those which are uncertain; in tracing the limits of those which are vague and indeterminate; in comparing the details of particular cases, which cannot be brought within the ordinary rules, and of which the extent is not sufficiently well known to allow of their being fixed and reduced under precepts.

It will be sufficiently apparent from the above course of reasoning that the object of the Academy, in dealing with the facts communicated to it, should be not merely to place them together and publish them as collections of observations. It has in view a much more important work, and one more worthy of such a society: it considers almost all the observations with which it may enrich our art, only as the remote means to be employed in bringing this to perfection, and we can only fully carry out our desire to contribute towards this perfection by especially endeavouring, through the assistance of these facts, and of those to be found in ancient and modern observations, to settle doubtful or undecided points of practice, to detect faulty methods introduced through prejudice and favoured by false appearances; and, on the other hand, to discover and settle the true indications to be followed in doubtful cases.

REMARKS ON WOUNDS OF THE BRAIN;

IN WHICH IT IS PROVED, BY NUMEROUS OBSERVATIONS, THAT THE BRAIN IS SUSCEPTIBLE OF VARIOUS OPERATIONS WHICH MAY FREQUENTLY SAVE THE LIFE OF THE PATIENT, AND IN WHICH AN INQUIRY IS INSTITUTED RESPECTING THE REMEDIES BEST ADAPTED FOR THE TREATMENT OF WOUNDS OF THAT ORGAN.

By M. QUESNAY.

I.

The brain is formed of such a delicate substance, and its functions are generally so important to life, that it would seem as if the smallest shock, or the slightest wound, would cause irreparable injury, and attack life at its fountain-head. We have, however, numberless observations serving to dispel this groundless fear, from which we learn that wounds of this organ, especially those of the cortical and medullary substances, heal almost as readily as wounds of most other viscera.

Observation 1. A child, 7 years of age, fell from the height of seven or eight feet, and received a very considerable wound on the right side of the frontal bone, with fracture and depression. The supraorbital sinus was included in the fracture, which extended to the orbit. There were four fragments, the angles of which had penetrated somewhat into the substance of the brain, and on their removal an opening remained which rendered the use of the trepan unnecessary. The dura and pia mater were contused and torn to a small extent, and a little bit of the brain had protruded through the rent. No severe symptoms supervened, notwithstanding the unruly conduct of the child, who would neither remain in bed, nor submit to proper diet; from the size of the wound, however, it required six months before the cure was complete.

The above observation contains nothing surprising, and merely serves to confirm the reports of similar cases by various authors. Barnard Suevus, amongst others, in his treatise 'De Inspectione Vulnerum Lethalium et Sanabilium,' printed more

than a century since, has collected several cures of this kind related by the ancients. Before Barnard, André de la Croix had furnished an ample catalogue of similar cures, effected by those practitioners who had preceded him. The following observations are of more importance than the last, and we find amongst them several very interesting cures of the same kind.

Obs. 2. A little boy, 8 years of age, was kicked by a horse on the side of the head; the parietal bone was injured at its upper and posterior part. M. Belair, who was called, endeavoured to replace the portions of bone; but the brain was so damaged beneath the fracture, that at each effort to adjust the fragments, portions of the cortical substance were pushed out, so that during the time the bones were being replaced sufficient came away to form a mass larger than a hen's egg. M. Belair, who was obliged to leave, committed the patient to the hands of the village surgeon, giving directions how the wound was to be treated, although he had no hope the child would recover; his surprise was therefore great on learning next year that the child had recovered; he desired to see him, and found him, indeed, in good health, with only a little depression in the site of the wound, in which a nutmeg might have been lodged, and some irregularities in the scar; the child's intellects, however, did not appear to have suffered from the accident.

The fragments having fitted each other but badly, had, no doubt, left spaces between them which served instead of the trepan, and which allowed the escape of the discharge which so severe a contusion must have caused. We may suppose, indeed, that had this not been the case, M. Belair, instead of replacing the fragments, would at least have removed such as were likely to prevent the discharge of these matters; for the extensive suppurations to which the brain is liable, are always much to be feared, and require great attention on the part of the surgeon. But dangerous as are these great suppurations, they often terminate favorably, and have often served to display the resources of our art. The following observation shows well what surgery can accomplish in such a case.

Obs. 3. A large, stout, young man, of 17, was wounded by a musket-ball; the ball, which had been fired from below upwards, passed through his upper lip into the right nostril,

pierced the roof of the orbit, and passing through the brain, escaped at the top of the head near the sagittal suture; causing a fracture at this part which extended to the parietal bone, and made a large wound in the integuments, parts of which were torn away. Swelling of the head followed, to such an extent as to give it a monstrous appearance. An incision was made across the wound into the orbit, from which escaped at the first dressing a portion of the two substances of the brain, as large as a small hen's egg; the eye was much swelled, from extravasated blood it was supposed; but on making an incision to let it out, instead of blood a splinter of bone escaped, with about one third as much brain as had come away on the former occasion. The wounds were lightly dressed, with pledgets soaked in arquebusade water, and, after some days with digestive, sharpened with spirit of wine. Bleedings from the arm and foot were not forgotten. Some other small portions of brain afterwards came away. On the fourth day suppuration of the substance of the brain began to appear in the form of a thick discharge; on the fifth day this was much increased; on the sixth the suppuration became general: after the bleedings the patient felt pretty well, with the exception of occasional faintness, up to the eleventh day; on the twelfth this faintness increased; on the thirteenth day the matters which came from the brain, and which had flowed freely from both the upper and lower wounds, were in part retained, and the patient fell into a state of torpor and general depression. M. Bagieu, who treated the case, carefully re-examined the wounds, and perceived in the upper one a large piece of loose bone, which he easily removed; but the patient experienced no relief, he appeared even worse up to the fifteenth day, when he was thought to be dying. M. Bagieu observed, on pressing the skin at the point from which he had removed the bone, that matter escaped, which led him to suspect that a collection of pus had taken place there; under this idea he cut away the skin, and some portions of dura mater which retained the matter. This re-established the discharge; the pulse rose, and the patient recovered his speech on the following day; little by little the discharge diminished. On the nineteenth day granulations appeared, and the wound at the top of the head was soon closed in: that of the eyelid was longer in healing; for a large fungus,

caused by the presence of splinters from the adjoining bone, appeared, and notwithstanding the care that was taken to remove the fungus, and to burn it, it returned until all the splinters came away, when it was readily destroyed; the wound then soon healed, and the patient was cured without deformity.

We find in Valeriola[1] an observation of the same kind, except that there do not appear to have occurred such serious symptoms in the course of the treatment. A soldier received a gunshot wound, the ball passed through his head from the left temple to the right; but here the patient remained blind and somewhat deaf. Rhodius[2] also relates the case of a soldier cured of a javelin wound, which passed between his eyes and came out at the top of his head; but we must remember that there is a great difference between a gunshot wound and the wound of a sharp-pointed instrument, so that Wepfer from his own experience thinks that there is no recovery from a gunshot wound which penetrates deeply into the substance of the brain. We shall, however, see, in treating of wounds of the brain caused by foreign bodies, that there are facts which prove the contrary, besides those we have already cited, and especially that related by M. Bagieu, about which there can be no doubt, since the case was under the care of several very able surgeons. But what is most astonishing in wounds of the brain is, that that organ, the substance of which is so delicate and soft, can tolerate the presence of foreign bodies, even for a long time, without any serious consequences.

A brigadier in the king's troops received a musket-shot above the eyebrow; the ball passed through the bone and buried itself in the brain. The patient recovered sufficiently to go into the country the year after, and then died, of a coup de soleil, as it is said; on opening the head the ball was found two inches deep in the brain, where it had lodged without causing any disturbance.

Obs. 4. M. de la Martinière presented at the Academy a grenadier of the regiment Montmorency, in whom there remained a small sinus at the centre of the lower part of the frontal bone between the frontal sinuses, caused by a musket-shot, which had passed through the bone and had not come

[1] Liv. iv, Obs. 10.

[2] Bonet, Biblioth. de Chirurg. cent. 1, Obs. 72.

which had gradually formed, and had increased to such an extent that only a thin layer of the cerebellum remained covering the tumour; we also find some examples of wounds of the cerebellum when the substance of the organ had been almost wholly destroyed, and yet the sufferers had survived their wounds several days. M. Göelike has observed that wounds of the spinal cord near the brain are absolutely mortal; he pushed a very sharp knife in between the first and second cervical vertebræ in a dog; the animal immediately fell into violent convulsions and died. M. de la Peyronie having concluded, from many observations, that the cerebellum, the lobes of the brain, the corpora striata, the pineal gland, &c., are not separately absolutely essential to life, nor the faculties of the mind, especially to knowledge and judgment, convinced himself of the falsity of the various opinions respecting the seat of the soul; on the other hand, he found, from all the observations furnished by anatomy and surgery, that the corpus callosum cannot be wounded without the disturbance or destruction of those faculties, from which he concludes that the corpus callosum is the part of the brain in which the soul exercises its functions.[1]

The knowledge of all these facts is, in one point of view, particularly important to surgeons; for not only the cures we have related, but many other similar ones to be found on record, should encourage us to treat wounds of the substance of the brain, however considerable they may be, with all possible attention, since by doing so we may hope to succeed; they also serve to show that we may attempt certain operations on the brain itself in desperate cases, which the hopeless state of the patient justifies, and which the symptoms indicate as the only available resource; that we may, for instance, open an abscess in the substance of the brain, or, when the circumstances require it, seek for a foreign body supposed to be retained there; that we may cut away portions of the brain attacked with mortification, or remove fungous growths, or carcinomatous tumours to which the brain is subject. The observations related in our paper on the Multiplicity of Trepans, may serve to show that the necessary openings can be made in the skull for the ready performance of these operations.

To show the necessity for these operations, and to describe

[1] Acad. des Sciences, ann. 1741.

the circumstances which may render them more or less feasible, or more or less difficult, we shall narrate some observations which will serve to show the different cases in which they may be undertaken more or less safely. Let us begin with abscesses concealed in the substance of the brain.

There are cases of wounds in the head in which, after having opened the skull, we are obliged to divide the membranes of the brain to seek the cause of the symptoms which continue after the application of the trepan. This second operation is not always sufficient, the symptoms being sometimes kept up by suppuration in the substance of the brain, generally on the opposite side to the fracture which has required the trepan. The matter is collected in an abscess, which does not betray its presence by any external sign; the urgent character of the symptoms alone could determine us to penetrate the substance of the brain to give vent to the matter supposed to be the cause of the symptoms; but the uncertainty of success has always been considered too great for surgeons to act on this conjecture. The fear of too greatly exposing their reputation, has led them to prefer leaving the patient to his fate rather than hazard such an attempt; nevertheless, our fear to open the brain is much like that of the ancients to open the dura mater, about which we have no longer any hesitation, and have consequently saved the lives of numberless patients. Perhaps the practitioners who succeed us may be equally surprised at our fear to pierce the substance of the brain; we have already many facts which show our timidity, and which powerfully tempt us to risk the proposed operation in desperate cases.

Obs. 6. A child got a fall on the left parietal bone, which was followed by symptoms indicating the trepan; the operation gave vent to a considerable effusion on the dura mater; this membrane otherwise appeared healthy, and the symptoms disappeared till the twenty-eighth day, when convulsive motions supervened, with imperfect palsy of the right side, torpor, and almost continual insensibility. M. de la Peyronie opened the dura mater, suspecting that there was an abscess below it which caused the symptoms; for there were no local appearances to assure him of this; he, however, found nothing. The alarming state of the patient led him to propose opening the

brain itself; the step was, however, thought too bold, and was opposed: the patient died in convulsions. M. de la Peyronie opened the head, when he found opposite the perforation an abscess in the substance of the brain, only three or four lines from the surface; thus there is little doubt, from the cases we have reported, that there would have been fair hopes of the child's recovery had the operation proposed by M. de la Peyronie been risked.

Obs. 7. M. Belair reports a nearly similar case. A man, 19 years of age, received a halberd wound which penetrated an inch deep into the brain; the mental functions were not affected by this wound, and the patient, without assistance, walked some distance to seek a surgeon. Several pieces of fractured bone were removed, and the wound was dressed as if made with a trepan. Forty-four days passed without inconvenience, the patient getting up every day, but at the end of this time shivering and fever came on, and he died in twenty-four hours. A little abscess was found in the cortical substance opposite the wound, and the dura and pia mater were tense and inflamed.

Often when the dura mater has been opened by the surgeon or by the original blow, nature has herself carried out the indications afforded us by these abscesses. The following observation, and several others which we might adduce, in which the bursting of such abscesses has ended favorably, sufficiently prove that were an incision to penetrate the abscess, the operation would often be successful.

Obs. 8. A child, 9 years of age, fell from a height upon the corner of a square stone, and became insensible. M. Petit, who was called to him, found a wound two or three finger-breadths wide above the right eye, sufficiently large to allow of the introduction of his finger; he felt that the bone was fractured and depressed, which obliged him to make a crucial incision, large enough to expose the whole fracture and provide room for applying the trepan; he postponed this part, however, until the following day, on account of the hemorrhage; almost immediately as he had completed the dressing the child recovered his senses: he was bled several times. On applying the trepan, M. Petit found no blood effused under the skull; he raised the depressed portions of bone, removed such as

were entirely detached, and cut away such inequalities as might have injured the dura mater. No ill symptoms ensued during the first days, but on the night of the fifth day a little fever came on; the patient was restless, hot, and very thirsty, which led to a repetition of the bleeding in the morning. In the evening, the head being heavy, and the fever having increased, he was bled from the foot: on the following day the wound was drier than ordinary, the dura mater appeared brownish, a little rounded out, and resisting pressure with the finger, which led M. Petit to think that some fluid was effused beneath it. Scarcely had he opened the membrane with a lancet, when there issued from an abscess which had gathered in the substance of the brain a teaspoonful of brown fetid serum; he then enlarged the opening as much as he could. This first discharge did not dispel the symptoms; on the contrary, his patient passed a very disturbed night, talking and grinding his teeth several times; the pulse was also contracted and irregular; in the morning the dressings were, however, found quite wet; on the following evening and during the whole night there was considerable torpor, but on the following day, the eleventh from the accident, all the threatening symptoms disappeared. The cause of this sudden change was seen on changing the dressings, for M. Petit found them full of very fetid pus; some flocculi of cerebral matter followed the discharge; the portions of membrane which had become gangrenous separated, and the patient was well at the end of two months. We shall by and by relate a case by M. de la Peyronie of the same kind, and attended with the same success.

We find observations recorded of similar abscesses; it must, however, be observed, that they are not always placed so favorably for an operation, for sometimes they are near the ventricles, and sometimes in the part of the brain opposite to the blow; thus, where a blow has been received at the upper part of the head, the abscess will sometimes be found near the base. We have a case of this kind in Pigray;[1] the abscess was very small, and the patient did not die until six months after the wound.

When abscesses form on the opposite side of the brain to the blow, they generally give rise to some symptoms which lead to a suspicion of their presence. We have already seen, in the

[1] Liv. iv, chap. ix.

article on the use of the trepan in doubtful cases, that many practitioners have been led to trepan, and with success, on the opposite side of the head. If, after trepanning the part where we suspect a contre-coup, we should find nothing beneath the skull, or under the membranes of the brain, and the symptoms which led us to use the trepan continue, we may conjecture that there is an abscess concealed in the substance of the brain.

The circumstances which lead to the opinion that there has been a contre-coup, and on which we decide to trepan, are principally a fixed pain, which, although it may not make itself felt in the spot struck, appears nevertheless to be a consequence of the blow. Should irregular shiverings supervene, with fever, and other symptoms, we may presume that an abscess has formed in the painful spot.

The palsy that often occurs in such cases, and which generally affects the side opposite to that part of the brain the lesion of which produces it, will, when coupled with the pain, assist us much in deciding on the seat of the abscess; for, if the palsy affects the arm, the leg, or some other part of the body on the same side as the blow, we may be almost certain that the lesion is on the opposite side. We have, however, some instances of palsy, of which the cause has been found in the brain on the same side with the palsy; but we should not allow these exceptional cases to interfere with us unless something clearly points to their existence: thus, when the palsy is accompanied by urgent symptoms, we may determine to trepan on the opposite side; and should we find nothing under the skull, nor under the membranes of the brain, we may venture on some small incisions into the substance of the viscus, to satisfy ourselves whether or not some abscess may not exist in the cortical substance, or even deeper, and which may be the cause of the symptoms. Such an incision is not likely to add to the risk of the patient; should it fall on an abscess it might save the patient's life, and should it fail to do so, the abscess will prove fatal, independently of the incision; neither as regards the pain is there any reason to fear it, for it has often been remarked that the proper substance of the brain is insensible.

Carcinomatous tumours occurring in the brain, and always ending fatally, equally deserve the attention of surgeons, with the abscesses of which we have spoken; for the intolerable pain

they cause, which ends only at death, renders them very dreadful, and the attempts made to relieve them are the more hopeless, from the fact that we hardly ever discover the nature of the disease until it has put an end to the patient. The following observation is an example of this.

Obs. 9. A man was afflicted with a violent and constant pain in the head, which came on after a blow on that part, to which he had paid no attention at the time; the pain continued, in defiance of all remedies, until the patient's death, after which a carcinomatous tumour was found in the brain as large as a hen's egg. Many instances of these terrible tumours are to be found in authors.[1] It does not appear that the extirpation of these tumours would be always impossible, especially when they are of a moderate size, and are situated at the surface of the brain; for the brain might probably bear such operations, since it often recovers from extensive wounds and gangrenes. These tumours are not generally as large as that we have just mentioned: in the twentieth observation of the preceding paper, we found a long and severe pain in the head, caused by two carcinomatous tumours, each no larger than a pea, and which were attached to the cortical substance of the brain. If, then, in a case of intolerable pain in the head, appearing to threaten a fatal result, we had reason to suspect such a cause, and if we should succeed in discovering its position, would it not be reasonable to try to extirpate the tumour, rather than leave the patient to perish miserably, under circumstances where relief might ensue from an operation infinitely less formidable than the disease. The same reasoning will hold good respecting fungous tumours of the brain as regards their extirpation.

Our art would afford us the same means of relief in gangrenes of the brain, but unfortunately there is the same obstacle as in the case of tumours, namely, that they are not discovered until after death.

Obs. 10. A young woman, of 22, struck her head against a wall, bruising the middle and upper part of the occipital region; the blow was followed by no severe symptoms, and, indeed, she did not mention it until some days after; by way of precaution, simply, she was advised to employ some vulnerary

[1] Ephem. Dec. 2, An. 1, Obs. 167; Bonet, Sepulch. Plater, lib. i; Fabr. Hild. Op. Chir., &c.

applications. For two months and a half she felt no other inconvenience than a slight pain at the back of the head; but, at last, fever came on, with pains all over her head, and in the belly. M. Sauré, who was then called to her, examined the head, but perceived nothing externally; he ordered fomentations, and had recourse to bleeding, under which treatment the pains disappeared in ten or twelve days; but they soon returned, and continued until her death, four months after the accident. The head was opened, no fracture was found, nor effusion on the membranes of the brain; but they were livid for about three inches, and on raising them the substance of the brain was found black and gangrenous to the depth of near three inches.

In wounds of the head where the skull is open, or where the violent fixed pain has led to the use of the trepan, we can discover these gangrenes before they have made such progress, and then we should not hesitate to remove all the mortified part of the brain.[1] Lambert, the celebrated surgeon of Marseilles, relates a case which deserves mention here as affording a very instructive lesson to surgeons.

A footman, 15 or 16 years of age, received a blow from a stone on the middle of the right parietal bone; the brain was injured, and on the following day the patient became convulsed on the same side with the blow, and paralysed on the opposite side; these affections were accompanied with fever, delirium, and a considerable diarrhœa. The substance of the brain became black, a dressing was applied composed of two portions of spirits of wine and one of honey of roses; the brain swelled, and became softer than usual, which led the surgeon in attendance to cut away every day a portion of the gangrenous substance which was pushed forth. On the eighteenth day the patient fell out of bed; all the protruded portion of brain was detached by the fall, and was found in the dressings, but the swelling continued to push out the blackened cerebral substance, which was daily cut away. On the thirty-fifth day the patient got drunk, which increased the swelling of the brain, and a large piece protruded; whilst drunk he slipped his hand up under the bandages, and, clutching the tumour, tore it violently away. On the morrow the

[1] Comm. sur la Carie, chap. v.

brain looked healthier, almost all the gangrenous part had been removed, and the corpus callosum was in view. A vermilion tint succeeded to the lividity, the gangrene ceased, and the patient recovered. The palsy remained, however, and he became subject to epileptic fits, but he recovered his intelects entirely.

By imitating this patient's proceeding, we may carry out the indication naturally arising in such a case. The timid surgeon, who only daily cut away as much of the gangrenous matter as was thrust out from the skull, was labouring in vain; putrefaction, which readily goes on in a soft, moist substance like the brain when it is gangrenous, would continue to destroy the dead part left behind, and this dead and putrefied matter would accelerate the progress of the gangrene; so that there is little doubt the patient would have perished had he not himself removed the cause of progress by tearing away nearly all the portion of brain which was gangrenous.

We have already cited several cases which teach us that foreign bodies may remain a long time in the brain without causing death; but with this knowledge we must also bear in mind that it is our duty to extract these bodies, which, sooner or later, almost always prove fatal to the patients; and when we have reason to suspect from the events, from the instrument which inflicted the wound, and from the state of the fracture of the skull, that such bodies are retained and concealed in the substance of the brain, we should make the necessary examinations for the discovery.

Obs. 11. A lady, about 30 years of age, went to see some mortars fired, one of them burst, and a piece struck her about the middle of the left half of the frontal bone; she fell back on the pavement, motionless, senseless, and without any pulse; she vomited, and soon after recovered her senses. The explosion had caused a contused wound, with loss of substance; the skull was fractured, and several splinters were separated; M. de Manteville extracted three as large as one's nail, all comprising portions of both tables. There was also a tumour of the size of an egg, with fluctuation towards the back part of the head, on the posterior and lower part of the left parietal bone. M. de Manteville and M. Desportes, who was called in consultation, decided on opening this tumour; but two other surgeons, who were also consulted, opposed it, and got

away the patient, who was at that time free from any bad symptoms. On the ninth day fever came on, with delirium, followed by a lethargic torpor, and finally death on the twelfth day.

The surgeons of the Châtelet examined the body; they found no effusion, but only a splinter in the substance of the brain opposite the wound. We see from this how much we should be on our guard against foreign bodies in the brain, and especially how suspicious we should be in comminuted fractures of the presence of splinters which may be buried in the substance of the organ.

The numerous cures we have related at the commencement of this article, to show the resources of surgery in wounds and other affections of the brain, must not blind surgeons to the danger which attends on injuries of this part, nor lead them to forget the great care necessary in treating these wounds, and the caution required in forming a prognostic; for it would not be difficult, as we may well suppose, to excite as much fear by other cases, as hope by those we have detailed: but as it is much easier to cause fear than confidence, we shall content ourselves with citing the following observation as a set off against others which might engender too much confidence, and it will give us an opportunity of making some remarks on the judgment which is sometimes pronounced too lightly in some cases of injury of the brain.

Obs. 12. A man received a blow on the head, which drove a splinter into the brain about an inch deep; this wound almost immediately caused severe symptoms. M. Mareschal removed the depressed portion of bone, and dressed the wound with balsam of Fioraventi,[1] over which was placed some digestive. The patient was bled six times. A portion of brain about as large as the yelk of an egg came away. The severe symptoms almost all disappeared; the patient appeared pretty well; the fever was trifling, and the wound looked well. The suppuration always brought away some portions of the substance of the brain, which were softer than that which first came away. A hole big enough to lodge a tennis-ball in gradually formed in the brain. On the ninth day M. Mareschal introduced his finger very gently to the bottom of the wound, to examine

[1] [A spirit distilled with resins and aromatic herbs, and analogous to the arquebusade of the shops.—Tr.]

whether the granulations were in an unhealthy state, "when immediately," he says, "the patient was seized with convulsions so violent that he thought they would end fatally;" these symptoms soon disappeared, but the state of the patient was very bad, and he died the same day. M. Mareschal has recorded this observation as a warning to young surgeons that the dangers of these wounds accompanied with much loss of substance from suppuration is so great that they never recover. Such a declaration made by a surgeon of such extensive experience as M. Mareschal deserves attention; it must not, however, alarm us too much, for the observations we have reported, and a great number of others we could adduce, give us reason to hope for better success.

We must remark, that often the danger depends more on the circumstances than on the wound itself; the temperament, the locality, the care of those who have the charge of the patient, the events which may excite his passions, &c., often decide his fate. Thus it has been observed that wounds of the head are more readily cured at Montpellier, Marseilles, and Avignon, than at Florence or Paris. As regards the effect of passion, cases have occurred where a patient has died suddenly in a fit of passion; the unexpected arrival of a person beloved or hated has had the same effect; others have perished from having, on a single occasion, failed in the continence enjoined them, or even at the very sight of the object to whom they were passionately attached. Errors of diet have often been followed by similar fatal consequences. Other peculiarities attended with great danger are related. Fabricius Hildanus relates that one of his wounded patients died in consequence of too much noise being made near him, and that his father was fined in consequence. The works of authors are full of observations in which death, occurring after wounds of the head, is attributed to some such circumstances.

It is not to be doubted that these external influences do often cause the loss of the patient; but we must remember that very often the ill success is laid to the account of some apparent or external circumstances which is really the effect of a hidden internal cause, a splinter, for example, or an abscess in the substance of the brain, or a suppuration, such as sometimes forms after blows on the head in different viscera, particularly

the liver, or matter retained, or a gangrene, an inflammation, or an effusion. If, then, these concealed causes suddenly cause the death of the patient, at the same time that some remarkable coincidence furnishes an apparent external cause for the unexpected death, the fatal event is sure to be attributed to the preceding external cause, since it is the only perceptible one by which to account for it.

Experience, however, will inspire us with some doubt respecting these external causes, for it is certain they do not always prove so fatal; observers have furnished us with many facts, which seem to throw suspicion upon them. Salmuth,[1] amongst others, has reported that a man with a large wound of the brain recovered, notwithstanding his continuing to get drunk, and to keep company with loose women, who at least amused him with their gaiety and free conversation. Two reasons have induced us to mention this observation: 1. Since they will afford us an opportunity to warn young surgeons who may meet with similar narratives in authors, not to allow themselves to be misled by these dangerous examples, and relax in the precautions that ought always to be taken to prevent such disturbing causes; for in spite of these observations, which are indeed extraordinary, it is certain that these irregularities are quite enough to prevent our succeeding in the cure of extensive wounds. 2. That we may charge them not to deceive themselves respecting the cause of the fatal events occurring in such wounds, in attributing them to accidental and external causes, while, for want of proper examination of the wound and the surrounding parts, they overlook causes which might have been removed, and which may carry off the patient without their presence ever having been suspected. We could cite numerous observations where the examination of the body has revealed such hidden causes, which have proved fatal to the patient, only because they were not perceived by the surgeon.

M. Mareschal has communicated to us an observation that may serve to call attention to a mistake of another kind, which is in truth less dangerous than that we have spoken of, but which is not less disgraceful to the surgeon who commits it, and is detected in his error. The substance of the brain is so soft, that the matter furnished by wounds of the head may some-

[1] Bonet, Bibl. Chir., cent. 5, obs. 26.

times have a colour and consistence similar to the cerebral substance, and lead to the notion that the wound has penetrated this organ when such is not the case.

Obs. 13. A man received a blow on the lower part of his forehead, which made a penetrating wound into the superciliary sinus; the wound, from the time of the second dressing, discharged white mucous flocculi, which the surgeon mistook for portions of the brain. M. Mareschal perceived that the wound went no further than the sinus, and that the surgeon had taken the matter discharged by the sinus for bits of brain. It is such mistakes, no doubt, that led Muys and Nuck to say that wounds of the frontal sinuses are so deceptive, that the brain has often been supposed to be severely wounded, when only the external table has been broken. The membrane lining the sinus may receive an impulse during respiration, giving it the appearance of the membranes of the brain, which may still further lead to the supposition that the wounds have passed through the whole thickness of the skull, when they have gone no further than the membrane of the sinus. The wound of which M. Mareschal speaks was soon cured. This last circumstance leads us to conclude with a trifling remark, a little foreign to our subject, but which we should not pass over; it is that the speedy cure proves that wounds of the frontal sinuses are not of themselves intractable or difficult to close, as many authors pretend, and who, for that reason, forbid us to trepan these sinuses; it must indeed be acknowledged that the site is not very well adapted for the operation; nevertheless, should some disease of the sinus or any other circumstance require it, we should not be prevented from trepanning, by the supposed difficulty of healing the wound.

II.

It will be seen in the cases related by most eminent surgeons, that we are still very undecided as to the remedies to be employed in wounds of the brain, and that but little examination has been made as to those most likely to be suitable, nothing being said even of the particular indications to be drawn from the substance of the brain. Some have employed vinous liquors, even spirit of wine, other spirituous balms containing essential oils, and oils dissolved in spirits or wine; one

party uses syrup or honey of roses, another tincture of myrrh or aloes; some employ pure essential oils, such as oil of turpentine, some olive oil in which St. John's wort or some other vulnerary plant has been infused; some even content themselves with dry lint. None of these practitioners gives any reason for his preference of one remedy to another. It must be admitted indeed, that the brain has generally been considered as a spermatic or exsanguine part, and that those remedies have been employed for it, which generally are best adapted to such parts, especially nervous parts; but there is an inconvenience to which the brain is liable, and which is readily perceived, and which requires attention in wounds of this viscus, it is that tendency of its substance to swell, which is with great difficulty repressed, and which renders it liable to separate in suppuration. M. Mareschal, and other great surgeons, have frequently remarked on this inconvenience, and it has been observed that spirit of wine, although employed with success in other wounds of the nerves, tends to increase this. M. de la Peyronie has favoured us with an observation, and the experiments made by him, in which the ill effects of this swelling are sensibly seen, as well as what remedies may be employed to prevent it.

Obs. 14. A young man, of 16 or 17, was wounded in the head with a stone, which fractured and splintered the left parietal bone, he was trepanned to remove the splinters which had penetrated the membranes of the brain; an abscess formed below the membranes; M. de la Peyronie opened it, and found the matter had penetrated between the convolutions of the brain, and made an impression on the cerebral substance, for already some marks of putrefaction were perceptible; he thought it right to employ spirit of wine to the part, as a remedy well adapted to resist putrefaction, but at the end of two days a swelling came on, which escaped from the opening in the skull, in defiance of the dressings employed; this swelling was attended with such a discharge, as carried off the patient in a few days. From the quantity of matter which escaped, it seemed as if half the brain must have come away in debris with the suppuration. M. de la Peyronie examined the young man's head after death, and was surprised to find the loss of cerebral substance not at all equal to what had appeared to come away, by which he perceived that this part had by no

means furnished all the matter of these great suppurations, but that the fluids passing into it, had supplied the greater part.

M. de la Peyronie having several times remarked that spirit of wine did not answer in these tumefactions, or rather in discharges from the brain, but seemed, on the contrary, to increase them, determined to try the following experiments to clear up his doubts, and to discover some remedies better fitted to repress this swelling. He placed a portion of brain in spirit of wine, another in wine, another in balsam of Fioraventi, another in oil of turpentine, and, finally, another in the Commander of Perna's balsam. That in the spirit of wine had become lighter, and was much softer, and afterwards decayed more quickly than the rest; the same changes occurred in that placed in wine, but they were less considerable. The portion in balsam of Fioraventi was, on the contrary, somewhat contracted, and firmer; and in the oil of turpentine and Commander's balsam this effect was still more remarkable.

These experiments sufficiently show that essential balsamic oils are preferable to alcoholized oils for repressing and preventing these discharges of the brain.

Honey of roses, again, is a remedy much employed in wounds of the brain, and well authorized by long experience in cases where a cleansing effect is wanted, especially where the suppuration is thick and tenacious. Some practitioners consider it rather too warm and acrid a preparation for this part. Scultetus has opposed experience to this prejudice. M. de la Peyronie has employed this remedy with great success in injections into the organ, for which reason we shall cite a famous cure of his, restricting ourselves, however, to a short account, because it has been already narrated by several authors.

That case, so well known, both on account of the extent of the disease and the success of the treatment, comprises the history of a wound on the left parietal, to which M. de la Peyronie was not at first called; more than a month having elapsed since the accident before he saw the patient. The symptoms which had supervened some days before, and which led to his being called in, caused him to suspect an extravasation under the skull: he examined the bone, and discovered a fracture with depression; on the following day he applied two crowns of a trepan, and removed the pieces of bone which had

The authority of practitioners, and the erroneous ideas prevalent respecting the nature of the sinuses, contributed not a little to the notion of the dangerous nature of such an accident: it was thought that the sinuses pulsated, and that arterial blood flowed in them. Vesalius[1] was the first who taught that the branches of the internal carotid opened into the sinuses of the dura mater. This opinion was subsequently adopted by Highmore, Vieussens, Van Horne, and Diemerbroeck, who indeed states that he traced the entrance of an artery into one of the sinuses of the dura mater. Vesalius states that he has seen the pulsation of the sinuses, and, according to Ridley,[2] the longitudinal sinus exhibits pulsations isochronous with those of the arteries. Lastly, M. de Lamure, a celebrated physician of Montpellier, states that the longitudinal sinus rises with the brain by its own proper motion.[3]

But numerous and exact experiments have proved that it is the veins of the brain and dura mater which discharge themselves into the sinuses, that they are not susceptible of dilatation and contraction, and lastly, that they have no pulsation. If opened, the blood does not escape in jets as from a wounded artery. It is, in fact, impossible that they should pulsate, seeing they are strongly bound to the skull by the dura mater in a duplicature of which they are formed. The blood circulates in the brain as in all the rest of the body. It passes from the arteries into the veins, and from the veins into the sinuses, which discharge it into the jugular veins, to be returned to the heart. The truth of this is evident from the functions they perform: they are merely venous reservoirs in which a reflux of blood takes place during strong muscular efforts and prolonged holding of the breath. Was it not absolutely necessary that receptacles should be provided, in which the venous blood might accumulate in certain cases without risk of their laceration? The transverse bands which we find in them prevent their becoming too much loaded and over-distended, by which the brain might have been compressed, and injurious effects might have ensued.

[1] Lib. iii, cap. xiv, p. 349.

[2] Phil. Trans. No. 287; Haller, Elément. Phys. tom. iii.

[3] Mém. de l'Acad. des Sciences, ann. 1749, p. 557.

To obviate this, they are inclosed as in capsules formed by the dura mater; the circulation is a good deal slackened in rapidity in the sinuses, and must be even slower than in the veins.

Experiments on living animals confirm these physiological truths, by which we must learn to correct our erroneous pathological and surgical notions. "We have occasionally opened the sinus in the falx of a dog," says Haller, in a Memoir on the Sensible and Irritable Nature of Parts, "and we found the blood flow without effort without any jet or any pulsation."[1]

In describing another experiment made on a goat, the same author says expressly, that "the large sinus of the falx is devoid of pulsation, and when wounded, the blood escapes from it gently as from a vein."[2]

I have repeated these experiments on two dogs, and found that, on cutting the longitudinal sinus across with a scapel, the blood flowed gently, in small quantity, and without impulse; when the animal struggled, it appeared to me to flow more freely.

It will perhaps be replied, that the sinuses in these animals are too small to allow of a reasonable comparison being made between a lesion of them and of the sinuses in man; but even admitting this difference, do we find in authors any example of hemorrhage, properly so called, having come on after a wound of the sinuses of the dura mater? If this hemorrhage occurred, and if it were as dangerous as is ordinarily supposed, we could not fail, amongst the infinite number of fractures of the skull and lesions of all kinds which occur in daily practice, to meet with well-authenticated facts in confirmation of this truth; the volumes of our art, however, furnish none: we find instead only groundless fears, for there is really nothing to justify them. An opening of the sinus cannot produce a hemorrhage which would require any extraordinary measures; a part of the sagittal suture therefore may be removed with a trepan, should this appear necessary; and we ought not to be deterred by fear lest the sinus be wounded. Even the authors who appear to be most afraid of wounds of the sinuses, have related instances of the removal of portions of bone from them without any ill consequences.

[1] Tom. i, p. 161.

[2] Ibid. p. 170.

Case 1. A lad of 13 was struck by a pointed piece of iron, on the upper and middle part of the head. The blow fell so directly on the sagittal suture, that a portion of each parietal was driven into the longitudinal sinus. The patient fell down in a state of insensibility, but recovered his senses, and appeared pretty well for six days; at the end of that time he had repeated epileptic fits, accompanied with vomiting and paralysis of the left side. The sight of the left eye was perfect, but with the right eye all objects appeared double. These symptoms continued for a month, at the end of which time he came under the care of Mr. Warner, a celebrated surgeon in London, who, having learned these particulars, proceeded to operate. As soon as the skull was laid bare, the blood spirted from the hole in the bone in a continuous stream; this opening and the sagittal suture were included under the crown of the trepan. The circular bit of bone being raised, a wound was seen in the sinus, which had been made by some splinters; this was dilated with the lancet for their more ready removal. The hemorrhage was at first increased by extracting them, but the application of a little dry lint soon stopped it. The patient fainted after the operation, but soon recovered his senses. Half an hour after, he experienced an agreeable sensation on the left side, and on the following morning had recovered the use of his limbs sufficiently to use them freely. Six days after the operation, the sight of the right eye was perfectly restored, and from that time he continued to improve.[1]

The above observation appears to form a complete answer to the fear of ill consequences from opening the sinus. The next case, taken from the 'Treatise on Injuries of the Head,' by Perceval Pott, the celebrated English surgeon, exhibits a line of practice in complete accordance with the theoretic reasoning we have employed above.

Case 2. A boy, about 8 years old, the son of a Jew merchant in the city, received a blow on the head with a stick, from his tutor. The stroke made him giddy for a few minutes; but, as no blood was shed, and the pain soon ceased, he concealed it till it was discovered by his barber that his head was swollen in that part. In the middle of the top of his head was a

[1] Observations in Surgery, by Warner.

tumour about the size of a common walnut; it was indolent, had a dull kind of pulsation, and palpably contained a fluid.

Mr. Serjeant Amyand and Mr. Shipton were joined with me. In their presence I divided the tumour with a knife, and let out a quantity of venal blood. When as much had been discharged as the tumour might be supposed to have contained, we were surprised to find the blood still continue to flow, plainly not from the wounded scalp, but from the bottom of the cavity.

Upon examination, it was found that the sagittal suture was broken, that a portion of the fracture was forced into the sinus, and that the blood issued by the sides of this fragment.

Extraction of this fragment was attempted, but to no purpose. By the direction of the consultants, I made a small perforation by the side of the suture; but, when that was done, the elevator could not be so introduced as to get the broken piece out. The trephine was then applied on the other side of the suture, and to the same effect, or rather no effect. The fragment was only capable of being extracted as it had gone in. At last, after much deliberation and conversation about the hazard of wounding a sinus (which was, indeed, already wounded by the broken bone), it was agreed to set a trephine on the suture, in such manner that the whole surface should be comprehended within its circle. This was done; but when the elevator was applied, the sawed piece came out in fragments, and left the one portion of the bone which had pierced the sinus still sticking in it. We were then necessitated to lay hold of it, and extract it with a pair of forceps. A flux of blood followed; but by the application of a small dossil of dry lint, held on for a few minutes, it ceased, and never returned. The patient is alive at the time of my writing this.[1]

The knowledge of these cases is well fitted to dissipate the fears entertained about opening the longitudinal sinus. Often, probably, surgeons have been deterred from undertaking a beneficial operation by the fear of an imaginary danger. The observation of M. Quesnay, respecting abscesses in the brain, might be appropriately applied here: "Our fear of opening this viscus," says he, "is much like that which the ancients enter-

[1] On Injuries of the Head from External Violence. Pott's Works, vol. i, p. 194.

tained about opening the dura mater, and yet this latter operation has saved numbers." Wounds of the brain accidentally made, afford certain proofs of the possibility of attempting operations on this organ, which can alone afford relief in cases where death must otherwise ensue. Guided by analogy, Pott, on finding that extensive injuries of the longitudinal sinus were not followed by dangerous hemorrhage, the fear of which has so alarmed former practitioners, determined to open this vessel as a remedy in a case where the symptoms had resisted every other measure.

Case 3. A girl, about 16, was knocked down by her mother with an iron poker of considerable weight; the latter immediately ran away, and the former was brought senseless to the hospital. She had a large wound on the top of her head, with a considerable fracture of the sagittal suture. The broken pieces were so large and so loose, as to be easily removable without any perforation. When they were taken away, the longitudinal sinus was left bare, at least two inches in length, but no hemorrhage followed the removal of the fragments.

For three days she was bled twice a day, from one part or other of her, and stools were procured in such manner as was possible, but to no purpose, she still remained perfectly and absolutely senseless. On the fifth day, finding her still in the same state, and verily believing that nothing in art could at all save her, I made an opening with a lancet into the longitudinal sinus, and suffered the blood to run off, until her countenance, which was much flushed, became pale, and her pulse, which till now had been full and strong, though labouring, faltered considerably; in short, till she showed, as much as a senseless person could, the marks of a deliquium from inanition. I then put a bit of lint on the orifice, and ordered the nurse to keep her finger lightly on it till I had visited the rest of the house. When I returned, the part showed no disposition to bleed again, nor did it ever after. That afternoon she opened her eyes and moved her arms, and the next morning was sensible enough to ask for drink. She retained her senses for several days; but a fever coming on, she became delirious and convulsed, and died so on the seventeenth day from her admission into the hospital.

Upon examination after death, a considerable abscess was

found on the surface of the brain, on one side of the falciform process of the dura mater.[1]

It is not my intention in relating the above observation, to encourage practitioners to bleed from the longitudinal sinus, for the benefit might have been equally obtained in the above case by opening the jugular vein. We cannot but perceive, that bleeding was too sparingly used in this case: the rules of our art require more copious abstraction of blood; but I did not consider it right to pass over the case, as it is one that should be known by those who are not in a position to read it in the original.

My object in this Memoir was to endeavour to banish the fears that have been erroneously entertained respecting the danger of wounds of the sinuses of the dura mater, and to show the advantages to be derived from trepanning over the sutures in case of necessity. There is the less danger, also, of our wounding the sinuses, because the dura mater is almost always detached from the skull by the violence of the blow, and thus protected from being wounded by the trepan.

Since the perusal of this memoir, M. Gagnière, surgeon-in-chief at the hospital at Laon, has communicated to the Academy a case confirmatory of the doctrine laid down in it.

Case 4. On the 24th of May, 1770, M. Gagnière was sent for, three leagues from the town, to attend a lad of 14, who had received a blow on the top of his head with a dung-fork. The blow had been carelessly given by one of his companions. A pretty large quantity of blood flowed at first from the wound, which was stopped, however, by the applications made at the time. M. Gagnière found an opening in the scalp, as big as a six-sous piece. On introducing a probe, he found that it penetrated to the skull: a crucial incision enabled him to remove some splinters of the frontal bone, and he then perceived a clot of blood which had formed in the opening of the superior longitudinal sinus, which had been made by the hook. The patient was dressed in the usual mode after the use of the trepan, the opening made by the removal of the splinters serving instead of a trepan hole. The pledget was moistened with balsam of Fioraventi, no severe symptoms followed, and the wound was quite healed by the end of three months.

[1] On Injuries of the Head from External Violence. Pott's Works, vol. i, p. 196.

EXAMINATION OF THE DOCTRINE OF ANCIENT AND MODERN AUTHORS

RESPECTING THE APPLICATION OF THE

TREPAN ON THE SUTURES OF THE SKULL.

By M. LOUIS.

The object of the foregoing Memoir was to prove that as the longitudinal sinus is a venous vessel, there is no ground for that fear of hemorrhage from a wound of it which almost all authors have so strongly entertained. M. de Garengeot was amongst the number of those who held that opinion. "In general" says he, "we do not trepan on the sutures, because in doing so we should destroy the attachments of the dura mater, which generally adheres strongly at those parts; we should also be liable to tear the vessels which pass from that membrane to the pericranium, and from the pericranium to that membrane. We must not apply the crown of the trepan to the centre of the frontal bone, *lest we should open the superior longitudinal sinus of the dura mater*, which lies in a channel hollowed in the internal surface of that bone, and *thus give rise to a hemorrhage very difficult to check.*"

M. de Garengeot repeated this opinion in 1731, in the second edition of this 'Treatise on Operations,' in the same terms as he employed in 1720, in the first edition.

It has been objected to M. Lassus' statement, that M. de Garengeot had retracted this opinion in the preface to his second edition. The engraving, and taking off the impressions from the prints which accompanied this edition, greatly retarded its publication; and meanwhile the author had occasion to trepan an infant, whose case furnished him with grounds for correcting his former statement, which he did in the following terms:

"Had this book not been already printed, we should have omitted the direction which, in accordance with the opinion of all other authors, is given at page 178 of the third volume, not to trepan on the sutures, nor over the longitudinal sinus; for an operation we performed on a child 6 years old, in whom we applied the trepan seven times, one application being over the superior longitudinal sinus, and another over the coronal suture, proves that this precept is not always to be attended to."

Before we examine whether this restriction should be admitted amongst the principles of art, we must exculpate M. de Garengeot for not having inserted his retractation in the body of the edition published in 1748. This edition was published without the author's consent or superintendence, by a librarian at Trevoux.

The operation he performed in 1730 does not affect the question discussed by M. Lassus, seeing that it no way involved the making an opening in the longitudinal sinus. Platner, who has noticed the case in his 'Institutiones Chirurgiæ,' considers it only in relation to the application of the trepan on the sagittal and coronal suture, and blames the author for not having mentioned the result of his operation: "Garengeot, in the preface to his new edition of 'Surgery,' p. 16, relates that he made seven openings in the skull with a trepan, one of which was on the sagittal suture, and another on the coronal. He does not say, however, whether the boy escaped." In a more detailed account of the operation inserted in M. Quesnay's Memoir on the Multiplied Application of Trepan, in the first volume of the 'Memoirs of the Academy of Surgery,' he only informs us that, by means of the openings made over the longitudinal sinus, the operator was enabled to free the sinus, and that the lad was immediately relieved from the symptoms which would soon have proved fatal. Platner disapproves of the operation; he thinks that a surgeon ought not in prudence to follow the example, although it may have succeeded in the hands of a few rash people; consequently he prefers applying the trepan on each side of the suture. The authority of M. Garengeot, however, in the short account he gives of his operation, is neither for or against the opinion of those who maintain that there is nothing to fear from

hemorrhage of the longitudinal sinus, in opposition to the common opinion which Platner upholds. "In the falciform process is contained the large venous sinus, from which, if wounded, fatal hemorrhage would take place."[1]

De Gorter enumerates nine places to which we ought not to apply the trepan except under urgent necessity, amongst these are the sutures and the parts corresponding to the sinuses, such as the middle of the forehead.[2]

Heister treats this question at some length, and forbids us to apply the trepan on the sutures, especially the sagittal, on account of the longitudinal sinus, a wound of which might easily occur, and would be very dangerous. For the same reason we should not trepan over the middle of the frontal bone, especially not at the fontanel because the longitudinal sinus is directly below; *quem perrumperere pestiferum est.* Could he more strongly express the danger he thought would follow the opening of the longitudinal sinus!

There is nothing in M. Garengeot's observation to reassure us against the fear of hemorrhage, should the sinus be accidentally wounded. There seems very little probability in trepanning near the upper part of the frontal bone that we should injure the sinus, the dura mater being almost always detached from the bone by the violence of the blow; this remark was made by Berengarius Carpensis, and M. Quesnay has very properly called attention to it.

Amongst modern authors, Sharp appears to me to be the first who looked with less alarm than formerly at the chance of hemorrhage from the longitudinal sinus. Still, he leaves enough doubt on the subject to render its removal creditable to those who might after him establish a useful truth, by showing that there is no danger to be feared in opening the vessel. He expresses himself as follows: "Before describing the application of the trepan we must remember that there are parts of the skull to which we cannot apply it so safely as to others. All authors say that it is dangerous to trepan along the whole length of the sagittal suture as far as the nose, on account of the internal spine of the coronal bone,[3]

[1] Institut. Chirurg. p. 342, § 545. [2] Chir. Repurgat. p. 71, num. 343.

[3] The spine of the frontal bone is so prominent towards the base in some subjects, that the teeth of the trepan would tear the dura mater, pia mater, and brain, on each

and the longitudinal sinus which courses along that bone. It is supposed that this would necessarily be wounded by the teeth of the trepan, and that the consequent hemorrhage would cause the death of the patient.

But although, contrary to the general opinion, we may trepan over the sinus without wounding it, and even should we wound it, the hemorrhage, to all appearance, would not be mortal, as I witnessed in two cases; yet it would at all events be very troublesome, and since we have room in that part of the skull, I think we ought not to make an opening in the whole of the space I have described."[1] Sharp here agrees in opinion with Platner, and the advice he gives shows his prudence.

M. Garengeot's remark, considered merely in relation to the application of the trepan on the sutures, opens the way to a useful discussion. He admits having forbidden, *in common with all authors,* the applying the trepan on the sutures; but such an agreement was far from being universal. The perusal of a Treatise on Wounds of the Head, published in 1720, by M. Rouhault, a member of this Society, and of the Royal Academy of Sciences, would have furnished M. Garengeot with authorities on this point, with whom, however, the author of the Treatise did not feel bound to agree.

"Almost all authors," says M. Rouhault, chap. xiii, p. 88, "forbid to trepan on the fontanle in infants because the bone is not sufficiently solid. I think we ought equally to abstain from applying the trepan over the fontanle in the heads of adults, both on account of the longitudinal sinus passing below it, which we should always avoid, and of the sagittal suture, which, in some adults, extends beyond the coronal suture.

"I know," says M. Rouhault, "that some authors have advised and even practised the application of the trepan on the sutures. Cortesius is of this number, as we may see in his 'Commentary on the Treatise on Wounds by Hippocrates.' Berengarius assures us that he had performed the operation with success. Carpensis [we see that M. Rouhault here takes

side of the spine, before they had cut half through its substance. This is an important point, which, if appreciated, has not been strongly or precisely enough expressed by authors.

[1] Sharp, Treatise on Operations, p. 280.

the same practitioner for two different authors] also advises it, and says he has sometimes operated in this way, and has succeeded. Werdenbergius, a physician at Basle, writes to Hildanus that he has seen the trepan applied over the sutures in Italy. "These observations," continues M. Rouhault, "are only of use to show us that there have been physicians bold enough to advise, and surgeons of sufficient hardihood to undertake, such a proceeding."

M. de la Faye in his notes on Dionis, quotes the same authorities as M. Rouhault has mentioned, but he is more cautious and reserved in what he says about the consequences. "We trepan at present over the sutures *in certain cases*," says M. de la Faye, "a practice which has long since been recommended by good authors. John Frederich Wertembergius,[1] J. B. Cortesius,[2] and J. Berengarius Carpensis assure us, from their own experience, that we ought not to be afraid of any bad consequences. Muys[3] says that formerly the trepan was not applied on the sutures, but that in his time surgeons were not so scrupulous."

M. de la Faye then quotes from Berengarius Carpensis the reasons he gives for this practice in the following terms: "When the head is much wounded in the neighbourhood of the sutures, and the dura mater is separated from the skull, either immediately or some time after, the trepan cannot hurt the veins or arteries, seeing they are already separated, and removed to some distance from the skull."

This is all very true, but it is not by any rational signs that we can judge whether the dura mater is separated and removed from the skull. This proposition will appear not unimportant, when we state that recent and carefully made observations have shown that the separation of the dura mater from the skull is not a necessary consequence of a blow, which may be violent enough to fracture the skull. The commencement of M. Quesnay's Memoir on 'Multiplied applications of the trepan' has reference to this point, and fractures across sutures are the first cases treated of. M. Garengeot's case is there given with some details, as well as the quotation from Berengarius, and M. Quesnay, then the interpreter of the opinions

[1] Fab. Hild. Obs. 8, cent. 2. [2] J. Munnick's Chir. [3] Obs. 1, Decad. 5.

of the Academy, appears not to agree with that celebrated author's statement.

The subject possessed sufficient interest to lead me to reperuse attentively the work of that learned surgeon, on Fractures of the Skull. His opinions are very clearly expressed, and I found with satisfaction that he recommended the operation of trepanning upon the sutures only in certain cases of necessity, which form an exception to the general rule, and thus serve to confirm it.

We know that ancient authors carried to an excess their scruples about meddling with the sutures; they would not even permit us to trepan too near to these junctions, and it is this that Berengarius finds fault with. When the wound has injured the sutures themselves, it becomes necessary to extract the osseous teeth composing them, we must trepan near the sutures, and he derisively calls those who oppose our doing so, "Great surgeons in talking and writing," and he does not value their anatomy much higher.[1] The expression "circa commissuras" does not mean on the sutures, but near them, and Berengarius immediately adds, that because of the more intimate union of the membranes at the sutures it is well to avoid these.[2] He had stated in chap. xi in his 'Anatomical Account of the Dura Mater,' when describing its natural attachment to the skull, that the arteries, veins, and nerves communicate from the interior to the exterior through the sutures; in chap. xxxvi, where he treats of the operation, he recalls this communication as furnishing a reason for the precept which directs us to avoid the sutures in operating with the trepan; he observes, nevertheless, that there are particular cases in which we are absolutely compelled to trepan on these junctures, when it is indispensable to raise the portion of bone which forms the suture, but he reminds us of the accidental separation of the dura mater from the bones of the skull which takes

[1] "Ponunt etiam isti periculum in operando circa commissuras; profiteor tamen ego me vidisse vulneratos plures et curasse in commissuris et extraxisse frusta seratilia commissurarum qui evasere, nec vidisse in istis differentiam illam magnam quam ponunt multi qui magni sunt medici calamo et verbo credo ego istos indiligenter vidisse anatomiam."

[2] "Dico tamen in commissuris magis panniculos allegari quam alibi, quia illic non intermediat os; et propter hoc bonum est in operando cavere a commissuris."

place there, and by which the arteries, the veins, and the nerves are removed from the dangerous action on them, which the teeth of the trepan would produce did that separation not exist. The precept to trepan on the sutures is therefore given only as an exception, to be employed in determinate circumstances, and this precept has been confirmed by repeated and constant success, but this is very different from the advice of M. de Garengeot, who, from a single case, described in an indistinct manner, endeavours to deduce a general precept. The text of Berengarius Carpensis I have added in a note, in order that no doubt may be left respecting his doctrine, which we cannot fairly judge of from the brief quotations which some authors have made of it.[1]

I have also reperused Fabricius Hildanus, and what Werdenberg wrote to him, the sense of which M. Rouhault has very much mistaken. We should be very wrong in accusing the physician of Basle of having said that no inconvenience attended trepanning on the sutures; he wrote a letter on this question to Fabricius Hildanus, which forms the eighth observation of the second century of this great author's work. In his reply on the 5th May, 1607, he writes to Werdenberg, that he greatly approves of his resolution not to trepan on the sutures, and adduces many reasons for this, drawn from the great sensibility of the dura mater, the irritation and laceration of the arteries and veins which traverse the sutures, the pain, the inflammation of the membranes of the brain, the

[1] "Dicunt alii esse maximum periculum operari in loco commissurarum vel prope illum quia per commissuras egrediuntur multi nervi et venæ et arteriæ sicut dicit Avicenna primâ primi cap. præd. immo si fissura sit continuata cum commissura vel sit prope eam dicunt fieri debere amotionem ossis sani continuati cum osse lædo longe a commissura.

"Nota tamen lector quod quamvis arteriæ et venæ et nervi reperiantur inter commissuras non tamen propter ea medicus semper debet commissuras fugere in operando; nam possunt reperiri aliqui casus in quibus non minus necessaria est ossis amotio in commissura quam alibi, nempi si contingat caput lædi notabiliter in loco commissurarum ob quod vel statim vel paulo post contingat ibidem duram matrum esse separatam, tunc etsi in commissuris operetur nullum fiet nocumentum venis et arteris quia jam sunt separatæ et a cranio distentes.

"Talem operationem ego plures feci nec cognovi differentiam aliquam ab aliis locis. Est itaque hoc modo operandum quia bene succedit res. Prudenter autem ad plura advertitur dum operatis in loco et ut locus bene expurgetur providetur."

hemorrhage, and other severe symptoms which might endanger the life of the patient. Fabricius also mentions the difficulty which would be experienced in consolidating the wound, which, however, would not prevent the wounded man from recovering his health. In illustration of this, he mentions the case of a blacksmith, his neighbour, who, in 1593, received a blow which caused a considerable fracture at the junction of the sagittal and coronal sutures; it was necessary to remove the fragments of bone, on accomplishing which all the formidable symptoms disappeared, under the care of this skilful practitioner, but a fistulous opening remained till the man's death, nine years after. I do not relate this case, says Fabricius, by way of recommending the application of the trepan upon the sutures; on the contrary, I advise students to abstain from doing so, because of the very dangerous symptoms which may ensue; and when a considerable contusion of the sutures obliges us to trepan, it is better to apply the instrument on each side than to cut the bone over the suture itself. *Præstat ex una atque altera parte suturæ potius quam in ipsa sutura os secare.* Werdenberg, in his reply to Fabricius, remarks on the reasons which the latter had given against applying the trepan on the sutures, and confirms them by the authority of Hippocrates and Fernelius. If he adduces examples of trepanning on these junctures, it is clearly for the sake of discussion, and not because he approves of them. He saw it once practised in Italy, when he was a student in surgery. *Cum enim studiorum causa versarer in Italia vidi a chirurgo quodam operationem perfectam fuisse in suturis.* This observation, says he, seems to favour the doctrine of trepanning on the sutures; but he adds that, on examining the fact attentively, we shall come to a different opinion; that one or two examples cannot authorize this practice, rare cases not affording a rule for art, *nam quæ rara sunt illa non sunt artis.* Werdenberg is, therefore, decidedly opposed to the application of the trepan on the sutures, although his name has been adduced as authorizing an operation which he rejects.

Glandorp, a pupil of Fabricius ab Aquapendente, and of Spigelius, who in 1618, at the age of 23, had attended the schools of Padua, the hospitals of Rome, of Florence, and of Bologna, before returning home to Bremen, says only two

words on the subject we are discussing; but they are sufficient to prove that it was then a received doctrine not to trepan on the sutures, nor even too near them. *Nota non esse utendum trepanis prope ipsas suturas vel in eis, propter exortum membranæ dictæ pericranium.*

The supposed sensibility of the membranes, the greater danger of inflammation, and the fear of hemorrhage, led Cæsar Magatus, the celebrated professor of Ferrara, to abstain from applying the trepan on a suture,[1] even where they were the seat of a considerable fracture, preferring to open the bone on either side. This he did with the knowledge that other surgeons were of a different opinion, amongst whom he places Berengarius Carpensis, whose meaning he had not thoroughly caught; for he attributes to him the establishment of that as a rule, which he had only put forward as an exception, with a full explanation of his reasons, that he might not be misunderstood. "Although James de Carpi assures us we may trepan on the sutures, and that he has performed the operation with success, I do not think, says Cæsar Magatus, that we ought to follow this precept, since this operation is not free from danger; apart from which, may we not attain the same end by trepanning on either side of the suture?[2]

Thomas Fienus, in his work on the principal controverted points of surgery, *De præcipuis Artis Chirurgicæ controversiis*, treats in the first place of the trepan, and of all authors he is the one who speaks most strongly of the danger of performing this operation on the sutures. He considers it would prove fatal, from pain, inflammation, fever, spasm, and convulsions, which formidable accidents the author attributes to the laceration of the arteries, veins, and nerves passing into the sutures. But when these lines of union have become effaced, there may be no greater danger in applying the instrument there than elsewhere, and this no doubt it was which led

[1] "Quibus de causis semper abstinui a manuali operatione in suturis, etiamsi os vehementer esset in illis confractum; sed ab utroque suturæ latere paravi effluxus."

[2] "Et quamvis Jacobus Carpensis asserat aperiri etiam posse ad suturas, et se quandoque os perforasse in illis partibus felici successu; attamen cum id periculo non vacet, et citra periculum, quod ab aperitione in suturus operare possumus ex aperitione hinc inde factâ consequi valeamus, nulla nos necessitas cogere poterit, ut ferro suturas attingamus."—Cæs. Magat. De Rera Vulner. Medicat. lib. ii, cap. xxxix.

Berengarius to say he found no difference between these and other parts of the skull. This, however, would not hold good were we to apply a trepan on a suture, of which the dentations were very distinct; and the operation would be much impeded by the splinters resulting from irregularity of the numerous little tenons or denticles, united, and yet separated, by the interlacement of the pericranium with the dura mater. Fienus has not exaggerated the danger of the consequences resulting from their laceration. I shall relate a practical instance of this, which is strongly impressed on my recollection.

A young recruit, of 17, had a malignant fever in the military hospital at Metz, in 1739, from which he recovered by the help of a purulent deposit occupying all the top of the head. This was opened in a clumsy manner by a crucial incision, extending from end to end, and the seat of the abscess was seen to be in the cellular tissue uniting the aponeurotic extension of the frontal and occipital muscles to the pericranium. The integuments were much thinned, and the surgeon thought fit to cut away the whole of the four flaps. The loss of substance was consequently great, and in the centre of what the doctor called the *wound,* was seen the coronal and sagittal suture covered with pericranium. The cure of this was left to me. After some days the edge of the integuments formed a vermilion ulcer around the bared skullcap; the suppuration was good, which was formed by fleshy granulations springing from the bone. As the cicatrix extended, a concentric circle of granulations formed under the pericranium, which thus became the integument of the top of the head. I daily covered this with dry pledgets. It was highly interesting to watch the daily labours of Nature. The surface of the ulcer kept a constant breadth of three or four lines, the circle diminishing in size from day to day. At the end of three weeks there remained only an oval patch of the size of a crown-piece on the top of the head, not yet covered over. A surgeon-major now advised the dangerous measure of rugining the skull, by way of hastening the cure; and accordingly the pericranium was scraped pitilessly and most effectually, for the extent of two inches around the coronal and sagittal sutures. Several of the denticles were broken off in tearing away the membranous tissue uniting them. Fever attacked the patient a few

hours after this operation; he became insensible and delirious, and died in three or four days. The dura mater, pia mater, and brain were much inflamed under the portion of the skull which had been rugined, especially near the sutures; the bones were ecchymosed, a state of parts which Fienus has noticed amongst the consecutive accidents of applying the trepan on the sutures. Fienus does not trust to those who assure us we may apply the trepan there,[1] and in laying down the rule to trepan on each side of the suture, expressly mentions the adhesions of the dura mater to the pericranium, as often remaining undivided by the fracture of the bone. This fact is well known to the Academy, and the proofs of it are given in M. Quesnay's excellent Memoirs on the 'Use of the trepan in doubtful cases,' and on 'Multiplied applications of the trepan.'

Munnicks gives no opinion on the point; he cites the authorities for and against, but does not decide between them; we may suspect, however, that he leans to the general opinion, since, in favour of trepanning on the sutures, he counts only Cortesius, the commentator on the book of Hippocrates on Wounds of the Head, and Berengarius Carpensis. On the other side he enumerates Hildanus, Magatus, Peter Marchetti, and John de Vigo.

Muys says not a word about the controversy, but seems inclined to the operation condemned by most authors. The ancients, says he, would not allow of trepanning on the sutures, but now some surgeons boldly practise it.[2]

Barbette speaks in a similar way of the practice of Dutch surgeons;[3] but a testimony so vague, though given as the result of experience, cannot be allowed to prevail against the reasoning and facts to be found in both ancient and modern authors.

Juncker seems to have met the difficulty judiciously; he

[1] "Ergo non est iis fidendum, certòque tenendum non debere suturas vulnerari, si ergo in suturis est fractura, trepanum est ponendum utrinque ad latera suturæ, quam proximè ad eam."

[2] "Veteres minime admittere voluerunt ut trepanum poneretur in suturis; sed jam temporis habemus chirurgos qui hoc intrepide faciunt."—Muys, Decad. v, Obs. 1.

[3] "Ipsis in suturis trepanizationem æque tuto se instituisse et extra eas, chirurgi exercitate testantur."—Barbet. Anat. Pract. p. 83; edit. Mangeti.

prohibits the use of the trepan on the sutures, except in cases of necessity, and especially if the dura mater is known to have been detached by the force of the blow or by effusion.[1] Except in these cases, of which he requires that we should have the most positive conviction, he advises the application of the crown of the trepan on each side of the suture. He is the only author who has well understood Berengarius, to whom he refers, as well as to Andrea della Croce, and to Guillemeau: the former of these two, through his numerous pupils, seems to have extended these bold practices more than any other practitioner; he exhorts surgeons to afford succour, even if accompanied with danger, rather than abandon the patient to a certain death. This danger, however, which is to be braved with intrepidity, consists simply in incising the soft parts over the sutures, and in the temporal region; he forbids us in the most express terms to apply the trepan over the sutures, and says that he has very frequently been obliged to apply the trepan on both sides of them. The violence of the symptoms in great depressions, or where the fractures are very extensive, justifies us, however, in his opinion, in trepanning over the sutures, especially when we have indications that the dura mater has been extensively separated from the skull by the force of the blow or by an extravasation.[2]

The doctrine of Guillemeau, in his treatise on Wounds of the Head, savours a little of the lessons of Madame Germain Courtin; we are advised, after Fallopius, to avoid the sutures, and to trepan on each side of them. The same precept is repeated in the treatise on Operations; but at the end the rule is modified as follows: "We are sometimes, however, obliged to trepan in all parts of the head, which Andreas a Cruce, a very famous surgeon, says he often did without danger; and I can assure you in 1591 and 1592 I trepanned and saw trepanned several on the forbidden points, whether on the sutures or at the temples; nevertheless, I counsel the young surgeon

[1] "Præcipue si constet duram matrem propter contusionem vehementem aut materiæ extravasatæ copiam, jam dum secessisse."

[2] "Atsi accidentium magnitudo invalescat, in ingenti depressione aut magnâ fracturâ, etiam super suturas manum admovebemus, præsertim cum indicia adfuerint propria duram meningem a cranio abscedi, vel percussionis robore, vel a copia humoris super eam contenti."—Andr. a Cruce de Vulner. tract. 2, lib. i.

to avoid all he can trepanning on the aforesaid parts." The above furnishes a manifest instance of the manner in which the most important doctrines get changed in passing from one author to another. Why does Guillemeau, or rather the editor of his work, omit to give the reasons on which Andrea della Croce founds his exception to the general rule? How can young practitioners decide on acting from Guillemeau's advice, when he speaks only of success which might justify a practice that he rejects? We want the reasons; he knew them no doubt, and yet omits to give them.

This discussion, which might easily be extended, proves that the doctrine recognised by the Academy on this capital point is founded on reason and experience, and that the general precept, which M. de Garengeot thought to weaken by a single fact drawn from his own experience, ought to be constantly followed, except in particular cases, foreseen and well described by excellent practitioners, such as Berengarius Carpensis, and those who have worthily followed in his footsteps.

We have seen in the above account of the opinions of different authors how inattentively their works are read; their doctrine is often misunderstood, and under their name errors are transmitted in books subsequently published. The truly respectable authority of the real masters of our art greatly suffers by these changes. Better servilely copy them, than place in their mouths, by erroneous extracts, opinions they never held. In order to distinguish between the true and the false, and to attain correct principles, we must go back to the sources of knowledge, rediscuss matters laid aside, distinguish species, appreciate experience, guard ourselves from being dazzled by success, note the favorable circumstances which have led to it, and combat errors which prejudice sustains and unwillingly abandons. We present, with confidence, to those whom neither time nor opportunity permits to make the necessary researches on these points, the result of our academical studies, and the reflections to which they have led us—such was the object proposed in this analytical dissertation.

MEMOIR ON FUNGOUS TUMOURS OF THE DURA MATER.

By M. LOUIS.

The science of diagnosis holds the first rank in medicine, of which it is the most useful and the most difficult part. The discrimination of the true character of each genus and species of disease is the source of the curative indications: without an exact and precise diagnosis, theory is always defective, and practice uncertain. If the difference of opinion which has existed respecting the nature of the tumours that form the object of this memoir, proves that it is difficult to arrive at certainty respecting them, the various cases of this particular disease which are here brought together ought to put an end to this inconvenience, since they will furnish diagnostic signs capable of guarding us from those errors which the most able surgeons were unable to avoid, until our experience was enlightened by a sufficient number of facts. The greater number of observers have mistaken the character of fungous tumours of the dura mater. They suddenly make their appearance beneath the integuments of the head: now this they can do only by first secretly perforating its bony walls, which would be supposed capable of resisting their progress. An apparent want of the ordinary relation between causes and effects, such as we are accustomed to see, has prevented our supposing it possible that the perforation of the skull could be effected by a soft fungous growth produced by the distended vessels of the dura mater. But the hardness of the bony substance, compared with the softness of the tumour, presenting, on the one hand, an apparently very feeble cause, and on the other a seemingly invincible resistance, can only deceive minds which are inattentive to the ordinary actions of nature. Everywhere she exhibits similar phenomena; and, without looking further than the human body, do we not frequently see that the repeated pulsations of an aneurismal tumour springing from the arch of the

aorta perforate the sternum and the ribs, without the coats of the dilated vessel undergoing the least alteration by the bony and cartilaginous parts, whose resistance would seem to expose them to the same destructive thinning which the bones themselves undergo. The symptoms and signs which fungous tumours of the dura mater exhibit, in common with other anormal affections of a different kind, have been too superficially looked at by some practitioners, and hence erroneous judgments have been formed as to the true nature of the disease.

Another cause of the slow progress of our knowledge upon the subject arises from the fact, that even those who have not misunderstood the nature of the case, have contented themselves with the mere consideration of the object immediately under observation. For want of research, each case has been considered as singular, unique, and altogether extraordinary. Our knowledge, always too limited, is almost necessarily in fault when not applied to a sufficient number of facts relating to the same object, seeing that each object requires to be examined with a most scrupulous attention from different points of view. Here, then, is the advantage possessed by a learned Society, occupied with the care of collecting cases, which would be useless if published as isolated facts, and which require to be compared and discussed in all their relations, and being thus duly appreciated, consequences may be deduced from them for the establishment of a judicious theory and a certain practice.

It is difficult to understand how such difference of opinion should have occurred respecting an external disease, which shows itself under an essentially uniform aspect, and with fixed and invariable signs. It would seem that these fungous tumours, placed under the eye of the surgeon, and open to manual examination, could not give rise to doubt: how happens it, then, that experience has hitherto appeared deceptive? It is because sufficient reflection has not been bestowed on the subject. The mind receives all its knowledge through the senses; but if these are not directed by previously acquired knowledge, they become a source of error, and lead us into continual mistakes. We cannot repeat too often, that it is his reason which teaches the surgeon to see and feel; and his judgment, which prevents him from misrepresenting positive facts, which might furnish materials for clear and precise inductions, and from

joining together incoherent ideas into false and dangerous theories: lastly, it is by the aid of the enlightened intelligence that true knowledge and great skill are acquired, and that experimental science attained which is the happy result of the union of study and practice lending each other mutual assistance. In the following observations we shall see the application of all these truths to the improvement of that valuable art, the advancement of which is the great aim of the labours and zeal of the members of this Academy.

Obs. 1. I was requested by the late M. Pibrac to open the skull of a man of 35, who had died of disease, after having been for some time under medical treatment. The man, who was of an excellent constitution, and born of very healthy parents, had met with a fall, towards the end of December 1741, while descending the steps from one of the footpaths of the Pont Neuf; his feet had slipped, and he had fallen directly and heavily on his buttocks, which had alone received all the force of the blow; this was clearly made out. There was, however, another important fact, namely, that he felt stunned at the moment, and was, in consequence, scarcely able to raise himself. The accident was attended with no pain. The man was known to M. Dupouy, a member of the Academy, to whom he mentioned the circumstances attending the fall, but did not ask for advice. The feeling of stunning continued constantly for four months, and after that gradually disappeared.

After having remained free from inconvenience for four months, his barber, in shaving his head, perceived a dull sound under the razor towards the top of the head on the right side, which struck him as curious; it was a sort of crackling, as if dry parchment were stretched under the scalp. He expressed his surprise to M. le Gallois, the patient, who, on feeling his head, perceived the same thing. There was at that time neither elevation nor depression. On the following day a swelling appeared as large as a shilling, a little raised and exhibiting pulsations. The crepitation felt the day before was evidently caused by the pressure of the razor and of the fingers on the surface of the parietal covering the top of the fungus, which had so thinned it as to leave only a flexible lamina of bone.

The tumour caused no pain, but increased rather rapidly in

size, which led the patient to consult several persons. One of these thought it was an aneurism, and recommended a compressory bandage. This M. le Gallois could not bear. The tumour was readily kept by it at the level of the parietal bone, but the necessary pressure brought on such giddiness as to alarm the patient; the bandage was therefore left off. The tumour increased in size, as did the opening in the bone; several physicians and surgeons were called together in consultation. The notion of an aneurism was entertained by only one of them; several thought it was a cerebral hernia, whilst the greater number suspended their judgment, and would not give an opinion respecting a disease which they considered as altogether extraordinary. M. le Gallois was free from suspicion of any venereal taint; but in his youth, when about 18, he had shown some scorbutic appearances. Acting on this indication, antiscorbutics were administered.

Their employment was hurtful to the constitution: they excited the blood, and, far from arresting the progress of the tumour, it was considered to have gone on more rapidly during their use; it attained the size of half a turkey's egg, and became painful, with this peculiarity however, that slight pressure caused the pain to cease. The insensibility, which was the immediate result of this compression, rendered it intolerable, and the patient preferred the pain to the means which relieved him from it. This phenomenon does not appear to me very difficult of explanation; the painful sensation was not a morbid characteristic of the tumour, but was caused by its being constantly irritated by pressure against the irregular points of bone surrounding the opening in the parietal, from which slight pressure relieved it. At length M. le Gallois, having committed himself to quacks during the last four or five months of his life, and being worn out, less perhaps by their inefficient remedies than by the fear of the bad consequences of his complaint, gradually lost strength, and died on the 17th of April, 1763.

In order to effect a thorough examination of the disease, and to avoid injuring the parts with the scalpel, I made a circular incision through the integuments down to the skullcap, sawed through the bone, and removed it along with the integuments and dura mater, thus keeping them all in the connexion

they had with the tumour, both internally and externally. The tumour arose from the convex surface of the dura mater; it was as large as a fist, very regularly circumscribed, and the portion below the bone was somewhat smaller than that outside it; its base was broader than the summit. That part which was beneath the skull, and which pressed in the dura mater, was lodged in a depression formed in the corresponding portion of the brain. The internal surface of the dura mater was in this part somewhat thicker than elsewhere, and its vessels had acquired a varicose appearance.

The tumour had no attachment to the skull, the opening in which had a carious appearance, and was not ulcerated. This perforation was irregular in form; on the external surface of the parietal, around the opening, there were bony elevations, evidently produced by the pressure of the tumour from within outwards. Between the two anterior angles of the parietal, near the coronal suture, an irregular bony mass was seen, as large as a goose quill, and about ten lines in length, rising almost perpendicularly from a base somewhat larger than its body. The internal table of the parietal was unequally worn around the perforation, and to an extent proportioned to the base of the tumour, which the constant pulsation of the brain tended to push entirely out of the skull, through the opening of the bony parietes covering it. Both without and within, for a certain distance, numerous inequalities were visible, extending to the surface of the neighbouring bones, and showing the efforts of nature going on beyond the perforation. The fungous substance of the dura mater was covered with a membrane exactly circumscribing it; in consistence it resembled that of ordinary sarcomas, and exhibited neither induration nor fluctuation in any point. The blood which escaped from an incision into it was black, such as the veins of these tumours generally furnish.

The above description appears to leave no doubt as to the nature of the disease, and completely exhibits its true character. But, before entering on a discussion respecting its causes, and the treatment to be employed in a similar case, it is important to continue our examination of the facts, and to ascertain what information has been acquired by experience, and what errors have prevailed respecting the matter.

Those who considered it aneurismal, on account of a symptom which is neither essential to that form of tumour, nor exclusively appertains to it, namely, pulsation, must have shut their eyes against the light to be derived from the principles of art and the perusal of good authors. No one could overlook the perforation in the skull through which the fungus escaped. The dura mater has no vessel capable of being dilated to the size of this tumour. Should not the sense of touch too have sufficed to distinguish a sarcomatous tumour from one formed by an unnatural dilatation of an artery? The pulsation of a true aneurism is in the tumour itself: it is the tunics of the artery which pulsate by their vital action, and by the passage of the blood into the cavity of the vessel; but in fungus of the dura mater, the tumour itself does not beat, its entire mass exhibits impulses, communicated by the pulsation of the arteries of the brain at its base. This natural explanation affords a solution of the contradictory assertion of M. Veillard, who, in describing the case in a paper inserted in the 'Journal de Médecine,' says, "Some of those in consultation thought they had discovered pulsations in the tumour; they must have been very obscure, for I could perceive none."

Proper pathological knowledge, assisted by the light of experience, will guard us against confounding an aneurismal tumour with a fungus of the dura mater, because of the pulsations which each exhibits, since these have distinctive characters. It may be said, as an excuse for this mistake, that Ambrose Paré has described a disease of the kind, which he took to be an aneurism; but it is this very acknowledgment of his error which renders it inexcusable in another to commit the same mistake. Ambrose Paré, in a chapter on the antecedent causes of gangrene,[1] attributes to a poisonous matter, the quality of which cannot be described, the caries and corruption of bones which have been found rotten, corroded, perforated, and wormeaten, often with extensive loss of substance, where the skin and soft parts covering them are healthy and uncorrupted. "The following history will bear me out," says Ambrose Paré, in his quaint language, which shows at once his own modesty and his love both of his

[1] XII Livre des Contusions, Combustions, et Gangrènes, chap. xxiii.

art and of his fellow-creatures to whom he generously sacrifices his own self-love.

Obs. 2, by Ambrose Paré. "A very remarkable and curious history was that of a receiver of the Constable's lady, living at the town of Senlis, and named Dufresnoy, who sent to beg me to see him, because he had a tumour as big as an egg on his head, between the occipital and parietal bones, and wanted to know if it ought to be opened, as he thought there was matter in it. I found two physicians and two surgeons there, who lived at Senlis, honorable men, and well informed. Having considered the tumour, and heard that it had been gradually coming for a long time, and after having felt and remarked pulsation (which was the movement of the brain), thinking that it was an artery, because when I pressed my hand on it the tumour subsided and became smaller, truly I was of opinion that it was an aneurism, and so I said we must take great care not to open this tumour, for fear of hemorrhage and sudden death. But one of the physicians and one of the surgeons maintained there was no danger in opening it, as they thought there was only matter; there being thus a division of opinion, I advised that we should send for M. Fabry, physician in ordinary to the king and to the Constable's lady, to advise whether it should be opened or not, who quickly declared his opinion that there was pus in it, and that we might evacuate it without danger; nevertheless, when I told him that I was of opinion that it was an aneurism, by the signs which appeared, he changed his mind, and concluded that it ought not to be touched, and that we ought to dress the tumour like an aneurism, which was always my advice. The matter being so settled, I came to Paris, but, three days after, the said receiver sent to a barber living near Senlis, who, as soon as he arrived and had seen his patient, said there was pus contained in the tumour, and that there was no danger in opening it, which he did, but instead of pus the proper substance of the brain came out, and two days after the said receiver died. After his death his head was opened by two surgeons of Senlis, who informed me that the tumour was formed by the proper substance of the brain, with loss of the two tables of the skull to the extent of a rose noble. I was

desirous to relate this history, in order to warn young surgeons not to open the head in similar cases."

Paré was not present at the anatomical examination, and it is only on the report of the two surgeons of Senlis that he states the tumour to have been formed by the proper substance of the brain. This is no doubt an error; for the brain, inclosed by the dura mater and the skull, cannot overcome the resistance offered by those two parts. To produce a hernia of the brain, it is necessary that the bone should have first been destroyed by some cause, and that there should also be an opening through the dura mater. Experience has proved on numberless occasions that, in wounds of the head accompanied by extensive loss of the bony covering, no protrusion of the brain has taken place as long as the dura mater has inclosed this viscus, and even when an incision, or laceration has been made through the membrane, the expansion of the brain has been effected only in consequence of a peculiar alteration of its proper substance following the injury. M. de la Peyronie has enriched our art with very interesting observations and experiments on this turgescence of the brain, which was erroneously supposed to be a mere displacement of the part.[1]

In the case at Senlis the skull was perforated by the tumour which Paré objected to open. He learned that it was not aneurismal, as he had at first supposed. It was formed by a soft substance, which the other consultants mistook for fluctuation, and determined to open. The pulsation deceived Paré; this, however, really existed, only the great surgeon did not make out its true character. The error of those who thought the tumour contained pus, and that it should be evacuated, was less pardonable. This notion was absolutely false, and the operation which they wished to perform caused the death of the patient.

This history gives us no insight into the cause of a disease, which Paré, notwithstanding his great experience, considered as a fact worthy of admiration. He merely says that it was coming little by little for a long time, and nothing is said about any accident which might have caused it.

[1] See M. Quesnay's Memoir on Wounds of the Brain, in the present volume.

The treatise on Diseases of the Bones by Petit, one of the most illustrious of our fellow-academicians, contains some cases of tumours with pulsation on the surface of the brain, and caries of the bone, which are manifestly of the nature of those we are now considering. Several practitioners, in like manner, supposed them to be aneurisms.[1] M. Petit refutes this opinion, and establishes the distinctive signs between aneurisms and these fungous tumours, among which is the judicious remark, that the pulsation in the latter is only communicated to them by the brain.

Obs. 3, by the late M. Petit. The practical remarks with which M. Petit concludes the article respecting the causes of caries in the work quoted, are made on the subject of a fungous tumour of the dura mater, with destruction of the os unguis, the ethmoid, and the os planum. This case occurred in 1703. M. Mareschal was then practising surgery in Paris, with a distinction which that very year led to his being chosen to succeed Felix as first surgeon to Louis XIV. He attacked the tumour at the inner angle of the eye with a portion of caustic potash. The patient died some days after in a state of coma. At the opening of the skull, M. Petit observed the fungous state of the dura mater, but, having adopted a notion respecting the metamorphosis of bones into flesh, he employs the case to prove that bones will become carnified.

Obs. 4, by M. Engerran. It was with the same notion that M. Engerran drew up a case, which he read to the Academy on the 14th October, 1741. It is entered in our registers under the title of 'Carnification of a Portion of the Parietal and Fungus of the Dura Mater.' We have no other account of it.

Obs. 5. In the same registers we find that, on the 22d of February, 1733, M. Fevrier exhibited the skull of a man who had died a few days before with a tumour of the occiput, the skull perforated, and a fungus of the dura mater.

The presentation of this specimen to the Academy reminded the late M. Sivert of a case he had seen, when a pupil at the

[1] Maladies des Os, tom. ii, chap. xxvi, Sect. Des Causes des Exostoses et des Caries.

Hôtel-Dieu, at Paris, and of which he had notes made thirty-six years before.

Obs. 6. On the 29th of March, 1697, a man of 40, came to the Hôtel-Dieu with a large tumour, occupying almost all the left parietal region: it was three inches high, of pretty firm consistence, and pulsating. It was supposed to have originated in a very violent pain in the head, which the patient had suffered for more than a year, and which had rendered him blind for the last six months, and caused deafness of the left ear. M. Sivert, to whose care the patient was confided, asked the advice of Joseph Petit, chief surgeon to the hospital, and a celebrated practitioner in his day, who, after a careful examination, decided that it ought not to be opened, that the bones were carious, and that in making an incision into it there would be risk of causing a hemorrhage, which there might be no means of checking; perhaps he thought the tumour aneurismal, but this is not stated. However this may be, the patient was bled and purged, for the purpose of calming the pains in the head; they, however, appeared to increase considerably under this treatment. The man, in despair at having no ease night or day, insisted that they should operate on him, or at any rate lay open the tumour with a knife, and, in order to satisfy him, it was decided to comply with his wish. The point of the tumour was cut into with a bistoury; only arterial blood issued from it, and continued to do so, notwithstanding the bandages and manual pressure, until the patient died two days after.

On opening the skull, the left parietal bone was found entirely eaten away; a fungus, adhering to the dura mater, protruded through the opening, and was penetrated in all parts by bony points entering into its substance. There were two other fleshy eminences on the dura mater, one under the coronal, the other under the occipital bones, before and behind the perforation through the parietal; they compressed the brain, which, in other respects, was in a healthy state. The falx had become much thickened.

It appears highly probable that in the above case the effect was taken for the cause, and that the violent pains in the head, of which the patient had complained for a twelvemonth,

were occasioned by the tumour, the inequalities of which produced irritation. In none of these cases is any cause mentioned to which the disease could fairly be attributed.

In the following case, communicated to the Academy, in July 1755, by M. Robin, then a student of surgery at Paris, and since established at Rheims, were he enjoys a well-merited reputation, this circumstance is not overlooked.

Obs. 7. A woman, of good constitution, fell, when 18 years old, from the top of some cellar steps to the bottom. She immediately became insensible, and did not recover for an hour, when she was astonished to find herself in bed, having no recollection of her fall. A contusion at the back part of the parietal bone did not appear of sufficient consequence to induce her to apply to a medical man. During 1712, after the accident, she had occasional attacks of vomiting.

From the period of her fall up to 1741, that is, for twenty-nine years, she was subject to violent headaches, which were more frequent and more severe in summer. In 1741, while passing behind a loaded waggon, which was swaying to and fro, she received a blow on the head precisely in the spot where the contusion had been in 1712; she remained in a state of fainting for full an hour, and it appeared that a slight depression had been made in the bone. Some bleedings from the feet afforded relief to the headaches, which returned with great violence from time to time, and were thus temporarily alleviated.

About a year after, on Palm Sunday, 1742, there appeared suddenly, in the place which had been struck, a tumour as large as a small hen's egg; the patient was attending divine service at the time; she returned home, and became very ill; bilious vomitings came on, and constant hiccup, the pulse became small and contracted, and the extremities cold: all announced imminent danger. The surgeon who ordinarily attended her considered it desirable that the tumour should be immediately opened, which had formed on the site where the pains had been always felt, but did not choose to proceed to this step, in so severe, so sudden, and so extraordinary a case, without a consultation. M. Mugeux, a celebrated surgeon at Rheims, and one of the surgeons to the hospital, was called in, and did not approve of such a measure; he felt a soft

It is impossible to mistake in this case the efficient cause of this disease. It originated in the fall, and when we reflect attentively on the structure of these parts, and examine the different relations existing between the dura mater and the skull, we shall be astonished that this accident does not occur more frequently. Although the ordinary description of the bones of the skull, as being composed of two tables separated by a spongy and cellular diploë, is true, we know, that in many parts, the two tables appear united without the interposition of the third part; and that, where this is wanting, the bone is transparent. There is scarcely any skull in which we do not find in the internal table depressions two or three lines in width, which dip into the diploë, and often penetrate to the external table. The accurate Winslow has observed this, and has not forgotten, in treating of the attachments of the dura mater, to remark, that it often adheres to the skull by a number of filaments from its external convex part, that it fills the depressions and perforations, and that these filaments are generally small vessels.

May we not readily perceive in this structure, how easily an internal congestion may take place, in consequence of a slight blow, not of sufficient importance immediately to give rise to any severe symptoms? The headaches which have followed blows neglected, because thought to be of little consequence, probably originated in this cause. The successive decrease of these pains has been effected by the gradual diminution, and their cessation by the tardy disappearance of this congestion; the best remedy for which, when circumstances will permit it, is repeated bleeding. Its increase, as we have seen by the interesting cases just related, will be likely to cause disorders that might have been easily remedied at first. Here we find a new indication for the operation of the trepan, the use of which is not limited to those cases in which the necessity for employing it arises from depressions, fractures, caries, or effusions giving rise to consecutive symptoms. The practice of surgery will be improved, and humanity benefited, by the knowledge of cases throwing light on diseases to which it is certain that hitherto sufficient attention has not been paid.

Fungous tumours of the dura mater may also arise from an internal cause; we have cases which appear to prove this,

if an accidental complication have not been mistaken for a symptom of the disease. It is to the venereal disease especially that this kind of growth has been attributed; this poison, in general, attacks the proper substance of the bones; venereal caries is destructive of fungosities, and if these occasionally arise from local peculiarities, they are merely exuberant growths, such as we see in numerous ulcers. But in the disease which we describe, the primitive taint is in a soft part, it is a sarcomatous vegetation, the formation of which precedes the destruction of the bone, this being a consecutive result due only to the compression of its substance caused by the fungous tumour. Predispositions to congestion may, however, fix the venereal virus in the vessels of the dura mater, where they are united in a bundle in the natural depressions in the internal table of the skull, and thus give rise to a symptomatic vegetation.

Obs. 8. The Royal Academy of Surgery was only just established, when M. Ray, assistant-surgeon-in-chief to the Royal Military Hospital of Strasbourg, hastened to take an active part in its proceedings, by forwarding several cases, which were read on the 29th of January, 1732. A soldier, of the regiment of Picardy, had come into the hospital for a pain in the hip, accompanied with fever. General treatment removed the fever, but the pain in the hip continued, and a swelling supervened, which the ordinary treatment by anodyne and discutient cataplasms, continued for two months, could not dissipate. The patient, before entering the hospital, had a tumour like a little wen, at the lower part of the right side of the frontal bone, a little above the frontal sinus, which enlarged without causing any headache. Emollient and discutient remedies were applied for a long time without any success; it attained such a size as prevented the upper lid from being raised, and thus deprived the patient of the use of the right eye. M. le Maire, surgeon-major to the hospital, who enjoyed a reputation for skill and sound judgment, proposed to the patient to open the tumour, and he consented. A crucial incision showed that it was caused by an isolated mass of whitish fungous flesh, around which the finger readily passed, and could be introduced into the cavity of the skull without meeting with any resistance down to the dura mater,

the pulsations of which were distinctly felt. Immediately after this operation the patient fell into a state of profound coma, from which he never recovered, but died on the sixth day.

At the examination of the body, which was undertaken by M. Ray, in the presence of M. le Maire and of M. Maugeu, chief physician to the hospitals in Alsace, the lower part of the frontal bone was found destroyed over a space somewhat greater than could have been covered by two six-livre pieces. The fungus which passed through this opening had its roots in the dura mater, which was pressed inwards by the volume of the tumour within, and formed a considerable depression in the right anterior lobe of the brain. We observed a similar state of parts in M. le Gallois, the subject of the first case.

This case would be imperfect, were we to pass in silence over the examination of the swelling in the thigh. "I found," says M. Ray, "the femur carnified from its middle part up to the head, which was retained in the cotyloid cavity by the dried round ligament; this altered part was nothing but a fleshy mass." The author regrets possessing no details respecting the life led by the patient, nor his former illnesses. MM. Malaval and Le Dran, who were appointed by the Academy to examine the cases of M. Ray, state in their Report, which was inserted in our Registry for the 12th of February, 1732, that they think the soldier in question had had the pox, and that if this cause had been known in time, the consequences which led to the death of the patient might have been prevented by proper treatment.

The following observation communicated by M. le Grand, associate of the Academy at Brussels, leaves no doubt as to the disease of the humours in the person whose local malady he describes.

Obs. 9. A man, who held a post at the court of Brussels, was cured, in 1758, of several venereal chancres by too slight a treatment, seeing that the internal taint was not combated by the regular administration of the specific. He perceived, some time after, a flat indolent tumour on the sagittal suture; it was carelessly examined, and taken for a wen. This tumour made slow progress. At the end of May 1762, it filled the

patient's nightcap; in its progressive increase it had caused neither pain nor redness of the integuments, nor any severe symptoms; the base of the tumour was more than twelve inches round. M. le Grand thought there would be danger in meddling with this tumour, the character of which was less known than the cause which had produced it, but the desire to get rid of an unnatural mass, which prevented the man from putting on his wig, and attending to his business out of doors, prevailed. Contrary to the advice, and in the absence of M. le Grand, a caustic was applied to the tumour; some days after convulsions took place, and the patient died on the eighth day. The tumour was found to be formed by a fungous substance, and the parietal bones were destroyed at their upper part for two thirds of their extent.

The following case affords an example of a similar disease which was not mistaken, and of which the cause was not venereal.

Obs. 10. A woman, of 50, of lymphatic temperament, had been subject for twenty years to mild epileptic fits, originating as was supposed in a very severe fright. In the month of March 1759, during the fits of severe cough, with which she was troubled, she felt a sharp pain under the upper part of the occipital bone, which frequently caused her to place her hand on the spot for the purpose of relieving it. Proper pectoral medicines cured her catarrh, and it was observed, that during the continuance of that disease she had no attack of epilepsy. The patient, however, was attacked with it on the 13th of April following, whilst seated in a chair. She fell back, and her head struck the tiled floor rather heavily, precisely in the spot where the cough had caused pain, and from that moment she felt constant pain there. Six weeks after she perceived a small tumour of the size of a filbert at that part, and consulted M. Nazaret, a surgeon of Versailles, respecting the wen which she thought was growing on her head.

This surgeon, on examining the tumour, recognised all its characters; he perceived a pulsative movement, synchronous with the pulse, and observed that the tumour was bounded by a nearly circular opening in the occipital bone; he pronounced it to be a hernia of the brain, principally because, on pressing his fingers on it, it passed into the skull, and reappeared

externally on ceasing from the compression : the pulsations were equally perceptible to the eye and to the hand. The case appeared of sufficient importance to require a consultation before anything was undertaken. M. Marrigues, deputy of the king's chief surgeon, was summoned and saw the patient, with his brother, a master in surgery at Montfort l'Amaury, who happened to be at Versailles. These gentlemen confirmed the remarks of M. Nazaret ; the tumour was pushed back beyond the bony circle, when fainting came on, which lasted as long as the tumour was compressed to this extent ; when slighter pressure was made, and the whole tumour was not pressed back into the skull, this symptom did not ensue. As often as the pressure was repeated fainting supervened, beginning with dimness of sight, noises in the ears, and feebleness in all the limbs ; the pulse became small and obscure, and the arterial pulsations almost imperceptible. It was observed that the patient suffered nothing during these trials ; on the contrary, that the pains usually felt in the situation of the tumour ceased as soon as it was removed from the internal part of the perforation.

M. Marrigues did not agree in the opinion that it was hernia of the brain, as he could not conceive how a blow received should have caused caries of the bone, without any swelling or tumefaction of the part, the integuments never having differed in appearance from those of other parts of the head. The bone was, however, destroyed, and the pulsation felt in the tumour left some room for doubt, but M. Marrigues did not think that a portion of the brain, naturally soft, could acquire such marked resistance and such firm consistence as the tumour. Moreover, the phenomena which ensued on its reduction within the skull appeared to him to prove that the brain was then compressed by some foreign body.

Whatever was the nature of the tumour, the patient felt herself sensibly relieved of the pains in her head when slight compression was made, and when not carried beyond a certain point it did not interfere with the functions of the brain as strong pressure did ; it was therefore decided in consultation to employ a compressive bandage, which should resist the pressure outwards. In this way the swelling ceased to be exposed to the impressions of the bony irregularities around

it, to which, as it seemed, the continual pains might be justly referred.

The patient soon became tired of wearing a bandage; the pains returned, frequent attacks of cardialgia came on, and she was observed to lose her memory. M. Marrigues was called again on the 3d of July, when the size of the tumour was increased by nearly one third. The state of the patient became very distressing; full daylight or the sight of a luminous body excited inexpressible pains. A new consultation led all present to pronounce the tumour to be of a fungous or scirrhous nature, and that its base was within the skull; they considered that the only means of saving the life of the patient in her present state, was to make a crucial incision in the integuments, to apply the trepan several times around the opening through the skull, for the purpose of increasing its size, and allowing room to attack the tumour in any way that circumstances might appear to indicate. The patient would not agree to this plan of treatment.

Some days after this consultation, she complained of great pain in the right arm, followed by a difficulty of moving it; the lower extremities, some time after, became painful, then paralytic; remedies were ordered according to the circumstances. The violence of the headaches led to the employment of bleeding from the feet, soothing medicines, &c. At the beginning of October, the family intrusted the patient to the care of a physician, who hoped to be of service to her; he had the swelling fomented with a decoction of the flowers of the lime tree and saffron, sharpened with muriatic acid, and applied to the soles of the feet plasters of mucilage, a blistering plaster below the knees, and administered by the nostrils Bonferme's cephalic elixir, much in repute at Versailles against blows of the head. We may well suppose that these remedies were of no sort of use for such a local disease as we are describing. Antiscorbutics were used with as little success; betony leaves boiled in strong wine, and applied, appeared to afford a little relief; fever, however, came on, and the patient died on the 23d of October.

The body was opened on the following day, in the presence of several physicians and surgeons. The integuments and pericranium were sound, and had no attachment to the tumour,

which was of a fungous nature, and seemed to arise in the substance of the dura mater. Its base was broader than the portion which projected beyond the skull; this part was strangulated by the margin of the opening through the bone. The impressions left by the tumour were about nine inches in circumference, the perforation was irregular: examined externally, it was only an inch and a half wide in its smallest diameter, and scarcely two in its largest. This skull did not exhibit the elevated points and projections which the swelling of the spongy portion of the bone had produced in the skull of M. Gallois, the subject of our first case. This difference arose from the difference in the texture of the skull in the two persons; that of M. Gallois was very thick, and had a good deal of diploë, while the skull of the woman from Versailles was very thin and transparent, there being only two tables, with here and there a little spongy matter intervening, and the diploë had so little thickness, that it only served to diminish, not entirely to destroy, the transparency of the bone. This structure did not allow of the formation of bony vegetations, but along the sagittal suture, internally, there existed a broad rough line, marking the course of the superior longitudinal sinus, showing that the vessels which united the dura mater to the skull had begun to be affected by disease.

The part of the tumour projecting internally was lodged in the left hemisphere of the brain; and M. Marrigues observed, that it would have been easy during life to have detached it from the dura mater, after the opening through the skull had been widened by a few applications of the trepan, so as to lay bare the base of the tumour. On examining the concave surface of the skull, the internal table was found bevilled away, and resembling a very extended squamous suture; in all probability, therefore, the lenticular knife might have been employed to increase the circumference of the opening without the necessity for the trepan.

Of all the cases we have collected, the above is one of the most interesting, and is undoubtedly the most creditable to the narrator. M. Marrigues clearly made out the nature of the tumour, and perceived the curative indications it presented, supposing it to have been curable; for the bad success attending the operations undertaken under a mistake as to the nature of the affection, must be taken into consideration in

establishing the prognostic of the disease, and should render us careful in employing means, the consequences of which are very doubtful, especially when the disease has made a certain progress. We will relate two cases in point, which may be very well classed with those handed down to us by Ambrose Paré. The first is to be found in a dissertation by M. Kaufman, published at Helmstadt in 1743.[1]

Obs. 10. The celebrated Heister was consulted by a Prussian soldier, about 34 years of age, of a very vigorous constitution, and who, it is said, had equally distinguished himself in the wars of Mars and Venus. He had on the top of his head a circumscribed swelling, which at first had appeared of small size, and had gradually grown to the size of the fist. The patient only felt a dull pain in it, but the fear of future mischief determined him to get rid of it. Heister, who found it hard, and almost immoveable, much like several others he had extirpated, considered that, as the means employed by various physicians and surgeons of the army had proved useless, there was nothing for it but an operation, and proceeded to perforate the integument with caustic, which he was accustomed to use for opening all sorts of tumours. At the end of three hours hemorrhage occurred, which was readily checked by the application of lint dipped in spirits of wine; the same evening the patient had a rigor, followed after some hours by fever and copious sweating. This was attributed to his imprudence in standing for a couple of hours in the cold air of a court. On the following day, on removing the dressing, an inflammatory swelling was seen at the fore part of the left side, extending to the eyelid; the patient was delirious, constantly restless, and had lost all his strength. On the day after he was found with the eyes closed and the lips livid; there was great difficulty in keeping him in a position to apply the dressings; convulsions of the lower extremities then came on, and the patient died about mid-day. The detail of the circumstances observed at the opening of the body would be superfluous here; suffice it to say, there was a fungous tumour of the dura mater, which had destroyed the parietal bone; the en-

[1] De Tumore Capitis Fungose. See M. Haller's Collection of Theses in Surgery, tom. i, p. 47.

gravings represent a tumour under the integuments, and the perforation of the skull, which prove it to be the same disease as that which forms the subject of this Memoir.

Although it is said that M. Heister examined this case with particular attention, it is clear that he confounded this tumour with others in which an operation had been useful. His judgment was not in accordance with the information afforded by the touch. He found the tumour harder, and less moveable than those which are absolutely external. "*Tumor perquam durus ac immobilis fere erat.*" Such are not the signs presented by tumours operated on successfully. These are commonly encysted, and have not the firmness here denoted; and the readiness with which they move under the skin in every direction is a characteristic sign, which Marcus Aurelius has described with great precision.[1] M. Heister mistook this sign, and the author of the dissertation, who feels it to have been a great honour to have been educated by so eminent a man, leaves us a most striking evidence of this inattention.[2] Again, how was it that M. Heister did not recognise the pulsation of the fungus, and the bony circle around the base of the protruded part? All the observations of this kind throw light on one another, and by comparing them we readily discover the amount of attention employed in examining the various cases, and the extent of knowledge displayed in the judgment formed respecting them.

Obs. 11. An infant, of two years, returned from nurse in good spirits, and complaining of no headache. Soon after, it was attacked with continued fever, from which it recovered. At the end of a month, the mother, whilst combing its head, observed a little swelling above, and rather further back than the right ear; it increased gradually and in five months acquired the size of a hen's egg, without heat and without pain. The late M. Coutavoz, surgeon-in-chief to the General Hospital, was called in, and took with him M. Chopart, then his pupil.

[1] "Abscessus cum tunicâ, qui manibus attrectati, permotique, sese exhibent circumfluos, id est, quoquo versum sub cute mobiles."—De Abscess. Anomal. cap. xxv.

[2] "Tactu exploratus durus atque immobilis deprehendatur, et tumoris cystici vel peculiaris abscessûs, qui haud raro et in capite observantur, faciem præ se ferebat, quales sæpius optato cum successu illustris Heisterus extirpaverat."—Haller. Disput. Chir. Select., tom. i, Dissert. citat. § xii, p. 62.

The master thought fit to make an incision in the centre of the tumour, this was on the 24th of April, 1766, only a little dark blood escaped, and the wound was dressed. M. Chopart, who saw it in the evening, found it very quiet; it had not complained of pain; the dressing was soaked with a fetid reddish sanies; the child died the next morning at five o'clock.

This unfortunate termination of the case, occcurring so suddenly, and without any warning symptoms, demanded a serious examination of its cause, and this M. Coutavoz intrusted to his pupil. M. Chopart found a fungous tumour of the dura mater, which had destroyed a portion of the parietal and temporal bones; the loss of bone had taken place in the same way as has been remarked in the foregoing cases. Internally, the tumour had formed a depression in the brain, corresponding to its bulk. If such slight operations, and apparently of so little importance, as those we have mentioned hitherto have proved fatal, could we hope for success in undertaking such as would be required under a full knowledge of the cause? In the Senlis case, the operator thought he was opening an abscess, and the simple incision of the tumour caused death in two days. A still smaller opening led to an equally speedy death, in the case related by M. Sivert. The persons whose cases are given by MM. Ray and Le Grand met with the same fate as did this infant and the Prussian soldier, to whose tumour Heister applied a mild caustic. Is art then without resource in similar cases? Operations are not to be looked to, which prove so constantly fatal; they should at least afford relief, or hold out some hope of benefit. In these fatal cases, the operation was, no doubt, undertaken without any fixed principles, and merely at hazard, but in other cases, the progress of the disease is such, that even the best devised plans meet with no success.

Obs. 12. Emanuel Kœnig, professor of medicine at Basle, inserted in the 'Ephemerides Naturæ curiosorum,' Decad. 11, Ann. 1, No. 167, a case to which Bonet has given a place in his 'Medicina Septentrionalis.' It is that of a peasant, aged 40, who had a pustule covered with a crust over the left temporal muscle, which she scratched with her nails; this pustule made progress under the appearance of cancer, and extended to the eye. It was extirpated, and the skull was found carious. Two surgeons, for the purpose of curing the disease

of the bone, in vain applied the actual and potential cautery; the perforation through the skull increased, and the dura mater was laid bare, and was seen pulsating. In the centre of the exposed membrane there was a white spot, which they endeavoured to destroy with calcined alum; through the opening a tumour protruded, as large as a middling-sized apple, which was thought to be the brain. The surgeons removed portions of bone round the tumour, which was considered carcinomatous. The patient was put on milk diet, and preparations of lead were used as external applications, as also absorbent powders, and a fomentation made with decoction of scordium, absinthium, and other analogous plants. Success appeared to attend these measures; in a few days the bared bone became covered with fleshy granulations, and the suppuration was healthy; hitherto the patient's mind had not been at all affected, but she was now guilty of some extravagances, became afterwards comatose, and died apoplectic. The substance of the brain was found much changed opposite the opening in the skull, and a good deal of greenish pus was collected on the cerebellum and medulla oblongata, near the occipital foramen.

The above is an example of a disease which does not appear to have been well observed; it, however, shows the efficacy of the measures employed for removing the circumference of the perforation. The surgeons took away numerous splinters. As regards the fungus, they contented themselves with cautiously watching it, as they supposed it to be a portion of brain. Would extirpation of it have prevented the internal suppuration and the abscess, far removed from the external seat of disease? The disease of the brain killed the patient—would death have been hastened by meddling with the tumour?

Obs. 13. Saltzmann relates a case in the 'Memoirs of the Royal Academy of St. Petersburg',[1] where, in consequence of a blow on the head, there came on a swelling over the frontal and left parietal bone, which raised the integuments to the size of a hen's egg. It caused violent pains, and an incision was therefore made in it, from which, as it is said, very little pus flowed. A portion of the tumour was removed, and whilst efforts were being made to cause the rest to suppurate away,

[1] Tom. iii, p. 275.

which seemed likely to be successful, there came on, on the eleventh day, bilious vomiting and delirium, which ended in the patient's death. On examining the parts, they discovered for the first time that there was an opening in the skull large enough to allow an egg to pass through; the internal table was more extensively destroyed than the outer. The dura mater was callous, and from it sprung a fungous excrescence, which extended through the opening in the skull, of which it filled all the irregularities.

Here is another case then in which the disease was misunderstood. Resection of the external swelling could not fulfil any curative indication, and only proved fatal to the patient. It is worth observing, that the formation of the tumour was attributed to an external cause, and that if the patient had been properly treated in the first place, it would probably have yielded to remedial measures, judiciously and perseveringly employed. Wepfer, the eminent physician at Schaffhausen, says, that in examining the bodies of persons who had suffered from pains in the head for several years in a fixed point, he had found under the skull tumours, bony and stony concretions, pus, and extravasated blood. The operation of the trepan, performed in time, might then prove very useful in such cases. He relates, in illustration of this, the case of a peasant of Doggenburg, who, wearied by a continual and very violent pain, insisted on a farrier performing on him the same operation he was in the habit of employing for horses with the staggers; namely, trepanning them. The farrier, for want of any other instrument, used a carpenter's wimble, and bored the peasant's skull. The opening set free a pretty large quantity of serum, and a cure happily followed this somewhat clumsy operation.[1]

M. Gallois, the subject of our first case, suffered for four months pains in the spot where the tumour showed itself only after the expiration of eight months from his fall. We must suppose they were caused by some internal disorder; "*causæ domesticæ intra cranium eique stabili*," according to Wepfer's expression.

The Academy received from Namur, in January 1757, an

[1] J. J. Wepferi, Observ. Medico. Practic. De Affect. Capitis, Obs. 48, p. 119.

observation which has some analogy with that of Emanuel Kœnig, cited above (Case 12); from which the same conclusions may be drawn as those we have deduced from the facts just related.

Obs. 14. A man, of 50, of a dry and cold complexion, formerly in the army, felt a severe fixed pain in the occipital region. Some time after a tumour appeared there. The surgeons to whom he showed it were divided in opinion as to the cause, but not as to the nature of the disease, it was considered to be an exostosis; but while some thought it a local affection resulting from a blow with a cane, which the man had received in the spot, others attributed it to venereal affection. The patient declared he had been guilty of no indiscretion; and the good health of his wife and of his four children lent support to his assertion; notwithstanding this the surgeons leaned to the opinion that it was venereal; the patient submitted to undergo the "*great course*" of mercury, was abundantly salivated, but derived no benefit from it.

The plasters of several quacks, employed successively for a year, under a promise of cure, did not check the growth of the tumour. M. Volprecht, surgeon-in-chief to the regiment Waldeck, then in garrison at Namur, describes it as follows. "It was round, three inches in diameter, raised in a point, not so hard as a bone or a scirrhus, and more resisting to the finger than a hernia cerebri, or than any tumour containing fluid." Is not the above the description of a fungus? The patient complained of a great weight in the head, was habitually drowsy, and sometimes waked with a start, in consequence, says M. Volprecht, of his feeling a very sharp pain, not exactly in the tumour, but at the base of the skull, especially about the ethmoid bone, near the crista galli. The man became deaf, and stupified as it were; he began to lose his sight; he had become very thin, and suffered under an almost entire abolition of his faculties.

In this apparently desperate condition, some surgeons had the hardihood to try to relieve him. The tumour was seated at the upper part of the occipital bone, the lambdoidal suture, however, remaining free. A pasty swelling extended around it, especially below, in which direction it reached beyond the transverse ridge of the occipital bone. Opinions were at this

time divided both as to the nature and origin of the disease, but it was unanimously agreed to operate. On separating the integuments, the pericranium was found immediately applied to the tumour and the bony circle surrounding it; this membrane was detached, and it was clearly seen that the irregularities of the bone around the opening penetrated the substance of the tumour. One third of the bony margin was removed with a trepan, the rest was necessarily left, as it extended beyond the occipital ridge. Whilst removing the points which pricked the tumour it was discovered that it was a fungous growth, and springing from the dura mater.

A difference of opinion now arose as to the further treatment of the case, some were for attacking the tumour with the knife and actual cautery, whilst others thought it more prudent to adopt a palliative treatment; the latter course was decided on. The patient was carefully but simply dressed; at the end of a certain time the integuments closed over the fungus and reunited, and only a small ulcer remained at the summit of the tumour. Affairs, however, became worse day by day; the patient entirely lost his sight and hearing, and passed his excrements involuntarily; the coma changed into lethargy, and the body fell into a complete state of marasmus.

It was in this state that M. Volprecht first saw the patient in the beginning of December, 1755; when, by very careful inquiries, he elicited the facts above related. The intermitting pulse and subsultus tendinum led to fear each moment for his life; in this miserable state he, however, continued to linger on until January 1756. His death was preceded by convulsions.

At the examination of the skull, it was found that the fungus compressed the confluence of the longitudinal with the lateral sinuses against the two posterior lobes of the brain and the cerebellum; this compression, which was the cause of the principal symptoms, would not have taken place could the bone have been trepanned along the lower border of the perforation. This was four fingers' breadth in diameter; where the trepan had been applied, the periosteum, it was said, formed a cartilaginous border. Those who were in favour of attacking the fungus considered they were justified in their opinion, when they saw how readily it was detached from the dura mater;

to relieve the patient would have only hastened his death. A case related by M. Pohlius, in the Leipsic Journal,[1] shows that, where the tumour is differently situated, some hope of success would remain.

Obs. 17. A woman, of 47, fell on a piece of timber, and contused her head a good deal; this was followed by pains of no great severity, and which disappeared in a short time. A tumour formed of the size of a filbert, which, for twelve years, remained in the same state, without producing much inconvenience to the woman. In 1734, after a fresh contusion, the tumour increased daily, and attained a size of thirteen inches in circumference, and seven inches in height; it was situated principally on the left parietal bone, extending to the right of the sagittal suture, and forward to the coronal suture, and resembled in size the head of a newborn child. Its constant increase, and the severe pains which it caused, led to the opinion that it would be better to remove it for the patient. Obscure pulsation was felt in the tumour, and there was fear lest, if the extirpation were effected with the knife, hemorrhage might come on. On this account the ligature was had recourse to; the surgeon surrounded the base of the tumour with a silk cord, which he tightened daily, more or less according to the pain produced; at the end of a fortnight the base of the tumour, of which the circumference had been thirteen inches, as we have stated, was reduced to an inch; in this state the pedicle was cut through with a bistoury; the mass weighed 4 lbs. 6 oz. A caries was perceived, which had destroyed the two tables of the skull, and the movement of the brain, which was communicated to the base of the tumour. At the end of some weeks the patient was attacked with convulsions of the whole right side, and she died on the 29th Jan. 1735, after being convulsed for six hours.

The head was examined: the carious opening was irregular, and from four to five inches in diameter; its edge was notched, and irregular points of bone penetrated into many parts of the circumference of the fungous substance springing from the dura mater. This membrane was, in other respects, healthy, and exhibited neither spot nor alteration of texture,

[1] Act. Erudit. Lips. ann. 1736, Mens. Maii.

but in the part occupied by the tumour it had attained to treble its natural thickness, and had formed inseparable adhesions to the pia mater and brain. Ligature of the projecting part of the tumour was certainly not the remedy that ought to have been employed, and it is somewhat surprising that a fatal termination did not more speedily follow this operation. On carefully considering all the circumstances of this case, it will be seen to have been one in which judicious treatment might have proved serviceable. We cannot make the same statement respecting a case communicated to us by M. Philip, Master of Arts and Surgery, at Chartres.

Obs. 18. M. Philip was called, with Dr. Mahon, of that town, to see a little girl, 8 or 9 years old, who, whilst in full health, was suddenly seized with pains and lassitude of the lower extremities, like those produced by rheumatism. They extended up into the cavity of the belly, and were accompanied by retention of urine, for which the catheter was used. She had, besides, a painful swelling on each temporal region; that on the left side was the larger, and was as big as half an egg; they were soft, but not fluctuating; her eyes projected a full inch beyond their natural level; the whole forehead was puffy.

After some days, the left swelling appeared to have acquired a degree of softness, which increased sensibly from day to day: her medical attendants determined to make an opening, under the idea that it contained some fluid which was not readily distinguishable through the temporal muscle, and which they supposed to communicate through the œdematous cellular tissue and pericranium with the orbit, and to occasion the unnatural prominence of the eye. The bistoury penetrated into a soft fungous substance, from which only a little broken down blood and serum issued. Several bony filaments were perceived in the temporal muscle; the wound which had been made with great caution was simply dressed. In the course of the day the patient was pretty tranquil; she eat a little soup at six o'clock in the evening, and at nine wanted some solid food, which was refused her; about ten she was slightly delirious; she then slept for an hour; on waking, a little soup was given her, when she begged to be placed on her back; she had scarcely, however, been placed in that position, when slight convulsions came on, and she died in two minutes.

This termination was similar to that which followed the operation mentioned above in the eleventh case. M. Philip sent the anatomical specimen to the Academy, after having macerated it for some days in a mixture of vinegar and water, for the purpose of preserving it from decay during the then hot weather. He states that this maceration detached and decomposed the bony filaments before adhering to the internal surface of the temporal muscle, and giving it the appearance of being ossified. The dura mater was fungous, and the bones diseased, not only near the site of the temporal swellings, but in the orbital fossa, and it was the extension of the fleshy vegetation which had pushed out the eyes. The number of the tumours and the unlimited extent of the funguses rendered this case absolutely incurable.

Surgical assistance can only be rendered with some hopes of success in cases where the tumour is single, circumscribed, and where the nature of the surrounding parts permits of its being attacked over its whole circumference. The greater number of the cases we have related exhibit these favorable dispositions. There are two characteristics of the disease which deserve equal attention: these are, that the fungus is essentially a disease of the dura mater; and, that the affection of the bone is only consecutive; this distinction has not been drawn by previous authors. Without doubt this secondary disease is what ought first to occupy our attention: we shall have read the preceding cases to very little purpose if we do not perceive that, whenever the tumour itself has been first dealt with, the loss of the patient has immediately ensued. It is evident that this fatal termination is caused by the access of air to the tumour, and by the increased irritation, and aggravation of the various symptoms thus produced. On the contrary, we perceive that the attempts made to remove the disease of the bone have not proved injurious. The following case is especially valuable as regards this point; we are indebted for it to M. Sand, a practitioner at Konigsberg. It serves as the basis for a learned dissertation in the form of a thesis, defended when he was president, on the 7th December, 1700.[1]

Obs. 19. A lieutenant-colonel, 31 years of age, and of small

[1] De Fungo Cerebri. Halleri Disput. Chirurg. Select., tom. i, p. 169.

stature, left the military service in August 1695, and returned home from Brabant into Germany. He travelled all night on the 24th of this month, in very cold and severe weather, in order to spare his wife, who was coming to meet him. It was to the chill he experienced on this occasion, that he always attributed the origin of the disease we are about to describe. Scarcely had he enjoyed the affectionate embraces of his beloved companion, when he experienced pains in the head of insupportable severity, which lasted seven weeks. A week after they had left him the patient was troubled with vertigo, which appeared to yield to some remedies prescribed by a physician. After three weeks' quiet, the pains returned with fresh violence, and for a fortnight they continued to be lancinating; the whole scalp became œdematous; and at length, at the top of the head, was seen a tumour, which in three days acquired the size of a large hen's egg. A plaster was applied, and on the following day the softened tumour was opened with a lancet, a good deal of pus escaped; in four or five days the swelling had disappeared, there being no longer any tumour, but the cicatrization of the wound could not be effected even with the utmost care, until the end of three months. An ichorous sanies constantly oozed from it, the effect of which was beneficial, for in a fortnight after it had healed, a fresh tumour of the size of a small egg appeared; this opened spontaneously after a plaster had been applied, and a large quantity of pus escaped. The ulcer remained fistulous, in defiance of the remedies employed by the various physicians and surgeons under whose care he successively placed himself. The seat of the disease was at the juncture of the sagittal with the coronal suture. On the 14th September, 1696, the opening was enlarged by a small incision through the integuments and pericranium. A fleshy excrescence was seen, the bone was carious, and the depth to which a probe passed showed that the disease was serious. On the following day the physicians and surgeons decided in consultation that the trepan was necessary; incisions were made to allow of the application of the instrument. On the 16th, the trepan was applied; the piece of bone which was removed by the first crown from the anterior and superior angle of the parietal bone showed that the internal table was affected, and that there existed, to a considerable extent under

the skull, a fungous substance arising from the dura mater. For some days the patient was dressed very simply, only a few bits of bone being removed with the nippers. It was determined in consultation to apply the trepan several times. On the 20th, the incisions in the integuments were extended, and the angles of the flaps removed, that they might not be in the way, all which operations the patient bore with great courage, and without complaint. On the 23d, a second crown of a trepan was applied, near the upper and anterior angle of the left parietal bone, at the distance of some lines from the former perforation, and, on the 24th, a third was applied at the top of the head, about midway between the two upper angles of the right parietal bone. I ascertained by measurement on the engraving at the end of M. Sand's dissertation, that the centres of the first two perforations were an inch apart, and fifteen lines from the centre of the first to that of the third, while the centres of the second and third were nineteen lines apart. We may judge from this of the size of the portion of bone removed; it was six and a half inches in circumference. On the 27th the bone, intermediate between the first two holes, was removed with cutting forceps, the patient ate, conversed with his friends, and slept tranquilly. On the 29th, grooves were marked on the skull with a small saw, from the third opening to the first and second, these were carried only down to the diploë. Some pain was caused by this, which, however, soon disappeared. For the purpose of drying up the fungus which projected, especially through the first trepan hole, he was dressed with Malmsey wine, boiled on vulnerary plants, and mixed with honey of roses. On the 30th, the saw was passed through the internal table, and this portion of the skull was raised with an elevator. It was clearly seen, as in the preceding cases, that the internal table was carious, though the external appeared sound. The dura mater was very sensitive round the fungus, and severe pain was caused apparently by the rough manner in which this portion of the skull, which was adherent to the tumour, was removed.

The patient complained besides of a painful sensation as if his left eye was being plucked out; there was some hemorrhage, which prevented the removal of the dressings in the evening, and only a compress was applied. The pain ceased as soon

as he fell asleep; his sleep was tranquil; his supper having been a light one, as it is said, which shows that no great attention was paid to diet in so severe a case. On the 31st, the patient was in good spirits, when dressed as usual at eight o'clock in the morning, the dressing was wine and honey; soon after the bandages were applied severe pains came on, which, however, did not prevent the patient taking a good dinner, and they disappeared while he was thus engaged. They returned in the evening; he supped lightly, his sleep was disturbed, and in the middle of the night hemorrhage supervened; the surgeon perceived that the blood escaped from a pretty large vein which had been cut through in the scalp, and stopped it by a proper dressing.

On the 2d of November there appeared healthy red granulations in the second and third trepan openings. On the 5th, a portion of the fungus was removed with a spatula, some blood flowed, and the pain extended to the eyes. On the 6th, the discharge was more copious than on the former days, and fetid, and some spirits of wine was added to the dressing to resist putrefaction. On the 7th, two portions of the fungus of the dura mater came away at the morning dressing, and one in the evening. On the 9th, a portion of bone exfoliated between the first and second trepan. Almost every day, between that and the 26th, portions of bone which had become detached by exfoliation were removed; we find, from the very lengthy detail given by the author of this case, that there was sometimes slight cough, and occasionally transient pains shooting towards the eyes. On the 27th, a slight caustic was applied to the granulations covering the exfoliated portions because they appeared spongy, and this was several times repeated. In due time, by the use of desiccatives, this large wound was consolidated, after various portions of bone had exfoliated; the last of which came away on the 27th January, 1697.

This cure is not without parallel; the case of M. Soulier, surgeon, of Montpellier, related in the Memoir by M. Quesnay on the Multiplication of Trepans, describes a disease of the same kind. The surgeon removed with a gouge, a chisel, and leaden mallet a large portion of the skull, the internal table of which was carious; those who will compare the case of that of M. Sand we have described, will see that there is no

difference except in the progress of the disease. The mode of operating, though different, fulfilled the same object, namely, the removal of a large portion of the skull. M. de la Peyronie has also furnished a remarkable case of the same kind; M. Quesnay has introduced it after that of M. Soulier; and the original narrative is given in a much more detailed form, in the first volume of the Memoirs of the Royal Society of Sciences at Montpellier, published in 1766.

The removal of a large portion of the skull for the purpose of laying bare the fungus of the dura mater produces then no inconvenience, and it is a measure we are bound to adopt where the necessity for such an operation is indicated. The numerous cases related, in which the trepan has been applied several times, show that there is nothing to fear from operations for the removal of the bones of the skull, which have thus become accidentally diseased. Can the destruction of the funguses of the dura mater be effected with equal facility? It would appear that, if efficacious means had been employed at the commencement of most of the cases we have above related, they would often have been successful. There is a case related by Marcus Aurelius Severinus which, amongst others, confirms this statement, and deserves particular attention.

Obs. 20. This author, in discussing the operations which are performed on the bones,[1] treats, in the third chapter, of trepanning the skull for the cure of melancholia and mania. A nobleman of the Spanish court and of the house of Avalos suffered from insupportable headaches, which no remedy internal or external had at all alleviated. He was persuaded to allow the integuments to be divided, and the skull to be rugined until the root of the mischief was reached. By means of this operation a fungous excrescence was discovered under the bone, the destruction of which entirely relieved the nobleman from the violent pains he had suffered.

If we now examine the accounts of authors respecting the funguses which spring from the dura mater in wounds of the head, we shall find many instances in which these morbid growths have been removed by the employment of remedies.

[1] De Medicina Efficaci, lib. i, part ii; Chir. quæ ad Ossa Pertinet, cap. iii.

M. Sand applied only vulnerary decoction, with wine and honey. Peter Marchetti, Chevalier of St. Marc, and formerly professor of anatomy and surgery at Padua, states, in the sixth case of his 'Medico-Chirurgical Observations,' that he saw in consultation a man who had been wounded in the head, and in whom the dura mater had been laid bare. At the end of some days a fungus of the size of a filbert sprung up, which he directed to be covered with a powder of spikenard and schœnanthe; on the following day the fungus was wasted, and soon yielded to ordinary remedies. The above remedy is recommended by our author as an approved and excellent specific: "*Quo remedio sæpius fungos sanavi, ac proinde tanquam arcanum vobis propono.*"

Fabricius Hildanus had before observed the good effect of aromatic powders for the cure of a fungus. A young man of 14 had the right parietal bone broken in several pieces by the fall of a block of wood, weighing twelve or thirteen pounds, upon his head. The removal of eight portions of bone, of which our author has given an engraving, shows that considerable loss of bone had taken place. Severe symptoms came on, which had disappeared gradually by the twentieth day. The part of the dura mater which had been injured with the bone had separated under the efforts of nature and the use of remedies, when a fungus suddenly sprung up, and in twenty-four hours projected to the size of an egg beyond the skull. Fabricius washed the wound twice a day with a decoction of flowers and leaves of betony, sage, camomile, melilot, roses, marjoram, and rosemary, with seeds of anise and fenugreek. The herbs were then put into a bag, and boiled in equal parts of wine and water, and applied hot to the head, the fungus being first covered with an aromatic powder composed of roots of bennet, angelica, calamus aromaticus, round aristolochia, and Florentine iris, with guaiacum wood, sage flowers, and the tops of marjoram and rosemary, all finely powdered. The fungus little by little shrivelled away in the course of a fortnight, and was quite cured in two months and a half.

The above was a capital cure effected by the knowledge and great experience of the skilful surgeon who directed the treatment; it must be observed, however, that we are left in doubt whether the fungus originated in the dura mater; it would

rather seem that the destruction of the dura mater had allowed the escape of a fungus which was gradually repressed by the use of the means indicated: this was a point which should have been clearly made out. We learn from Fabricius Hildanus that Cosmo Slotanus, a very excellent surgeon, had attended a young man for a wound in the head with fracture of the skull, in which a fungous excrescence had supervened. The patient was going on well when he was put under the care of another surgeon, who, without attending to the treatment adopted by Slotanus, powdered the tumour with alum and vitriol calcined. This application immediately excited horrible pain, acute fever, delirium, and inflammation, which led to his death in a few days. It is probable that these remedies would not have produced such fatal effects in a fungus of the dura mater.

Ambrose Paré carefully noted the exact situation of a fungous tumour in the case of a M. de Pienne, wounded at Metz in 1552. There was fracture of the temporal bone, caused by a portion of stone struck from the wall by a ball from the enemy's cannon. The first symptoms were formidable; blood issued from the nose, mouth, and ears of the patient, who vomited violently, and remained near a fortnight insensible, with a swelled and livid visage, and spasmodic twitchings. Pierre Aubert, surgeon in ordinary to the king, applied the trepan on the frontal bone near the temporal muscle, and on the twentieth day a soft and very sensitive tumour sprung up, called a fungus, and which came from the dura mater (qui sortoit de la dure mère) at the opening made by the trepan; this fleshy mass grew daily, notwithstanding the application of corrosive substances. M. de Pienne recovered perfectly from this great wound. Paré adds, that to cure a fungus we should apply very drying remedies and mild catheretics, such as a powder made of two parts of savine and one of ochre, or powder of burned hermodactyls. If the volume of the fungous tumour is considerable, we should tie it, says Paré, as near the root as possible; and after it has fallen off, have recourse to the aforesaid remedies.

The fungus which I had the opportunity of seeing, in the case related at the commencement of this Memoir, was covered by a membrane; it was seated in a duplicature of the dura mater, and to extirpate it, we must have cut through this sort of cyst

around the base of the tumour, when it might have been removed without penetrating the inner layer of the dura mater. The case related by M. Marrigues, the tenth, and the fourteenth, reported by M. Volprecht, exhibit the same fact; extirpation would have been possible, but would it not have been more prudent, first to try the effect of applications which have succeeded in analogous cases? Langius classes the fungous tumours, which spring from the dura mater after fractures of the skull, with the mushroom-like funguses we see spring from other ulcers.[1] This sort of fungus is a consecutive disorder, and does not essentially differ from those which arise under the skull, and at length destroy the bone.

Bartholin speaks of fungous tumours in his 'Historiæ Anatomicæ;'[2] he relates what Ingrassias, Langius, and other authors have said, who have treated of these diseases, and adds the fruits of his own experience. This work, however, rather exhibits a proof of his erudition, than the soundness of his knowledge on this interesting subject. He confounds genera and species, gives no accurate diagnosis, establishes no principle, nor clears up any obscurity. He erroneously attributes to Ambrose Paré the advice to use a compressive bandage, to dry these excrescences, without finding fault with the proceeding, which would be very dangerous. He saw at Copenhagen, in 1649, a little girl, 4 years of age, who had received a wound of the head, with extensive fracture of the bone; the brain was bare. At the end of six weeks, the lips of the wound appeared livid, and two blackish fungous excrescences, with anfractuous surfaces like the brain, sprung up; Bartholin informs us, that the surgeon thought there was no danger, but that he himself judged unfavorably of the case. These tumours were removed without pain, and some days after the child died. This observation explains nothing; it does not inform us if the growths were fungous vegetations from the dura mater, or a swelling of the proper substance of the brain. Our author refers to Fabricius Hildanus, for the treatment of these excrescences, and mentions a case from Cornarius, in which six fungous tumours, each of the size of a nut, grew up from a fissure in

[1] Joan. Langii, lib. i, Epist. Med. "De fungis qui fracto cranio et aliis ulceribus adnascantur."—Epist. sextâ.

[2] Cent. 1, Hist. lvii, De Fungis Cerebri.

the skull; the patient had them forty years on his head, and they then fell off spontaneously. These fungi would seem to have been of a different character from those of which we have hitherto spoken.

In the eighty-sixth case, of the fourteenth century of the same author's works, we find related the history of a woman of Leyden who had at the top of her head, on the right side, a tumour which a surgeon very skilfully extirpated. The patient passed the first three days without any dangerous symptom, but died suddenly of apoplexy on the fourth. This history gives no insight into the nature of the tumour, nor into the counter-indications it may have manifested. Bartholin adds that Walæus had foretold the fatal event, from the result of similar cases. The lesion of the pericranium in this kind of tumour produces, says he, dilatation of the meninges which adhere to the pericranium; the brain falls in, and compresses its ventricles. Such is the absurd explanation offered to account for death having taken place four days after the extirpation of a tumour from the head, the character of which is left undecided.

It is astonishing that Bartholin has not quoted Coïter, a learned physician of Nuremberg,[1] who speaks of fungus of the brain in his 'Anatomical and Chirurgical Observations.' What he says may serve as a supplement to those of M. Peyronie, on the same subject, which form so valuable a contribution to the first volume of the 'Memoirs of the Royal Academy of Surgery.' According to Coïter, the occurrence of fungus is very common, at least he seems to have met with it frequently, although he only cites two examples. The following is that giving the most detailed account: An esquire of Louis, Duke of Bavaria and Count Palatine of the Rhine, was wounded by a fragment of a shell, which fractured the frontal bone and pierced the brain. The protrusion of this organ, and the severe symptoms which came on, led to the conviction that the man would not survive more than three or four days. Coïter, sent by the Prince to see him, blamed the attendants for being afraid to touch the brain: he removed the protruding portion with the clots of blood, and exhibited the part

[1] He had practised surgery, and came into France with the army of Reitres in 1587, as may be inferred.

to all the court, that there might be no doubt of his having really removed a portion of the brain; he also showed his highness, in Fallopius's 'Commentaries on Hippocrates,' that similar cases had been successfully treated. The constant care of Coïter to extract all the splinters, and to afford all the assistance required during suppuration of the wound, succeeded in placing him at the end of four months in a state in which there was some hope of recovery. During the third month, a very firm but insensible fungus formed, which was with difficulty kept under by caustic solutions, with alum and vitriol calcined; it constantly grew again, and did not cease from growing until the tenth or eleventh month, when the patient was decidedly convalescent. A complete cure was effected by the thirteenth month.

Did this consecutive fungus spring from the dura mater or the brain, which resisted the use of caustics, but disappeared spontaneously? The insensibility of the tumour, and its hardness, were perhaps accidental, and may have been due to a congestion of the fluids in the part, and perhaps in some degree to the use of the medicines employed; probably extirpation of this would have hastened the cure. However this may be, Fallopius speaks clearly enough of swelling of the brain, and he does not direct that the protruding part should be removed; he kept it under by the use of incense powders and real pompholyx, which appear to have been frequently successful in such cases: we may easily conceive why the greater number of his patients continued weakened in intellect.[1] His plan of cure seems based on the same principles as those which M. Peyronie has so ably contended for.[2]

The object of this Memoir has been to bring under the notice of practitioners a sufficient number of facts respecting a disease which has been hitherto misunderstood, or considered as something quite extraordinary. From such an extended comparison of cases we arrive at a knowledge of the circumstances that give rise to these tumours, of the signs which distinguish them from other tumours of a similar appearance, and of the prognosis to be drawn in the various forms of the

[1] Fallop. Expos. in Lib. Hippoc. de Vuln. Capitis, cap. xlv, De Vulnerato Cerebro.

[2] Tom. i des Mém. de l'Acad. Royale de Chirurgie, vel supra, p. 61.

disease; and thus obtain a clue to the curative indications. These require, when the local circumstances will allow of our interference, that the tumour should be thoroughly exposed by well-known and appropriate proceedings. It is only after we have removed the bony circumference which conceals the base of the tumour, that we should employ means to destroy the sarcomatous vegetation of the dura mater by the use of a ligature, of aromatic powders, or even of appropriate catheretics, according to the nature of the case. Fresh observations may assist the progress which it is desirable should be made in our knowledge of a subject never hitherto treated dogmatically.

In composing this Memoir, I have endeavoured to follow the precepts given by Lord Chancellor Bacon, in the second part of his Memoir on the Re-establishment of the Sciences; entitled, 'Novum Organon Scientiarum;' where he maintains that an exact observation of facts, and a just and reasonable induction from these should furnish us with the true method of understanding and explaining Nature. To enable us to draw such an induction, we ought to possess, says this great man, a sufficient number of examples and facts carefully collected and impartially detailed; and when we have considered these facts from as many points of view as possible, that we may be full assured they do not contradict each other, we may hope to derive from them some useful truth which may lead to new discoveries. In this mode of proceeding, experience and reasoning united mutually assist and throw light on each other. The Academy of Surgery has always acted on these principles; no other theory is recognised by them but what is founded on facts; facts must always accompany precepts, which must be supported or rather founded upon them.

MEMOIR ON

ENCEPHALOCELE OR HERNIA OF THE BRAIN.

By M. FERRAND.

We often find on the heads of newborn children tumours of various sizes, of which it is important to know the true characters. The life or death of the little patient often depends on the conclusion come to respecting the nature of the disease, and on the means we may employ to remedy it. A deficiency of bone may be either a cause or effect of different anormal affections, some of which are so extraordinary that the unhappy victims of this want of completeness must be placed in the rank of monstrous productions. When matters are carried to a certain point they are no longer under the dominion of art, but it must rest with those who are professors of that art, guided by the knowledge they have thence acquired, to determine precisely the boundaries which circumscribe the domain, in order that they may not abandon those who might have been benefited by treatment. We must not conceal that proceedings which are useful in some cases would prove baneful in others. It is therefore necessary to appreciate the facts presented to us in practice, carefully to distinguish the diagnostic signs of each kind of tumour, and to judge from reason and experience of the indications to be acted on or rejected.

Hernia of the brain or encephalocele, of which I propose to treat in this Memoir, is a very rare disease, of which indeed there has not hitherto been any well authenticated case described. In the second volume of 'Select Theses,' published by Haller, there is a dissertation, by M. Corvin, presented on the occasion of his taking his doctor's degree at Strasbourg, on the 23d of September, 1749. Most of the cases related, however, rather serve to show his learning than to give a history of the disease which forms the object of his Thesis. He classes as hernias of the brain hydrocephalus and watery

pulse at the wrist, yielding to, and disappearing by compression, unattended by any change in the colour of the skin, situated at the fontanelles, or sutures of the skull, of which the size will be in proportion to the want of ossification.

The projection of the brain to a still greater extent would be rather a fatal defect of formation, than a disease properly so called, and would no more resemble an encephalocele than a similar state of the abdominal viscera would resemble an ordinary hernia.

The Academy has received from M. Salleneuve, son of the surgeon-in-chief of the Dauphin cavalry regiment, an interesting observation, which proves the existence of hernia of the brain. The wife of an officer in the regiment was delivered of an infant, who had at birth a pretty large tumour, on the back and lateral part of the head. It was of about the size of a small egg, soft, and disappearing on the application of pressure. It was seated on the spot where the occipital, parietal, and temporal bones meet, and form a lateral fontanelle. The borders of the parietal and occipital could be felt, there being a deficiency of bone in each, to the extent of about nine lines, consequently, the opening through which the brain passed was about an inch and a half in diameter, and through it the pulsations of the part could be distinctly felt. Several surgeons who were consulted about it, thought it was a tumour containing water, and that it should be opened. M. Salleneuve, on carefully considering the signs above mentioned, maintained that they were not those of any humoral swelling, nor were those present which denote the various kinds of imposthumes. His reasoning was listened to, and it was agreed to apply a leaden plate, a little larger than the tumour; this plate was perforated at the edges, so as to allow of its being sewn into the child's cap, and in this way, a pressure, varying with the greater or less tightness of the cap, was kept up. The tumour thus gently compressed, diminished gradually in size. Nature was not impeded in the process of ossification. The repression of the protruding part of the brain was the only measure needed. The lambdoidal suture was properly completed, the parietal and occipital bones uniting as closely as the other bones of the skull are usually united in children of that age.

Although hernia of the brain appears to be a disease peculiar

to infants, the circumstances which give rise to it in them, may occur in adults, from a loss of substance in the skull. M. Quesnay, in his Memoir on the Multiplied Application of the Trepan, has mentioned a very interesting case, observed by M. Mareschal. A female who had recovered from an extensive wound in the head, attended with considerable loss of bone, suffered every now and then from convulsions and insensibility. He considered the symptoms to be caused by pressure on the brain, which formed a sort of hernia at the opening through the bones which formed its natural support. To remedy these, M. Mareschal had a bandage made with a little shield, which supported the cicatrix, and thus prevented a return of the convulsions.

We read in Ambrose Paré, that a man who had lost a portion of the parietal, as large as the hand, from caries following a blow on the head, employed a patch of boiled leather to protect his brain, until the cicatrix had acquired sufficient firmness to perform this office.

This state of parts, which has often occurred to surgeons, has led them to try various forms of compressors for keeping the brain in its natural position; but experience has shown that metallic plates, made of silver, tin, &c., are inconvenient; they get hot, and become very uncomfortable in consequence. M. de la Peyronie was obliged, on this account to abandon the use of a silver plate, which he had applied to a man's head, who had lost his os frontis from venereal caries. A pasteboard covering answered much better; one of boiled leather, such as Paré speaks of, would also answer well.

We cannot be too well informed or too attentive in deciding on the nature of the tumours exhibited by newborn children. M. Corvin proposes to open all those which contain fluid, as a remedial measure, but this advice is not authorized by facts, since death has often sooner or later resulted from this measure.

The best authors have established a different mode of treatment. Zwinger, a celebrated practitioner at Basle, published, in 1722, an excellent treatise on the Diseases of Children, in which is contained an article on the soft tumours which appear on the heads of newborn children.[1] This author was called

[1] Pædojatreja Practica, Obs. 3.

into consultation with a skilful surgeon, to see a child who was lately born, with a soft tumour as large as a goose's egg on the top of its head; the tumour was soft and indolent, the skin covering it of a natural colour, and it contained a serous fluid. The physician and surgeon who usually attended the family were agreed as to the nature of the tumour, and the consultation was called for the purpose of deciding whether or no the tumour should be opened. The reasons given in favour of the step were the fear lest the fluid, by remaining *in situ*, might become acrid, and produce an erosion, which might cause the death of the child, who was in other respects in excellent health. This advice was not, however, allowed to weigh against the instances adduced of the bad effects of incisions in similar cases; cataplasms made with vulnerary and aromatic plants, such as betony and melissa, boiled in wine, gradually dissipated the swelling, and the child enjoyed perfect health. Zwinger mentions a second case, attended with similar success, as well as several instances in which incisions and the application of caustics, by admitting the external air, gave rise to gangrene and to the death of the children, some dying of convulsions within thirty hours, and others, after lingering for several weeks, dying of marasmus. Forestus[1] mentions a watery tumour in the nape of the neck, appearing in a child at birth, and increasing for two years, and which appeared transparent when a candle was applied to it. Forestus for a long time opposed the wishes of a surgeon who proposed to tie the pedicle of the tumour with a ligature, asserting that he had performed many cures in this way, but at length yielded to his instances. Great hopes of success were entertained for several days, for the child, who before was languid and fretful, seemed to recover its spirits; on the fourteenth day, however, an opening formed at the apex of the tumour, and gave vent to a serous discharge; from this time the child began to get weaker, and died some days after, on the 20th of October, 1563. No anatomical examination appears to have been made after death.

In the observations of Job a Meeckren we find a very similar case of a large tumour at the occiput. The child had had it from birth, and although a deficiency was clearly perceptible

[1] Obs. Chir. lib. iii, tom. iv, Obs. vii, p. 72.

in the substance of the bone at the base of the tumour, it was considered doubtful whether the brain was comprised in it, seeing that the child had suffered no change in its intellectual or corporeal functions. The tumour at length burst spontaneously, after having acquired a considerable size; pure serum alone escaped, and the child died soon after. Some time before an attempt had been made to place a ligature on the pedicle of the tumour, but the child lost its sight, and had repeated attacks of fainting. The ligature which had caused so much mischief was immediately cut. On opening the body, it was found that the dura mater formed the bottom of the sac, at the point where the ossification was defective, and that the brain did not protrude. This disease bore only an external resemblance to the tumour described by Screta, a physician at Basle, in a letter to Fabricius Hildanus, and given in the works of that excellent practitioner. In this latter case the tumour was a wen, larger than the child's head, and growing from a narrow pedicle on the head of an infant of two months, in whom the germ of the disease was visible at birth. It caused the child's death, by abstracting the nutritious juices necessary to growth and the maintenance of life. This wen might easily have been removed, whatever Screta may say, who praises Salzman and Sebizius, two celebrated professors of medicine, for opposing the operation proposed by a surgeon for relieving the child of its burthen. The varicose vessels on the surface of the tumour appear to have furnished the only ground for opposing its intended extirpation.

The omission of the necessary remedies is as fatal to humanity, and perhaps more frequently so, than rash attempts to cure. Everything depends on the discernment of the practitioner; life or death may be equally the effects of his knowledge and dexterity, or of his want of experience and skill.

M. le Dran has observed, in the doubts he expresses as to the nature of the tumour, which he took for a hernia of the brain, that sanguineous tumours formed by the rupture of some small arteries under the integuments of the skull are susceptible of increase. M. Louis made the same observation respecting a tumour which an infant had on its head at birth. At first it was so little raised as to be scarcely perceptible. The mark caused by the pressure of the os uteri before fully dilated,

on the upper part of the left parietal, was, however, visible. At the end of a week or ten days the nurse gave information that the tumour was evidently increasing from day to day: the child was therefore brought back to Paris. The tumour was circumscribed, and exhibited fluctuation in the centre, but no pulsation: these are the same signs as those described by M. le Dran. M. Louis might, like him, have been deceived as to the existence of a bony circle at the base of the tumour, but he felt that the integuments were hard and tense, that infiltration had taken place into the subcutaneous cellular tissue, that the effusion was in the centre, where some blood-vessels had been ruptured. M. Louis thought it right to open the tumour. M. de Laffitte was also present. Only blood escaped, as had been foreseen; a compress soaked in warm wine was the only local discutient employed to the wound. For some days a discharge took place, which tinged the compress red. The wound healed; and the dispersion of the blood infiltrated around the central effusion was assisted by the application of compresses steeped in sea water. The tumour was dispersed in a few days, as in the case of a thrombus.

The above observation shows that the prohibitive precept against opening tumours on the heads of newborn infants ought not to be of such general force as Zwinger would maintain; and that if in some cases the operation is dangerous, in others it is indispensably necessary. It is for the practitioner to distinguish between them, and an accurate diagnosis will always furnish the grounds for true curative indications.

SUMMARY OF OBSERVATIONS

ON

THE DISEASES OF THE MAXILLARY SINUS.

By M. BORDENAVE.

I.

The diseases of the maxillary sinus do not appear to have been known to the ancients; there can, however, be no doubt that these cavities are susceptible of a great many deviations from the natural state; the vessels of the membrane which lines them sometimes become congested, inflame and suppurate; or they may become congested without inflammation, and produce sarcomatous, polypous, or scirrhous tumours, which sometimes degenerate into cancers; diseases of the teeth and gums often give rise to those of the sinuses; caries and exostosis may affect their walls; instruments of different kinds may cause penetrating wounds or fractures; lastly, foreign bodies may lodge in them, as in the case of gunshot wounds, &c.

After a brief review of the structure of the maxillary sinus, I shall examine into its diseases and the different means proposed for remedying these. I shall endeavour by an appreciation of facts to determine the rules for the employment of these means. This methodical treatment, by affording instruction to young surgeons, will serve to protect patients against useless operations, which might be practised on them from false indications.

The maxillary bone is very irregular in form; it has connexions with all the other bones of the upper jaw, and with some of those of the skull; and it receives along its alveolar border all the teeth on one side of the upper jaw.

Anatomical works may be consulted for the description of this bone; suffice it to say here that the bony plates of which it is composed form, by their divergence, a cavity, which occupies its greater part, and that these plates are very thin, except at the parts where they meet to form the different angles. The sinus does not exist, or can scarcely be said to

exist, in the fœtus; it is gradually formed during the development of the bones, and, as in very young subjects, its cavity is smaller, the walls of this are proportionately thicker. In persons of more advanced age, the cavity is larger and the walls thinner and more transparent.

The form of the sinus is not so irregular as that of the bone, and though it exhibits varieties in different subjects, it may, in general, be compared to a flattened quadrangular pyramid, the apex of which is towards the cheek-bone, and the base towards the nose. This figure is pretty constant. The lower wall of the sinus slopes a little towards the alveolar arch, and its lowest point corresponds to the third molar tooth.

The wall of the sinus which is towards the nose is partly bony, partly membranous. Processes from the maxillary bone, the palate bone, the ethmoid and lower turbinated bone contribute to its formation; the remainder is completed by the pituitary membrane which lines the maxillary sinus as well as the nostrils.

This membrane is soft, vascular, spongy, and cellular; it is thin towards the border of the nostrils, and thicker in the interior of the nose; that portion which lines the sinus is thinner than that which lines the nostrils, nor is it of equal thickness in all parts of the sinus. The use of the membrane is to secrete a viscid, mucilaginous humour which moistens these cavities.

The opening of the maxillary sinus, placed superiorly and anteriorly towards the nose, is very narrow in its natural state, being about as large as a crow-quill, but it has not the circular form usually described, but is somewhat oblong, and in several subjects I have found the membrane forming a sort of fold on the side towards the sinus, which gave an oblique direction to the opening, causing it to be sometimes seen with difficulty. It lies in the nose, between the two spongy bones, and near the superior one. Sometimes two openings are found, and their positions are then irregular.

The two sinuses cannot empty themselves at the same time; and, if filled beyond what is natural, it is only when we are lying on the opposite side that the sinus of either side can empty itself; whence it follows that should the fluid secreted into the sinus undergo any change, or the membrane suppu-

rate, these matters may, by their lodgement, cause difficult diseases, which will affect even the neighbouring parts.

As the roots of the first molar teeth are very near the sinus, and even penetrate occasionally into its cavity, it may happen that the escape of mucus through the broken socket, after the extraction of a tooth may give rise to a fistula. We shall find that mistakes have been sometimes made respecting the nature of this discharge, which has been looked on as purulent, though in truth merely mucous, and we should therefore be careful in declaring the existence of suppuration of the maxillary sinus, merely because there is a discharge from the socket of a tooth.

Obs. 1. A lady who had had several carious teeth extracted, got one of the eye teeth of her upper jaw drawn, in doing which a bit of the upper jaw was carried away, so as to lay open the sinus, and to cause a constant discharge of serous fluid. The lady wishing to discover the source of the discharge, pushed a silver bodkin into the opening, which passed far in. Astonished at this occurrence, she next tried a little feather, the barb of which she had stripped off, and pushed almost the whole of it into the sinus, although more than six finger breadths in length; this alarmed her a good deal, as she thought it must have gone up into her brain. Highmore, who was consulted by the lady, relieved her fears by showing her, after he had considered all the circumstances of the case, that the stem of the feather must have got bent into a spiral form within the cavity, and he merely advised her quietly to put up with the inconvenience she suffered.[1]

This author, who so accurately described the maxillary sinus that it was named after him the antrum of Highmore, was too familiar with the structure and use of this part to fall into the error which occurred in a case related by Platner,[2] where, in consequence of mistaking for pus the mucous discharge which escaped through a fracture in the alveolus, after the extraction of a tooth, the surgeons very uselessly tormented the patient by the employment of various remedies.

Although the term deposit is generally applied to every

[1] Highmorus, in Corp. Hum. Disquis. Anat. lib. iii, part ii, cap. i.

[2] Platneri Prolusio VI, de Anatome Subtiliori, habita ann. 1734, Opusc. part. secunda.

collection of fluid in the maxillary sinus, we must not confound a collection of mucus retained in this cavity, in consequence of closure of the natural opening, with those purulent deposits or internal suppurations resulting from inflammation. These diseases differ much in character; but the retention of mucus is seldom simple: this fluid becomes altered, and as soon as, in consequence of its vitiated state, it acts on the neighbouring parts, excites suppuration of the pituitary membrane, and the disease then enters into the category of those deposits in the maxillary sinus to which we must now turn our attention.

The membrane which lines the maxillary sinus is very susceptible of mucous congestions; but if those general causes which excite inflammatory congestions in other parts give rise to an inflammatory congestion in it, suppuration, ulceration, or, to speak more correctly, a species of ozæna[1] which may be called maxillary, caries, and fistulæ may be the consequence of this state.

Inflammation is not the most common cause of suppuration in the maxillary sinus; more often it is produced by caries of the teeth, which affects the alveoli and extends to the sinus; by abscesses in the gums or parulis; or, finally, when there is an enlargement at the root of the teeth.

Thus, suppuration of the sinus may be independent of disease in the neighbouring parts, or, as is often the case, it may be the effect of some change in these parts; and although generally one finds it complicated by various alterations of the external parts, we cannot thence conclude that it is always a consequence of them.

To prevent the occurrence of these complications, it is necessary that the suppuration of the sinus should be treated at its commencement; but to do this, except by mere haphazard, we must first learn to recognise it, which is difficult, if no external change has taken place. We may conceive, indeed, that this disease will sometimes discover itself by the usual

[1] Some authors have applied the term ozæna to suppuration and ulceration of the maxillary sinus, though by this name is especially understood an ulceration in the nostrils, accompanied by fetor. They have not, however, confounded these two maladies; and in thus designating ulceration of the sinus, it has been only with modifications, and in consequence of the analogy between these two diseases. See Drake, Heister, Günz, &c.

symptoms of inflammation. A more or less severe pain, with heat, felt particularly at one side of the upper jaw, and which extends along under the eye; a feeling of throbbing in the interior of the sinus; the increase of these phenomena, accompanied by fever, may serve to denote inflammation in this part. These signs are equivocal: nevertheless, our being aware of their presence may become useful, and determine our opinion, if these symptoms, acute at first, leave, after having undergone some diminution, dull permanent pains in the sinus; if the pains extend particularly from the maxillary sinus to the eye; or if pus escape from the nostril when the head is lying on the side opposite to that affected; if on blowing the nose matter escape;[1] if the maxillary bone become raised; or if there be any external lesion of that part. These latter signs, drawn from the observations which form the subject of this Memoir, are not to be neglected in forming our judgment about suppuration in the sinus, and make us acquainted with the effect of simple inflammation, independently of any other alteration in the neighbouring parts.

Obs. 2. I was consulted in 1756 by a young lady, who had the right cheek swelled; she had felt, about a month before, a severe pain extending to below the orbit on the right side; she had experienced a sensation of pulsation and heat in the interior of the sinus; the maxillary bone on that side was arched towards the cheek. These symptoms decided me in proposing to her the extraction of the third molar tooth and perforation of the socket. This operation gave issue to a pretty large quantity of purulent matter. The sinus was afterwards injected, the maxillary bone gradually resumed its natural form, and the cure was completed in about two months and a half.

It may be objected that the symptoms we have described do not afford absolute certainty; that inflammation of the cheek, external to the sinus, may be mistaken for disease in the interior of the cavity; that tumefaction of the soft parts may be taken for swelling of the bone; but a little proper attention will readily enable us to distinguish between these diseases.

Inflammation, external to the sinus, affects the parts which

[1] See the observation by Cowper, detailed below, in describing his mode of treatment.

cover it, the pain is external; in the other case the external parts are free, and the pain is felt within. Swelling of the soft parts gives rise to a tumour, which is always more or less moveable, always less hard; whereas the enlarged bone is distinguishable by the feel, and is absolutely different from other tumours.

A skilful surgeon will readily appreciate the distinctive character of these diseases, and guided by his knowledge, he will be able to decide on useful operations, which would be dangerous in the hands of the insufficiently educated. By procuring a timely discharge of the purulent matter, we shall prevent caries and many accidents which would result from too long delay; of this we shall find examples in the progress of this Memoir.

Obs. 3. A child, 12 years old, whose first molar tooth on the right side was carious, had a swelling situated on the outer surface of the upper jaw, and extending to the orbit. This swelling was as large as a small egg. M. Fauchard, suspecting the tumour to be caused by the carious tooth, proposed to extract it, as the only mode of readily curing it. The operation, as was expected, gave issue to a large quantity of yellow serous fluid, and he discovered that the abscess extended into the maxillary sinus. The evacuation of the matter speedily caused the tumour to disappear, and the disease was perfectly cured in a short time.[1]

A doubt may be raised, whether the swelling observed in this case communicated with the sinus; but how then should the matter collected externally have escaped by the alveolus after the tooth was extracted? The assertion of M. Fauchard, whose talents are well deserving of praise, seems sufficient to dispel all difficulty on this point.

Whatever may be the causes of suppuration of the sinus, various complications may result from it. If the opening of the sinus be free, the matter flows out partially in certain positions, especially when the patient is lying on the other side, or he may be able to effect a discharge of the matter by strong expirations, and by placing himself in some position which he has found convenient; but as the ulcer cannot be cleansed, there is reason to fear lest the disease should extend to the adjoining parts. When the natural opening of the sinus

[1] See Le Chirurgien Dentiste, par M. Fauchard, tom. i, p. 238, Obs. viii, second edit.

is obstructed, as we find it in some of the cases related, the contained matter becomes depraved; it acts on the walls of the sinus, and makes an escape by destroying the bone, either in the direction of the orbit, or of the alveoli, or, lastly, of the cheek; thus an opening is formed for the discharge of purulent matter, and the disease produces an ozæna or a fistula.

In all cases, whether the pus is simply retained in the sinus, or by having remained too long has injured the adjoining parts, the chief indication for obtaining a complete cure is to evacuate the pus: for this purpose different modes of proceeding may be required, which are to be varied according to circumstances. Each author recommends as the best that which he has found succeed; a comparison of various cases will serve to show what course we should adopt in each.

Drake, an English anatomist, is the person to whom the honour of having first proposed a method for curing deposits in the maxillary sinus has been generally attributed. Heister says that some have attributed it to Cowper.[1] M. Günz claims it for J. H. Meibomius,[2] who, long before Cowper, had proposed a very similar method for the cure of maxillary ozæna.

Henry Meibomius, in a work published long after the death of his father, John Henry, proposes for the cure of abscess of the maxillary sinus[3] to draw several teeth, in order that the matter may find a means of exit through the alveoli. This method is founded in reason and experience; both father and son employed it successfully; and, as in this case, the matter is generally disposed to make its escape in the direction of the teeth, the roots of which it very often attacks, we may easily conceive that, after being thus evacuated, the suppuration may dry up and the disease in time be cured. This is a very simple mode, but will not suffice in all cases.

Cowper, the celebrated English surgeon and anatomist, relates[4] that he had to treat a man, who for four years passed by

[1] "Nonnulli celebri Cowpero, Anatomico et Chirurgo Anglo, cum primis inventionem hujus curandi artificii tribuunt." See the note. Instit. Chirurg. tom. ii, p. 622. Edit. 1750.

[2] Instit. Godefrid. Günz, Obs. et Diss. de Ozæna Maxillari et Dentium Ulcere. Lips. 1753.

[3] Discurs. de Abscessibus Internis; Dres. 1718, p. 114; and in Günz's Dissertation.

[4] Drake, Anthropologia Nova, p. 536; and Günz, Dis. cit.

the nostrils a quantity of fetid ichorous matter, caused by a maxillary ozæna. The situation of the sinus not permitting a free discharge for the matter by the nostrils, he took out the first molar tooth, and as the alveolus did not communicate with the sinus, as he had found in other cases, he perforated the bony partition which obstructed the escape of the matter. In this way he succeeded, the matter escaped, proper remedies were injected to cleanse the ulcer, and the patient recovered.

Drake's method is precisely the same, according to the description given of it by M. Heister after the author;[1] he proposes to extract the first molar tooth, and to perforate the alveolus with a sharp probe, which is all the more easily effected, in consequence of the bone being generally altered in structure; often indeed the destruction of the bone renders the latter step of the operation unnecessary. This perforation is not only useful as affording a means of exit for the pus, but allows us to throw in detersive and balsamic injections. A tent is further employed to prevent the injection from escaping altogether, and a cure is the result of this mode of treatment.

Juncker[2] proposes the same mode of treatment as Drake, without any variation, adding merely, that Drake recommends the perforation of the socket of the second molar tooth.

It will be seen from what we have stated, that Drake's method does not differ from Cowper's, nor Cowper's from that of Meibomius, except in the proposal to perforate the alveolus, which the latter does not expressly direct; perhaps because he had only met with cases in which the alveolus was already destroyed by the suppuration. We may, however, presume that as he had sufficiently considered the subject, to recommend the extraction of a tooth for the purpose of giving vent to the matter, he would not have hesitated to perforate the alveolus, in a case where the removal of a tooth did not produce the effect proposed. Be this as it may, we cannot deny to Cowper the merit of having explained himself very clearly, and having improved upon the method recommended by Meibomius, in expressly directing the perforation of the alveolus, where signs of suppuration of the sinus exist, and the alveolus is not destroyed. This latter step in Cowper's operation is, in many cases, very

[1] Inst. Chir., Part II, p. 622.

[2] Chirurg. Conspect. de Ozæna.

important, since it would often be dangerous to wait until the suppuration had destroyed the alveolus, with the hope that it would not at the same time affect other parts.

These methods may be employed indifferently in simple cases, as the following observation shows.

Obs. 4. In 1731, a woman had the third molar tooth on the right side of the upper jaw extracted; the crown was decayed, but the roots were sound. She experienced for a few days afterwards a great pain in the maxillary fossa, extending to the eye, and depriving her of sleep, but there was no swelling of the cheek or gums. A surgeon perceiving a cavity in the socket, introduced a sound, and gave vent to a quantity of fetid yellow matter. M. Lamorier was called some days after to see the patient; he removed a tent which had been introduced into the maxillary sinus, and which prevented the free escape of the purulent matter; he also advised the injection of Balaruc water, a part of which escaped by the nostril after a month's use of this means. In this way the patient was entirely cured.

In order to cure suppurations of the maxillary sinus, it is not sufficient to evacuate the matter; the opening should be free, to afford room for applying the proper remedies, and to facilitate the separation of the altered parts of the bone.

Obs. 5. An unmarried woman, 36 years old, having had the last molar tooth on the right side carious and painful for a long time, got it extracted in 1751. The tooth was broken in the operation, and the roots all but one remained in the socket. The pain caused by the extraction of the tooth gave rise to a small abscess, which appeared for a time to have relieved the pains to which the patient was subject, but this relief was not of long duration. Shortly after a numbness was felt in the maxillary sinus of the same side, with pain in the eye and ear; the gums became swelled, the pain ceased to be constant, but returned periodically. The patient remained in this state for five years, and the five molar teeth were successively extracted without affording her relief. At length, in 1756, M. Beaupreau was consulted by the patient, who, on examining her mouth, found all the gums united except in one part, where there was a small tubercle occupying the site in which the roots of the broken tooth remained, from which flowed a reddish fluid having a fetid odour. He passed a probe into this fistulous

opening, and met with an obstruction, which was, however, readily overcome, and the instrument then passed easily into the maxillary sinus. He dilated this opening with a knife; and after a time, carefully applied a mercurial solution to the diseased bone, and observed that the pains recurred as often as the opening showed a disposition to close. He then had recourse to injections, which in part escaped by the nose; he maintained the opening by means of catgut tents, and got away some exfoliations. The discharge having changed its character, and no longer having a bad smell, he allowed the opening to close, after dressing it for three months. This methodical treatment brought about a cure, and the patient has felt no pain since.

We may conclude from this observation, that there are few cases in which the simple extraction of the teeth according to the plan of Meibomius will be sufficient; and that in many cases, although a perforation of the socket should by accident exist, it will be necessary to enlarge this, and keep it open for some time, in order to obtain a cure.

As it is often necessary to draw one or more teeth, and to perforate the sockets, it is desirable to examine which tooth we should select for extraction, and in what point the sinus may best be opened.

The decay of one of the teeth, or even constant pain, will be sufficient to point out that as the one to be drawn, and that the matter is tending towards that point. If all are sound, which is rarely the case, we should strike the teeth lightly one after another, and if any one of them should be tender, we may know that this is the one we should extract. Cowper and M. Bertin, in his Osteology, advise the extraction of the first molar, which, though near the sinus, does not in general correspond exactly to it: this proximity, indeed, may cause the diseases of this tooth and of the sinus to be reciprocated; but we ought to have special indications to lead us to the selection of this tooth for extraction.

The same may be said of the canine; its root is lodged in the thickness of the bone, and extends towards the nasal fossa, and does not penetrate the sinus. It may happen, however, as in the case by M. Runge, which I shall have occasion to notice by and by, that, in consequence of great obliquity and irre-

gularity in the position of this tooth, it may take the direction of the sinus, and that disease of this tooth may be prejudicial to the sinus, or *vice versâ*. We must also observe, that the distance of the canine tooth from the sinus varies much according to the form of the nasal fossæ; for the maxillary sinus being broader when the nasal fossæ are narrower, the root of this tooth is nearest the sinus when the nasal fossa is narrow, and, on the contrary, is more distant when the nasal fossa is broad. We may therefore consider as rare the extension of this tooth towards the sinus; and that, unless there are particular indications, the extraction of this tooth would be useless as a means of relieving the diseases of the sinus.

An anatomical inspection will show us that the molar teeth, with the exception of the first, correspond to the sinus; sometimes, indeed, they reach the cavity, and form little elevations, the number and situation of which vary much, and indeed sometimes their roots extend actually into the sinus, being merely covered by the pituitary membrane. We should also notice that the sinus is thinner towards the last molars; we cannot, therefore, be surprised if, after the extraction of all these teeth, the matter formed in the maxillary sinus finds a ready issue by their sockets, since the action of the pus on the disease of the tooth produces an erosion, which establishes a vent for the matter collected; and should this not be the case, a perforation into the sinus must be made through the socket.

Although all the molars except the first correspond to the sinus, the third molar is that which we should select from preference: it corresponds more directly with the bottom of the sinus, the alveolus is but thin at that point, and in examining a variety of bones I have always found this the most convenient point at which to open the cavity. There would be no risk indeed in selecting the fourth molar, since the bone always becomes thinner in proportion as we approach the last molars.

There is one case in which the extraction of the third molar would be insufficient, but it is very rare; it is when the bottom of the sinus is divided into two cavities by a tongue of bone more or less elevated, such as Palfin has described;[1] but this case cannot be foreseen, unless indeed by passing a sound

[1] Anatom. Chirurg. Description des Os Maxillaires, part. iv, chap. xvi, seconde édit.

through the alveolus into the sinus; and should we recognise the existence of this peculiarity, we may provide against it by taking out the next tooth.

When one or several teeth are carious, we must remove them, since they are useless, or even hurtful, as the caries may extend its effects to the alveoli and to the sinus. After this, should the bone be diseased, we must treat the caries with the proper remedies. Should there be no communication with the sinus, we must perforate the socket, to permit the escape of the purulent matter, and this step of the operation is of the utmost importance for preventing the accidents which might result from its confinement. Without this, the removal of the teeth would be useless, and the purulent matter would make an outlet for itself, not through the alveoli, but sometimes through the anterior wall of the sinus, which is very thin, giving rise to abscesses in the cheek, which may easily degenerate into a fistula; sometimes in some other direction within the mouth, followed by fistulæ with caries. These diseases are readily cured by opening a passage for the pus through the alveoli. The following observations serve to establish the necessity for this operation.

Obs. 6. A servant of Count Maurepas had suffered for six months from a fistula situated in the left cheek, a little below the orbit, leading into the maxillary sinus, and following an abscess in that part which had opened naturally. M. Hevin had the third and fourth molar teeth extracted, both of which were much decayed; but as there was no opening at the bottom of the socket, he perforated one of them with a trocar. This opening gave issue to a quantity of putrid sanies: detersive injections, followed by vulnerary and desiccative ones, put a stop to the suppuration of the sinus. The opening made by the trocar did not close for more than a year after, whilst the fistulous orifice of the cheek had healed within a week after the counter-opening was made.

Obs, 7. A soldier of the regiment of Bassigny, who had had a fistula in the cheek for a long time, was treated for that disease in the Hôtel Dieu at Montpellier, in 1717, the matter gravitating towards the fistulous orifice prevented it from closing. M. Lamorier examined the mouth of this soldier, and finding the second upper molar tooth decayed, had it extracted, and through the alveolar cavity made an opening with the point of a

probe into the lower part of the sinus. The fistula of the cheek was thus cured in a few days; and the counter opening healed, after a long time, under the use of injections of Balaruc water, which never escaped by the nose.

The same treatment is suitable in cases in which the maxillary bone may be diseased in several parts, consequently to suppuration of the sinus, or where the suppuration is a result of disease of the bone.

Obs. 8. In 1757 I had under my care, in consultation with M. Morand, a young man who had for a long time been troubled with a purulent discharge from an opening in the roof of the mouth, between the third and fourth molar teeth, and which increased when the maxillary bone of this side was pressed on below the orbit. This part of the cheek was slightly swelled; the patient had some pain there, which diminished with the discharge of pus. These signs do not, in truth, necessarily depend on disease of the sinus: nevertheless, we recommended the extraction of the fourth molar tooth as being nearest to the fistulous opening. This tooth having been broken in the extraction, we had the next taken out, which was sound. I was thus enabled to discover the opening of the fistula penetrating into the sinus; this opening was enlarged with a sound, which facilitated the escape of a large quantity of fetid pus. The parts of the bone adjoining the fistula towards the palate were diseased; the probe passed into the cavity of the sinus could be felt in the cheek; even an injection, strongly thrown in, could be perceived there, showing that the bone was diseased at this point. After sufficiently enlarging the opening, we made the patient wear a silver canula, through which the matter constantly escaped, and which facilitated the use of injections. The patient was much relieved by these operations, and returned home into the country, after receiving the necessary directions for managing himself.

Obs. 9. A similar treatment succeeded equally in another case, of which the following is the history. A man had had a large swelling of the cheek for a year. The outer wall of the maxillary sinus was destroyed, and the pus escaped through several little holes in the cheek. A fruitless effort was made to enlarge the openings and to apply different remedies. The patient not being relieved consulted M. Maigrot, who perceived

a little opening in the mouth between two of the grinders; through this, purulent matter had escaped for the last three months. A probe, introduced into this hole, passed on to the maxillary sinus, and procured a freer discharge of matter. M. Maigrot determined, in consequence, to take out two molar teeth; afterwards he enlarged the opening with a trocar, and made an opening sufficient for the discharge of the matter, and for the easy introduction of injections into the sinus. After each dressing, he left in the opening a small leaden canula, and contented himself with covering the cheek with compresses soaked in honeyed wine. This treatment was perfectly successful: in a week after, the matter ceased to flow from the cheek, and the external openings were closed in a fortnight. The discharge having much decreased in quantity, the use of the canula was omitted at the end of twenty days; the lower opening narrowed by degrees, and the patient was entirely cured in two months.

We may readily conceive the advantages likely to result from a free discharge of pus towards the lower part of the sinus; it preserves the parts from the effects which might result from the presence of the suppuration, and the fistulæ heal almost of their own accord. But in these cases it is not enough to make an opening, it must always be kept in a sufficiently free state: for this purpose catgut, prepared sponge, &c. are commonly used, but these bodies, by swelling, close the aperture and retain the pus, and are often inconvenient; again, if one ceases to employ them, the opening narrows, and when the matter is abundant, it becomes obstructed, and produces pain, and other accidents. The silver canula appears well fitted to obviate these inconveniences; it always keeps the opening in the same state, allows the free escape of matter, and the easy introduction of remedies, and only requires to be plugged during meals. I found great benefit from its use in the case of a patient in whom I was obliged to keep open the sinus for a very long time, on account of a suppuration both tedious and liable to recur.

Obs. 10. A Russian youth, 10 years of age, was attacked suddenly, in 1755, with a very acute pain in the teeth, and a considerable swelling of the cheek. Two days after, an abscess of the gums opened above the second molar; the acute symptoms ceased, the patient felt better but the discharge continued. A fresh

attack having come on, it was thought better to take out the decayed tooth; the two next teeth were removed with it, the socket was perforated, and an opening made into the sinus; a little cotton, moistened with balsam of Fioraventi, was introduced into the opening, and the sinus injected with appropriate remedies. The patient was then placed under my care; the injection brought away thick fetid matter; the liquor injected strongly, passed in part by the nose; from time to time the patient, to use his own words, felt something burst in the sinus near the orbit, and shortly after a copious discharge of fetid matter took place. If the opening became narrowed, and the escape of the matter impeded, some pain speedily followed. I thought it desirable at first to dilate the opening with prepared sponge, and I afterwards introduced a silver canula having several holes, which permitted the pus to flow freely and without interruption. From time to time the matter became flaky; the canula was then removed and cleaned, and the patient, by sucking strongly, brought away this matter. Having become of better quality, I wished, at the end of six months, to leave off the use of the canula; but it was soon found necessary to recur to its use, for the patient still felt some abscesses open; the maxillary bone remained elevated, and the matter flowed abundantly through a small opening. I replaced the canula, and continued its use for nearly two years, as long as the quality of the matter seemed to require it. At the end of that time, the patient no longer feeling anything in the sinus, I withdrew the canula; the opening not closing I cauterized it lightly, and in this way the patient was entirely cured by the end of 1758. M. Morand, with whom I saw the patient, is acquainted with the particulars of this case.

The opening of the sinus at its lower part is indicated not only in cases where suppuration of this cavity has produced an alteration of the bone and external fistulæ; but also where the bone becomes affected in consequence of an external abscess, and the pus insinuates itself into the sinus, and becomes injurious from not being readily discharged. In this case we can only effect a cure by preventing the lodgement of the pus, and we should try in vain the recommendation of M. Gunz[1]

[1] Diss. cit.

to keep the patient lying on the sound side, or to modify his position in such a way as to obtain a discharge by the natural opening. In whatever position one may place the patient, the fistula will only be cured by affording the matter a free exit through a counter-opening. Various observations establish the necessity and success of this practice.

Obs. 11. A young lady having received a blow on the lower border of the orbit on the right side, had an abscess form in the cheek of the same side eighteen days after. M. Dubertrand having opened it, found the outer surface of the maxillary bone affected; this part of the bone was dressed with balsam of Fioraventi, and exfoliated at the end of ten days. The edges of the ulcer were fungous, but being properly dressed the ulcer healed at the end of a month. However, as a small fistula remained from which a tasteless mucous matter flowed, M. Dubertrand dilated the fistulous orifice with a bit of violin string. Some days after, having ascertained that the fistula penetrated into the sinus, he had the canine tooth and first molar extracted, as they were a little painful, and perforated the socket of the latter with a trocar, and thus determined the flow of matter downwards. His object in doing this being to heal the fistula of the cheek, he scarified the orifice, and it was perfectly closed at the end of eleven days. By the lower opening he injected the sinus, from which flowed matter which never had any bad odour. A month after he allowed the lower opening to close, and from that time the patient was perfectly cured.

Obs. 12. An observation, by M. Saint Ives, shows in a similar way the importance of making a counter-opening into the sinus through the alveolus for the cure of a fistula below the eye.[1] A young man having an abscess below the globe of the eye, the matter of which had discharged itself through an opening in the centre of the lower lid, the lodgement of the matter caused caries of that portion of the maxillary bone which forms the under part of the orbit. The matter flowed into the sinus and escaped by the nose. M. de Saint Ives having discovered this communication with a probe, and fearing the effects of the presence of pus in the cavity, from which it could not readily escape, had one of the molar teeth drawn, and thus afforded

[1] Maladies des Yeux, chap. iii, p. 80. Paris, edit. 1722.

an escape for the matter into the mouth by the opening through the socket. He injected the sinus, and under this treatment the fistula was cured in two months.

If it were merely required to establish a counter-opening, this might be effected by a perforation into the sinus above the alveolar arch, without the sacrifice of a sound tooth. This operation has been practised, according to the method of M. Lamorier, a celebrated surgeon of Montpellier, and an associate of the Academy.

In a Memoir presented by him to the Academy in 1743, he established for the opening into the sinus a point of election and a point of necessity. The latter is indicated by a fistula or a caries in any part of the maxillary bone. The point of election on which he fixes is immediately below the eminence, which one readily feels by carrying the finger as high up as possible under the upper lip, the mouth being shut. This eminence is the part at which the maxillary bone joins the malar bone, and is situated exactly above the third molar tooth, it corresponds to what one may call the point of the sinus ; some anatomists call this eminence the malar apophysis.

The patient, having been prepared by suitable treatment, should be seated in an arm-chair with the head raised as much as possible, and fixed. The jaws must be closed in order to relax the lips, the commissure of which must be drawn upwards and backwards towards the ear with a blunt hook, called 'a speculum for the back part of the gums.' This hook, occupying but little room, readily lays bare the part on which we are to operate. The upper lip is then to be raised and kept up with the fingers, and a transverse incision made below the malar apophysis above the third molar with a strait bistoury, through the gum and periosteum ; the bone being thus laid bare, we are to pierce it in the centre of the incision with a triangular shaped perforator mounted on a small wimble ; the opening into the sinus may then be enlarged according to the exigencies of the case. This method was employed with success in the severe case I am about to report.

Obs. 13. An unmarried lady, 65 years of age, had in 1740 an inflammatory swelling above the upper molar teeth, which nevertheless appeared sound. This swelling suppurated, and was followed in the same place by a fistulous ulcer, from which a

very fetid sanies constantly issued. Caries of the roots of the teeth being a very frequent cause of such discharges, it was determined to remove the canine tooth. The socket of the tooth furnished much pus; there was an opening into the maxillary sinus, and the discharge being very copious it was thought right to extract the first molar, the point of the roots of which appeared somewhat diseased. The patient continued to spit a great deal of sanious pus, and preparations were making to extract the second molar tooth, when it was determined to call in M. Lamorier, who thought the case a suitable one for his plan of treatment. Having raised the upper lip in the manner described above, he made a transverse incision above the third molar, pierced the maxillary bone, from which a quantity of sanious and thick pus flowed, and enlarged the opening sufficiently to admit the point of the little finger into the sinus. The patient declared she had suffered much less pain from the operation than from the extraction of one of her teeth ; she had no fever, and the sanious discharge ceased a few days after the operation. Barley-water, sweetened with honey, and Barège water, were afterwards used as injections. These fluids never escaped by the nose.

The opening left by the removal of the teeth, allowing the entrance of the air into the sinus, this lady spoke like a person whose palate is open; and in eating, part of her food found its way in. To remedy these inconveniences a little bit of sponge, attached to a fine silk thread, was introduced in the morning and withdrawn after supper. This plug restored the natural tone to the voice, and prevented the entrance of the food. After some time the use of this foreign body was laid aside, from the fear lest it should prevent the approach of the flesh and edges of the bone, care being taken to wash out the sinus by injecting a little fluid after each meal.

It may be supposed that the cure was tedious after so great a loss of substance; the patient was indeed forewarned that her age, her unhealthy temperament, and the natural flow of mucus would prevent the counter-opening from thoroughly closing. After the operation she ceased to spit bloody matter; and had no longer any pain nor fetid smell in the mouth. A year and a half after the operation, although the sinus was not entirely closed, and a mucous discharge still flowed, as

must necessarily be the case, seeing that the opening into the nose was obstructed, the patient might be considered as cured as compared with her state, when a quantity of fetid sanies was discharged daily.

M. Lamorier decided on operating in this way because the purulent discharge persisted notwithstanding the removal of the teeth; because he could not otherwise examine the interior of the sinus which he thought affected, and because the abundant discharge led him to suspect an extended ozæna. These considerations induced him to give the preference to this method, which allows of the opening being extended, and the interior of the sinus being examined, which cannot be done through the alveoli. It must be observed, however, that her attendants had neglected to employ injections, and that, if these had been used from the first, no other operation would have been necessary.

Should the alveoli have disappeared, in consequence of the teeth having been extracted long before, the method of Cowper and Drake would be impracticable. The bones having more density at their alveolar border, the pus would tend towards the adjoining parts, and it would then appear more proper to afford it a discharge towards the lateral parts; but the diseases which require these operations perhaps never exist under such circumstances. Lavater, who appears to have been acquainted with the use of the trepan to the superior maxillary bone, pronounces it, without any sufficient reason, to be the opprobrium of surgery.[1]

When it is necessary to form a lateral opening into the sinus, the plan of M. Lamorier appears simple, easily executed, and convenient for the after-treatment. Moreover, one is obliged to have recourse to this operation in certain complicated cases, such as caries, exostosis, or polypus; to deterge an extensive ozæna; to extract foreign bodies; or when the teeth are unaffected, and it is desirable to preserve them; lastly, one may give the preference to this operation, when the matter contained in the sinus shows a disposition to escape at some

[1] Vid. Paradoxa Medico-Chirurg., at the end of the dissertation 'De Intestinorum Compressione,' Thes. Chir. ab Hallero Collect. tom. iii, where he expresses himself thus: "Τρηδόνα ossium coronalium, et maxillæ superioris ad dentes molares, chirurgorum opprobrium declaro."—Basil., 18 Sept. 1672.

particular point. A very curious case related in the Memoir of M. Runge,[1] furnishes a proof of the advantage that may be derived from such a proceeding.

Obs. 14. A woman had on her left cheek a tumour of the size of a pigeon's egg, which disfigured her much. The tumour was indolent, and the colour of the skin but little changed. The teeth on this side were often affected with severe pains. This woman, though young, had but few teeth, and they were carious; in other respects she enjoyed good health. M. Runge, in examining this tumour, which projected towards the cheek, towards the palate, and towards the left nostril, found that it yielded to pressure, and that it made a slight noise in recovering itself when the pressure was removed. These signs led him to conclude that it was formed by a fluid retained in the cavity of the sinus, the walls of which it had dilated and thinned, and he considered it necessary to open the tumour, to give vent to the fluid, and to inject the sinus with appropriate remedies.

The most desirable plan for making the opening was between the left cheek and gum; this was the most prominent point, and that on which the instrument could most readily act. Having drawn aside the cheek with an instrument, he opened the bone with a bistoury, enlarged the wound forwards and backwards, and made a large hole in the bone, which gave vent to a mucous inodorous fluid collected in the sinus. The bones were not found denuded; the wound was dressed with a tent steeped in spirits of wine, and on the following day the patient was better. The third day the sinus became painful, and swelled; there was fever, and the matter was acrid and fetid. The fever was treated; and by the use of appropriate remedies the pain, swelling, and fetid odour were in a few days got rid of. On the cheek was placed a compress, moistened with camphorated spirit, and the sinus was injected with spirituous fluids, the employment of which we do not consider indicated in such a case, and which we may perhaps consider as the cause of the symptoms which had supervened. However, at the end of twenty-four days the walls of the sinus

[1] Dissert. Medico-Chirurg. de Morbis Præcipuis Sinuum. Author. Ludolph. Henr. Runge, tom. i, Disputat. Hallero editar.

had receded, especially on the sides towards the nose and palate.

The canine tooth on that side being very oblique, so as to be fixed almost transversely in its socket, M. Runge had it extracted; it was very long, and appeared sound. After the extraction the matter contained in the sinus escaped by the socket, and this opening appeared very useful in forwarding the cure. The success equalled his expectations; the bones retracted themselves sensibly each day; appropriate injections were continued for some time, and the opening made by the bistoury closed promptly without any exfoliation. The methodical compression of the cheek was of use in favouring the recovery of the bone, the deformity disappeared little by little, and at the end of six months the disease had disappeared.[1]

Although the lateral opening of the sinus may sometimes be very advantageous, we nevertheless see that, in this case, the opening of the alveolus was of still more use in procuring a free discharge of the matter, which confirms us in asserting that, as a general rule in treating suppuration of the maxillary sinus, the opening through the alveolus is always more useful, and will be found sufficient unless some particular reasons, such as the existence of tumours, caries, foreign bodies, &c. should render it necessary to make a large opening above the third molar tooth.

M. Heister, in giving an account of Drake's operation, remarks that the diseases of the maxillary sinus make progress only because of the difficulty which exists in obtaining a free discharge through the natural opening, and because the elevated position of that opening prevents the introduction of the necessary injections. This, which seemed to him a defect, some surgeons have endeavoured to overcome, with a view to rendering more perfect the treatment of these diseases.

M. Jourdain, dentist and licentiate of the College of Surgery, presented to the Academy in 1765, a Memoir on the diseases of the maxillary sinus, in which, after having examined their nature, and the means hitherto employed for relieving them, he proposes a new method of cure by introducing injections

[1] [The above seems to have been one of the cases described by Dupuytren as osseous cysts. See Dupuytren on Diseases and Injuries of Bones, ch. v. Edit. Syden. Soc.—Tr.]

into the sinus through the natural opening. This operation deserved attention from the Academy, and was very carefully discussed. Several members entertained doubts of its feasibility, in consequence of the difficulties arising from the structure of the parts; it was therefore determined to undertake some experiments for the purpose of resolving these doubts as to whether the proposed operation was possible.

M. Allouel, junior, member of the Academy, stated that this method had been discovered by his father, as long ago as 1737, and successfully employed in 1739.

M. Allouel, not having published his method in any work, and not having even announced it to the Academy, M. Jourdain cannot be suspected of having borrowed it from him. The first discovery appears indeed to belong to him; his probity and talents forbid us to contest this point, but, as it was allowed to remain unknown, M. Jourdain would appear entitled to share the honour of the invention, and deserves praise for having published his researches.

The new method requires three instruments: 1st. A solid sound made of annealed silver wire, with a button at the end, which is passed into the sinus, and a heart-shaped handle at the extremity, which projects from the nose, by which it is held with the finger and thumb. 2d. A hollow sound which has neither button nor handle, in which is contained a whalebone stilet, somewhat longer, of which one end projecting from the sound, enables one to hold it firmly between the fingers. 3d. A little syringe, the nozzle of which fits the hollow sound. The sounds vary but little in size, but more in length to suit different noses, and they should be more or less bent into an S shape.

Having ascertained that it is necessary to use the sound, we should place our patient in an arm-chair with a rather sloping back. Warm water should be drawn up the nostrils to cleanse them, and we should then, with the solid sound more or less curved, search for the position of the fold or depression which is at the natural opening into the sinus. When we have ascertained its position we are to introduce the hollow sound, having first moulded it to the shape of the solid sound, in such a direction that the extremity which projects from the nose almost touches the edge of the lower lip,

whilst the convexity at the other end is below and within the arch of the superior cornu, and the point which is to enter the sinus rests against the fold; a slight motion is then to be made towards the sinus, whilst, by raising the wrist a little, we cause the sound to describe a semicircle, and at the same time draw it a little towards us.

The Academy appointed an intelligent committee to examine into the matter, who, after repeated trials, came to the conclusion that, except when an opening exists of sufficient extent, the introduction of the sound, though possible, is very difficult. An examination of the parts showed them that the wall of the sinus, being very thin and formed of membrane only between the two cornua, the sound introduced into the nostrils most generally perforates it, and thus passes readily into the sinus. This occurred twice in the experiments made on five subjects, consequently on ten sinuses, from whence it follows, that though it be possible to pass a sound into the sinus by the natural opening, it will frequently happen that the sound will pass through an opening accidentally made between the ethmoidal and the inferior cornua of the nostrils. As an artificial opening may be thus made without causing any serious symptoms, such an occurrence may have often been mistaken for penetration into the sinus by the natural opening, a consideration which will alone suffice to establish the difficulty and uncertainty of the operation.

On examination, we shall find that there are very few cases in which the employment of injections through the natural openings in the manner above described would effect a complete cure. The disease of the sinus is rarely the consequence of congestion or simple suppuration of the membrane; more often it is the consequence of disease of the teeth and of a caries of greater or less extent; now, in these latter cases, injections would be insufficient, and a more effective local treatment is required.

If we reflect on the advantages likely to result from the use of injections, we shall readily perceive that they are limited to cleansing or disgorging the membrane of the sinus. But the better to appreciate the advantage to be derived from their use we must examine the cases adduced by the authors of this method to prove their usefulness.

These cases, which I shall briefly notice, were those of diseases which would probably have yielded to general treatment; and in only two of the five can we feel assured that the injection was introduced through the natural opening. A case observed by M. Allouel, and which is the least equivocal, presented only a considerable fulness in the nose, with a discharge of fetid matter from the nostrils. The source of the discharge having been traced to the sinus, by its flowing more freely, and in large quantities in certain positions of the head, and general remedies, together with injections into the nasal fossæ, having afforded no relief, recourse was had to injections into the sinus, which put an end to the disease.

Two observations by M. Jourdain relate to diseases arising from congestion of the membrane, caused, the one by a fall, the other by a blow on the maxillary sinus, and which he treated by injections; but, granting that the cure was due to this treatment, there is no proof that the injection was introduced by the natural opening, since, according to the author's expression, this opening was closed. In these two cases there was the injection passed into the sinus by the natural opening or through an artificial one. This question must remain unsettled. A third case presented a simple discharge. Lastly, the fourth was complicated with caries of the teeth, and seemed merely to require the removal of three decayed teeth which kept up congestion and pain on one side of the face. There seems no proof that, in this case, the interior of the sinus was affected; the curative means first employed may have contributed to increase the disease, and there appears no reason for preferring injections to the treatment usually followed in such cases.

Considered in this way, the above cases afford no conclusive evidence in favour of the new method; the diseases disappeared whilst the injections were used, but they might have done so equally without them. We constantly see the most obstinate discharges, with obstruction in the nose and pains in the sinus, yield to the employment of general remedies, or even disappear spontaneously. Injections in such circumstances would be useless, and it would be a mere abuse of our art to subject patients to a disagreeable and painful operation without any real necessity for so doing.

DISEASES OF THE SINUS PRODUCED BY A SPECIFIC POISON.

Venereal and other diseases may cause suppuration of the sinus, fistulæ, exostosis of the maxillary bones, caries, &c. In these cases, the means above described would be insufficient alone, or would only occasionally succeed. For the proper treatment of such cases it will be necessary to have recourse to specific remedies, after which, different proceedings, suited to the circumstances, will readily complete the cure.

The late M. Fournier showed me a man at the Bicêtre, almost all the bones of whose face were swelled and attacked by caries, in consequence of the venereal disease. After a methodical use of mercurial frictions, various points of suppuration were established on the face, through which the malar bones and portions of the superior maxillary bones came away. In this case the sinus had been opened at its upper and outer part, and suppuration had consequently taken place in its cavity, but the venereal poison having been destroyed, the parts recovered themselves without the employment of any local treatment.

Besides these internal poisons, which may render the cure of the sinus difficult, there are also local complications of different kinds, which may prevent one from treating these diseases according to any of the foregoing methods, and we are then obliged to have recourse to different practices, suited to the requirements of the case. The following observations will prove this, and may serve as examples of the modes of varying the treatment, and exhibit the resources of our art in nice and difficult cases.

Obs. 15. A labourer, in the neighbourhood of Paris, suffered almost continual pains for several years, occasioned by caries of the teeth. The canine, and the first and second molar of the left side were entirely rotten, and there only remained some of the roots. The patient complained of pain in the mouth, and a pretty large oblong swelling existed on the left side of the palate, when he applied to M. Coutavoz in 1750. This tumour had begun to appear three months before; it had been preceded

by severe pains in the teeth, it had increased little by little; there was fluctuation; and when it was pressed on, pain was felt extending to the cheek-bone and nostril. All these circumstances led to the conclusion that the seat of the collection was the maxillary sinus, that there existed a caries extending to the palate, and that a cure could only be effected by laying open the tumour throughout its whole length. The opening gave issue to a large quantity of viscid and very fetid pus, and on passing the finger into the sinus, which was readily done, the bone was found to have been destroyed. Hemorrhage occurred during the operation, which was stopped by a methodical compression, maintained by one of the pupils. The matter was for some time of a bad character, but proper dressings, especially injections, soon changed its character; the fetid odour disappeared, and all applications were then left off, except certain vulnerary and detersive injections, which were employed three times a day. The opening gradually closed; on the twenty-sixth day there was no longer any purulent discharge, and the patient, by merely continuing to use a gargle, was entirely cured by the thirteenth day. The cicatrix which formed in the palate exhibited a sensible depression.

Sometimes the progress of the disease produces a great change in the texture of the parts, the sinus becoming distended and its walls softened. In this case it is necessary to make a large opening, which is easily done, not by merely perforating the alveoli, but by cutting through a part of the sinus.

Obs. 16. A woman, 36 years of age, having exposed herself to the cold air on the eighth day after her confinement, in 1759, was attacked by sharp pains of the upper jaw of the left side, occasioned by the presence of several carious stumps. On the following day, the cheek became much swelled; some days after the pain ceased, but the swelling increased, without any change in the skin, the face became distorted, the orbitar process of the maxillary bone appeared to be considerably raised, the substance of the bone became softened. The same disorder exhibited itself in the nose, and the opening of the sinus being thus obliterated, the matter escaped through the alveoli about twenty-two months after the first attack.

The patient had had another child, and was in the third

month of a third pregnancy, when she came to Paris for advice in January, 1761. M. Beaupreau having examined the state of the parts, thought it necessary first to extract the teeth which were carious and broken, but in trying to extract these the bone was found to move with them, he therefore adopted the alternative of making an incision along the alveolar border, from the small incisor to the last molar but one, removing the teeth with the bone, which he readily divided with a pair of scissors, close to the canine tooth. The sinus was much dilated; its membrane was fungous, and there was much pus; the cavity was washed with detersive injections, and dressed with pledgets covered with a digestive cerate, containing oil of turpentine; sometimes mercurial ointment, or red precipitate were employed. M. Beaupreau prescribed a solvent bolus to be taken daily, followed by a glass of clarified juice of cresses. The success of this treatment was soon manifested; in a fortnight the tumour had visibly decreased, the pus was healthy, and lessened in quantity. At length, at the end of two months, the discharge having become mucous, lime-water was employed as an injection, at first diluted, but afterwards pure. As the injections had never escaped by the nose, M. Beaupreau preserved an opening below; the parts gradually recovered themselves, and at the end of two months and a half the patient was well. I was witness to this cure.

This plan was followed by M. Bourdet in a very similar case. Having to treat a patient in whom the sinus was very much dilated and softened, and so circumstanced that he could not attend to the subsequent treatment, he made a large opening into the cavity, and an incision through the alveolus in the form of a V, with the point upwards. The bones not being diseased, this plan succeeded, under the use of a gargle merely. M. Bourdet, therefore, thinks that this plan might without risk be employed where the patient cannot be frequently seen. But whatever may have been the success in this case, we do not think that it should be employed indifferently in all. This practice is fitted only for cases in which the bone is softened and the sinus much dilated. There are cases in which Nature indicates to the surgeon the mode of cure; there are others in which the efforts of art, guided by intelligence, should take the place of Nature's efforts, stop the progress of disease, and bring

about a cure by methodical treatment appropriated to the circumstances of the disease.

Obs. 17. A lady lost her left eye by a carbuncle, and the soft parts which fill the orbit being destroyed, a caries of its lower border was discovered. The cheek became raised, the tumour being formed by the distended maxillary bone. M. Bertrandi being called to see the patient, found a fistula at the orbitar edge of the superior maxillary bone, through which he could pass a probe to the palatine plate of the same bone. The patient suffered much, and was then labouring for the third time under an attack of phlegmonous œdema, which terminated in an abundant discharge of sanies through the fistulous orifice. M. Bertrandi proposed the extraction of a molar tooth, in order to allow of the constant discharge of the matter, but the patient would not consent. Some time after, he was recalled, but the extraction of a tooth was now become difficult, all the cheek was much swelled and painful, and there was so much tension at the articulation of the jaw, that the patient could scarcely open the mouth sufficiently to admit a finger. In consequence of this, M. Bertrandi proceeded to introduce through the fistulous opening a long and slender perforator, protected at the point by wax, and to carry it as nearly perpendicularly as possible against the internal surface of the palatine plate of the bone, which he supported below with two fingers, and thus steadied the head whilst he made a perforation between the two last molar teeth. From this time the matter no longer escaped by the fistulous opening in the orbit, nor by the nose; the patient was relieved, the exfoliation of the carious bone was assisted, and the cure was completed by the use of detersive and vulnerary injections.

Although the above case resembles some of those before related, in proving the advantages of a counter-opening for bringing to a termination certain diseases of the sinus, it nevertheless deserves particular consideration, because the disease had here reached such a pitch as no longer to allow the operation to be performed through the mouth, nor the employment of any of the methods before proposed. It was nevertheless requisite to make a free passage for the matter downwards, in order to cure the patient; this the surgeon obtained by availing himself of the upper orifice, in order to introduce a perforator,

and to effect such an opening from within, as he could no longer obtain by the removal of a tooth and the perforation of the alveolus.

When suppuration of the maxillary sinus is complicated by a bad state of the fluids, the walls of the sinus are often affected, and we find an extensive caries supervene, which is to be cured by the use of appropriate internal remedies, accompanied by a free exposure of the carious part to facilitate the exfoliation. Nature, in these cases, effects singular cures when aided by proper assistance.

Obs. 18. A riband weaver of this city, while at work, received a blow under the eye, on the front of the left maxillary bone, and a swelling formed in that part some time after. This swelling was preceded by pains in the teeth, and a considerable enlargement of the cheek, which appeared to yield to general treatment. About a month after, the swelling of the cheek returned, fever came on, and the patient for some time felt an acrid serous fluid constantly escaping into the mouth; at length, a considerable swelling of the palate appeared, from which flowed a quantity of fetid pus; the mouth exhaled a very disagreeable odour; two stumps, which had remained in their sockets, and a sound tooth fell out; lastly, a decayed tooth was extracted, and caries of the bone was discovered. Hitherto, the principal part of the disease having been overlooked, only general remedies had been used. The patient having in this state placed himself under my care in 1760, I found his gums swollen, black, and almost in a gangrenous state; the flesh which covered the palatine portion of the maxillary bone was in part detached; the hue of the skin was pale and leaden, the superficial veins appeared congested, his strength was almost gone, especially towards evening, and he felt a burning heat internally. All these symptoms, and an examination of the diseased parts, satisfied me of the existence of a disease of the sinus, complicated with a scorbutic poison. I immediately laid bare the diseased bone as freely as possible; I dressed the caries in a proper manner; injections were employed, which passed through the nose, and I ordered antiscorbutic remedies for the patient. In a short time the pus became changed in appearance, was less abundant, and less fetid; the state of the patient improved; he could blow his nose more freely, and the

matter escaped in part by the nose. By these means, varied according to circumstances, I obtained, after six weeks' dressing, a complete exfoliation of almost all the alveolar portion of the maxillary bone. I passed my finger into the sinus, and found some portions of bone diseased, which came away soon after; the external swelling of the bone subsided, and by following up the treatment, the fleshy part of the palate became drawn in, reunited with the neighbouring soft parts, and closed the opening of the sinus seven months after. The patient towards the latter part drank milk diluted with water of China root, and completely recovered his health.

Obs. 19. A case which a good deal resembled the above deserves a place here. A man whose right maxillary bone had been swelled at the upper part for three months, had also a soft swelling of the palate, pressure on which caused a flow of pus from the nostrils of that side. These accidents, joined with a swelling of the gums, a loose state of several of the molars, and a fetid odour from the mouth, led M. Planque to conclude that he had suppuration in the sinus complicated by a scorbutic state. The molars, which were only hanging to the gums, having been removed, pus escaped from the sockets. Caries of the maxillary bone was discovered and properly dressed; about a month after, the bone began to loosen, and a portion, an inch and a half long and half an inch wide, separated. The walls of the sinus afterwards closed in, the external swelling disappeared, and a solid cicatrix formed over the opening into the sinus. During the cure the patient took such antiscorbutics and opiates as were fitted for his state.

Were it necessary to multiply instances I might add a case of caries of the maxillary bone, communicated by M. Veyret, but the circumstances being nearly similar, it is unnecessary to relate it at length.

In the cases above related the nature and progress of the disease indicated exfoliation of all the lower part of the bone, and to obtain it, it was sufficient to lay bare the caries, which might then be immediately attacked. The same practice cannot be adopted when the caries attacks several distinct points; then it is necessary to vary the proceedings, and to employ different means, which the knowledge of the surgeon alone

can suggest to suit the circumstances. The following observations will furnish remarkable examples of this.

Obs. 20. A young man, 20 years old, had, for three months, a small ulcer in the upper and middle part of the right cheek, which would not heal, and which followed an abscess occasioned by a pain in the teeth. When the patient presented himself at La Charité, June 21st, 1743, the cheek was a little swelled, but without colour or inflammation; a small swelling was, however, observed at the lesser angle of the eye, which appeared to be the source of the matter; the patient from time to time suffered some pains in the teeth. M. Foubert, in examining the mouth, perceived that the canine tooth on the right side was carious; he had it extracted, and some days after, no change having taken place, he decided on making a transverse incision into the swelling from the fistulous opening outwards; and by this means he discovered three pieces of bone as large as a lentil, but broader and more irregular. Having then introduced a probe into the wound, it penetrated into the sinus, and, on being pushed on, escaped by the socket of the extirpated tooth. There was no longer reason for surprise at the long continuance of the discharge, and the difficulty in healing the ulcer; the matter made its escape by the alveolus, which was kept open by a seton passed from the fistulous orifice into the mouth. Vulnerary injections were employed; but as the matter escaped only whilst the part was being dressed, a leaden canula was substituted for the seton. A free evacuation being thus obtained, the discharge from the fistulous opening diminished, and cicatrization took place. The canula was kept in the alveolus for some time to maintain the lower opening and facilitate the flow of purulent serum, but was afterwards removed, and the patient left the hospital quite cured in the course of three months.

Some of the cases related above, when treating of the method of Cowper and Drake, seem to leave little doubt that a simple counter-opening by the alveolus would have sufficed in this case to effect cicatrization of the ulcer of the cheek, and afterwards a complete cure of the disease of the sinus. It may therefore be a matter for surprise that it was not employed here; but, on examining the views of the surgeon, we shall find that he was led to use the seton not only for the purpose

of introducing the necessary medicaments into the diseased parts, but also to facilitate the detachment of the diseased bone. But for these circumstances the seton would have been useless, and we may remark that it was removed soon after exfoliation had been effected. This means may, however, be of great use in practice when properly employed.

Obs. 21. A nun suffered from severe pains in the upper jaw of the right side. She consulted the surgeon who attended the household, who examined the inside of the mouth without discovering anything denoting disease in the sinus, and, finding the teeth all sound, treated it as an inflammatory affection. Bleeding and the other means made use of produced no mitigation of the pains; on the contrary, they became more severe; fever, convulsive movements, and delirium came on. The surgeon confined himself to endeavouring to mitigate the symptoms, and succeeded at the end of a month in doing so, but without attacking the disease at its source.

The patient, wearied by useless remedies, determined to put up with the disease; she passed three months more in a state of suffering, and was only driven by the violence of the pain to seek again for advice. She depicted her sufferings in such a way as to lead her surgeon to suspect their cause, and, on carrying his finger into her mouth, he discovered the point where the matter was seeking to escape; the slightest pressure on this point was painful. This latter sign and the long duration of the patient's sufferings enlightened the surgeon as to the nature of the disease; he recommended the use of an emollient decoction to be retained in the mouth, which afforded some relief. At some distance from the painful spot a slight inflammation supervened, with a swelling as large as a nut. This was opened, and a quantity of fetid matter escaped. The surgeon made no further examination, but continued the use of a gargle; the patient ceased to suffer, and at the end of a few days the incision healed, the surgeon flattering himself the cure was complete.

The patient relieved by the evacuation of the matter, remained for a month in this conviction; then new pains appeared, which were, however, easily borne; a new collection of matter formed, which no longer meeting with the resistance before offered to it by the base of the maxillary bone, readily

broke through the recent cicatrix; a considerable quantity of matter was discharged, and the patient left the case to nature. This process was repeated several times. After several recurrences, the cicatrix having become more firm, and the maxillary bone being diseased, a small swelling formed over the upper part of the bone, a little below the inner angle of the eye; there was fluctuation, and just as it was about to be opened, the patient making pressure on it, caused the cicatrix in the roof of the mouth to give way, a quantity of matter escaped, and the swelling below the eye entirely disappeared. This last occurrence ought to have left no doubt of the existence of two carious points and of their communication; but as nothing was done to make a radical cure of the disease, the patient for eight years experienced almost periodical returns of the swelling under the eye. Little troubled by her condition when the swelling appeared, she evacuated the matter collected by pressure, which broke the lower cicatrix. At last, tired of the inconvenience, she determined to come to Paris to seek the best advice.

M. Ruffel, to whom she applied, was speedily satisfied as to the nature of her disease, as well by her account of herself as by the return of the swelling, which clearly showed the communication between the two diseased points of bone. He first introduced a probe by the fistula within the mouth, which was situated near the alveolar border, and having entered the sinus he passed it on to the upper part of the bone, which he found carious; he thus raised the integuments, and still more conclusively convinced himself of the existence of a communication by touching the end of the probe; in place of the probe he then introduced the canula of a trocar, and pushed it on to the upper caries of the maxillary bone; then passing the trocar into its canula, perforated the integuments in the interval left between the two planes of the great incisor. The trocar was now withdrawn, and the opening enlarged with a bistoury, guided by the canula, until the caries was sufficiently exposed. An eyed probe, carrying a skein of thread, was afterwards introduced by the upper opening, and drawn through the mouth, and the skein left sufficiently long to prevent its returning into the sinus. In this operation the lower opening was enlarged, and some fragments of bone came away. The lips of the upper

wound were kept apart by the dressings, and a slight tumefaction which ensued was dissipated by a couple of bleedings.

The object of this operation was to afford facilities for introducing into the sinus proper detergent remedies, and to keep open with the seton the two orifices until the portions of carious bone had separated. The dressings were altered from time to time, and the injections brought away a good deal of fetid purulent matter. Several pieces of bone, loosened by gentle motions given with the seton, separated from time to time, M. Ruffel taking care to keep the upper orifice sufficiently dilated by means of prepared sponge, or by destroying the fungous granulations with caustic potash. The seton was left in for six weeks, a fortnight after the discharge had ceased to be fetid, and when there was no longer any purulent discharge. The openings closed firmly, and the patient recovered, with no other deformity than a little depression.

By a careful and considerate examination of the last two observations, it will be seen that the diseases described in them were not treated by any of the usual methods hitherto proposed. In these cases the caries had extended below the fleshy parts; it was deep seated, and it was not thought desirable to trust to simple perforation of the alveoli, because there were old fistulous openings; the lateral opening, proposed by M. Lamorier, would have also been insufficient, injections would have failed to cure the disease; it was therefore necessary to attack it directly, as was done in the last two cases, where a careful observation of the progress of the disease served to point out the course to be followed, and how it should be varied in order to effect a complete cure. The use of the seton was beneficial, as it always will be in deep-seated caries; it does not prevent the use of injections: it allows the employment of different medicaments, sometimes required for removing fungous elevations, sometimes for exciting suppuration in the congested inner membrane; it loosens and brings away bits of bone, and serves to keep open the orifices which otherwise might close before the cure was complete; counter-openings and a seton may be set down as likely to be useful in complicated cases. They may be considered as useful additional means to the usually received methods, when these alone would be insufficient, from our not having

sufficient indications of this double alteration; but they require much circumspection, and should not be lightly employed.

Before concluding this article, we feel it right to mention the actual cautery. Its use is perfectly well known in the treatment of caries of the bones, and undoubtedly it may be used with advantage in forwarding the separation of the bone in certain cases of caries of the sinus. It may also be useful in destroying sarcomatous or fungous tumours of this part, to diminish superabundant discharges, and to correct the unpleasant odour by drying away moisture. The preference which it deserves in comparison with liquid caustics, is sufficiently established by a great number of facts. But is the actual cautery the most appropriate means for cleansing the sinus? M. Bourdet speaks of having employed it successfully in a number of cases, of which he has given the details, and for this reason proposes it as the surest and most effectual remedy. We do not contest its efficiency; but to satisfy ourselves that it cannot succeed in all cases, we have but to remember that if the membrane was fungous throughout its whole extent, it would be impossible to apply the cautery at all points; that its application against the thin walls of the sinus requires the greatest circumspection; and, lastly, that it is not exempt from the risk of accidents.

Sarcomatous tumours and fungous and polypous tumours of the maxillary sinus will furnish the materials for a second Memoir.

SUPPLEMENT BY LOUIS.

Caries of the teeth is almost the only cause of the diseases of the maxillary sinus, and of the circumjacent parts; it is astonishing that so many oversights should have been committed on this subject. It is not necessary that the roots of the teeth should extend into the cavity of the sinus, as sometimes happens, in order to excite congestion, suppuration, and caries. Those who have considered the organization of the teeth, and who remember the origin, course, communications, and distri-

bution of the dental vessels and nerves, will not be surprised at the disorders occasionally produced by caries of the teeth. The membrane which lines the maxillary sinus receives branches from the same artery which sends twigs through scarcely perceptible openings and bony canals, to be distributed to the roots of the teeth in each socket. The nerves are branches of the second division of the fifth pair, which forms a beautiful network on the face, chiefly by anastomosing with branches of the portio dura of the seventh pair. Thus a reason is afforded for those fluxions which produce such prodigious swellings of the face, and which take their origin from an obstruction in the little vessels which give vitality to the tooth, and without which it would not be susceptible of caries. These fluxions generally end in abscess, external to the sinus above the gums, the opening of which but seldom obviates the necessity for extracting the tooth. We must also guard against mistaking a slight discharge from the alveolus for a suppuration in the sinus, and consequently setting about a painful operation, to be followed by tiresome and useless dressings. Caries of the bone requires only very simple treatment, when the cause which produced it no longer exists. M. Louis has communicated on that subject a case, such as must have frequently been observed by those who are attentive to the subject.

Obs. 22. He was consulted by a surgeon on the case of a lady, about 30 years old, of good constitution, and who had been under treatment for six months on account of a suppurating exostosis of the base of the lower jaw; two or three times hopes had been entertained that the ulcer would heal, but in spite of all treatment it remained fistulous. The integuments had been encroached on by the action of caustic; there had been exfoliations of the bone; the granulations looked healthy, but still the wound would not heal. M. Louis was requested to say whether it would be desirable again to lay open the integuments to a greater extent, for the purpose of applying the actual cautery to the bone. M. Louis was struck with the swelling of the lower jaw; he examined the teeth, and found the second and third molar carious. These were extracted by his advice; after which, by leaving the case to nature, the swelling of the bone disappeared, and the ulcer under the chin healed up.

This swelling might be due to disease in the dental vessels,

though the teeth should be sound and free from caries. The late M. Bunon, dentist to the Infants of France, has related a case which is worth repeating. Marshal Saxe had a nearly constant and very painful fluxion, accompanied by swelling, produced by the second large molar on the left side of the lower jaw. The gum had become detached, and the external wall of the alveolus was destroyed, so that a blunt probe could be introduced and carried to the bottom of the socket all the way round the outside of the tooth. This destruction could not be repaired, and M. Bunon was satisfied that it was necessary to extract the tooth to put an end to the fluxion, and to disperse the swelling to which it had given rise. The extremity of the roots, which were still slightly attached to the bottom of the socket, were enveloped by a very red fungous flesh, as the dentist had predicted. The Marshal was thus relieved from a swelling which might have otherwise produced the same disorders as were experienced by the lady of whom mention was made in the foregoing observation.

A similar disease in a tooth in the upper jaw would have caused exostosis, caries, or suppuration, either primitive or consecutive, in the sinus; and in each of these cases the surgeon's conduct would be guided by very simple principles adapted to the varying circumstances. The essential point is to remove the carious tooth: it is seldom necessary to perforate the sinus, even when it contains a muco-purulent collection, since the extraction of the tooth which has caused the diseased state of the membrane often establishes a communication between the sinus and the alveolus. Such was the case in the observation related by Highmore, and mentioned by M. Bordenave at the beginning of his Memoir. The symptoms ought always to be our guide in the treatment.

Obs. 23. In May 1751, M. Louis accompanied M. Morand to the house of a lady of 45 or 50, who, ten years before, had had the first molar on the right side of the upper jaw drawn. The root, or rather the point of the root, had remained behind. Ten months before, worn out with pain and repeated fluxions, accompanied by a discharge from the nose of fetid pus, of which a small portion escaped by the socket of the tooth which had been removed, this lady consulted M. de la Martinière, and other physicians and surgeons about the court at Compiègne.

The surgeon-in-chief advised the extraction of the second molar, although this was sound. M. Capperon, the king's dentist, removed the tooth; a quantity of pus escaped by the alveolus, proper injections were used to cleanse the sinus, and an opening remained, from which a saltish rheum flowed. The lady complained that, in using her handkerchief, the air entered by the alveolus into the maxillary sinus, and it was on account of this inconvenience alone that she consulted M. Morand. He readily introduced a probe into the sinus, and gave it as his opinion that the opening would not close naturally, but that by employing a wax stopper the advantage of complete closure might be obtained.

Obs. 24. M. Reiniger, in a thesis on the cavities of the head, inserted in the fourth volume of the collection of 'Anatomical Dissertations,' published by Haller, relates a case by M. Trew, which much resembles that of M. Louis we have just recited. A man of 40, had suffered for many years with pain in his teeth and swelling of the cheek. The third molar was quite decayed, and at its base there was a hole, through which a probe could be passed to the depth of near an inch. The application of an emollient cataplasm over the tumour appeared to have produced a suppuration through the opening; the tooth was extracted, and a quantity of matter was discharged from the sinus. The injections thrown in to cleanse it escaped in part through the nose, when the patient stooped forward his head. The opening in the bone did not close; and to prevent the entry of air and food, a plug formed of wax, with coral powder added to give consistence to it, was employed. In this way all inconvenience was avoided.

The necessity for employing a plug leads some to consider this cure as only palliative, and useless efforts have been made to effect a complete closure. M. Bordenave succeeded in effecting it in the person mentioned in the eleventh observation in his Memoir. Scultetus employed the actual cautery with success, and effected a radical cure in one case. He had used injections into the maxillary sinus after the extraction of a carious tooth; but getting tired of seeing the opening remain unclosed, he pushed a cautery into the socket, and burned the circumference freely. After exfoliation had taken place, the opening healed perfectly.

We may see, by the above account, that surgery has never experienced any serious difficulties in treating these cases, which are so simple, that general rules enable one to deal with them as well as the most extensive experience, even when they are complicated with caries.

Obs. 25. An ecclesiastic of Bar-sur-Aube came to Paris, in 1758, for consultation respecting an ulcer of his cheek, which had penetrated into the maxillary sinus, and from which issued very fetid pus. Injections thrown into the sinus through the sinuous ulcer on the cheek, passed in part by the mouth through the socket of a molar tooth which had been drawn some time before. The socket was carious. Messrs. Moreau, Dufouart, and Louis, having met in consultation, determined on making a free opening through the alveolar arch to give vent to the matter, and thus to facilitate the healing of the ulcer on the cheek. A little Egyptiacum ointment was ordered to be dissolved in the injection to be employed during the first few days; for, from the slow rate at which injections escaped from the sinus, although the opening through the alveolus appeared large enough, it was suspected that fungous and putrid excrescences existed in the sinus. During the examination made by the consulting surgeons, warm water was thrown with some force into the sinus with a large-sized syringe, when, to the surprise of all, there came away a plug which the patient had thrust into the sinus long before, but which he had no suspicion was still lodged there. M. Moreau undertook the care of the case, and completed the cure by the use of the means agreed on.

Obs. 26. Some time after, in September 1758, M. Louis had under his care, at La Charité, a young man of 20, servant to M. le Dran, formerly first commissioner of foreign affairs, and brother of M. le Dran, one of the members of the Academy. An abscess had formed in the lad's cheek above the zygoma, long after the removal of the third molar on the right side. The dentist stated that, at the time of the operation, matter had issued from the socket. M. Louis opened the abscess with a lancet, and found the bone bare. By the use of appropriate dressings a solid cicatrix soon formed. Two days after this supposed cure a collection of matter appeared under the skin below the cicatrix; M. Louis opened this, passed a bougie into

the sinus, and left it there; at the first dressing some bony laminæ came away. At the third dressing the end of the bougie passed through the alveolus into the mouth. Injections of barley-water and honey of roses passed readily from the ulcer in the cheek into the sinus, and escaped freely through the socket. M. Louis passed a few threads of silk through as a seton, to encourage the discharge of matter into the mouth. The injection was continued for some days, and was then changed for water quickened with a little spirituous vulnerary water. At the end of ten or twelve days, when the sinus appeared clean, he closed the seton; the opening in the cheek healed firmly in a very short time, and that in the alveolus also healed without further assistance. M. Louis had occasion to see this youth several years after; he had felt nothing more of the affair. It does not require any great sagacity to see that, in the majority of the cases above cited, though the natural opening of the sinus was free, the cavity could not be cleansed through it; nor had the carious openings, which had formed above the alveolar arch, furthered the cure; the essential thing then is to destroy the cause, and procure a free discharge of the matter at the lowest point by an accidental or artificial opening through the alveolus. In this way we shall render efficient service, as all the observations prove; and some particular cases, contrary to this general rule, serve to confirm it still further.

A more extensive caries requires operations which may suffice to destroy it. Ruisch, Obs. 77, speaks of a woman who was suffering much from a swelling of the cheek, with a malignant excrescence of the gums; after the extirpation of this fungus and the extraction of some of the molar teeth, some skilful surgeons introduced the actual cautery into the maxillary sinus, from which, a few days after, one of them drew out with his little finger a number of polypous tumours as large as a pea, and the patient was completely cured.

Such tumours are liable to undergo a considerable increase, and, by pushing out the walls of the maxillary sinus, to force the eye from its socket, and to deform the face in a frightful manner. M. Astruc, in his 'Treatise on Tumours,' classes these diseases amongst gummata or gummatous tumours; and because we should in vain seek amongst the Greek or Latin physicians for any account of these tumours, he comes to the

conclusion that they are the result of a syphilitic poison, and that they have only become known since the introduction of syphilis. This assertion is very far from being proved. M. Astruc, adducing only one case of the kind, communicated to him by M. Sebise, a physician at St. Malo, adds in a note, that he knows no similar case but the one which is reported in the 208th Thesis of the sixth volume of Haller's Medical Theses, under the title of *Car. Frid. Hundestmark et Frid. Jacob. Tittman, Osteotomatis casus rarior. Lips. 22 Aprilis,* 1757. But it seemed to him that neither the nature nor the cause of the disease was known.

The original dissertation informs us that the disease commenced in the maxillary sinus; it was attributed to a catarrhal discharge, with which the patient was attacked at the age of fourteen. The swelling made but little progress during four years, but in the last six months it grew to an enormous bulk, and became cancerous. The author of the dissertation allows, in a particular paragraph, that latterly it would have been impossible to undertake the cure of that tumour; but he feels called on to state what would have been the means of curing it at an earlier period. To our no little astonishment we find that purgative ptisans were the means by which the humours effused into the maxillary sinus were to have been carried off through the intestinal glands; that, in such cases, we should dilute the fluids with ptisans of saponaria and guaiacum; employ pills of ammoniacum, sagapenum, and galbanum, dissolved in squill vinegar with foliated tartar. Baths are to be prescribed to open the pores and facilitate transpiration; a seton is to be introduced to cause derivation of the vitiated humours, &c. &c. Not a word is said of a surgical operation, the only medical means at all likely to be effectual.

CONTINUATION OF A MEMOIR

ON

DISEASES OF THE MAXILLARY SINUS.

By M. BORDENAVE.

In the former part of this Memoir we set forth the proper treatment to be employed in suppuration and caries of the maxillary sinus. After examining the various modes of proceeding employed in these cases, we endeavoured, by observation and reasoning from acknowledged principles, to estimate their practical value, and we trust we succeeded in showing that each of these methods might prove useful according to circumstances, while no one of them deserved exclusive preference.

This truth, which ought to be admitted by all, has become a subject of controversy, and since the publication of my former Memoir it would seem as if the aim of certain parties had been to give a retrograde movement to our art, by endeavouring to establish exclusive modes of treatment, which cannot suit all cases. Some have contended, on no other ground than because they think so, that in suppurations of the sinus, a large opening ought always to be made, and acting under this prejudice, so unfortunate for their patients, have allowed themselves to destroy the parts to a useless and sometimes dangerous extent. Others are determined, after opening the sinus, not to admit of any kind of dressing, nor to employ any means for keeping open the passage, being persuaded that nature will do all that is required. We might just as well leave off dressing all kinds of wounds, because those of animals often heal without any assistance.

It is unnecessary again to enlarge on points of doctrine which we believe to be already sufficiently established, since a more lengthened discussion would not convince prejudiced minds. We will only remark, that no one, even though unacquainted with medicine, can fail to feel how unfortunate it would be for our patients, if we had only one mode of treating all diseases, even in cases apparently similar.

SECTION I.

The membrane of the maxillary sinus, like that of the nostrils, may give origin to sarcomata, or fungous excrescences, known under the name of polypi. Ruysch,[1] and several other authors, mention examples of them, and cases are even recorded in which several sinuses at a time have been found affected.[2]

It is impossible to foresee and prevent the formation of these diseases, which often depend on some undiscoverable constitutional or local disorder, thus they escape our observation at their first formation, and we only recognise them when the disease has made considerable progress.

The indolent state of these tumours at their commencement helps to conceal their progress, but as the disease seldom occurs without affecting the neighbouring parts, we may generally recognise it before it has attained a dangerous size, by the change in the form of the sinus, by examining whether the patient's teeth have not become loose, or fallen out spontaneously, whether the alveoli are not affected, and if fungous flesh is not to be seen through their openings, by observing whether there is habitual bleeding on one side of the nose, if a fleshy tumour can be seen in the nostril, or in the inner corner of the eye; lastly, if the bony walls are separated or pushed out, as always takes place when the tumour has attained a certain size, unless it have escaped into the nostril, and increases there, while its root still continues in the maxillary sinus,[3] a state which rarely occurs. In such a case we should see the polyp in the nostril, and should with difficulty recognise the disease of the sinus.

These signs, so different from those attendant on suppuration of the sinus, will prevent our mistaking one disease for the other, they will clearly announce the existence of a polyp, and will lead us to adopt the proper means for extirpating it.

In the former Memoir, we have pointed out the proper

[1] Observ. 7.

[2] M. Levret mentions a polypus of the maxillary sinus which extended to another originating in the frontal sinus. Observ. sur la Cure des Polypes de la Matrice, de la Gorge et du Nez.

[3] We find an instance in the Philosophical Transactions, No. 216, p. 473, and a case by M. Chastanet, which is given below.

modes of proceeding in suppuration of the sinus, but when we feel assured of the presence of a polyp, we must, without waiting the further growth of the tumour, make an opening into the maxillary sinus, either through its outer wall, or by enlarging any existing opening through the alveoli, and having sufficiently enlarged this, proceed either to extract the polyp, or to excite suppuration in the cavity, by the use of digestive remedies, or escharotics of various strengths, or by the application of the actual cautery. Not unfrequently, the state of the diseased parts sufficiently indicates the means to be adopted for readily curing the disease. Of this, the following observations will furnish sufficient proof.

Obs. 1. A man, about 75 years of age, had in his mouth a fleshy tumour, of the size of a large pea, occupying a space left by the decay of the second and third molar tooth of the left side. This tumour caused a dull pain; it was removed with a knife, and a small actual cautery was applied to stop the blood, and to destroy the rest of the tumour. Three months after, the tumour had reappeared, was twice as large as before, and interfered with mastication. The two carious teeth were loose, the other teeth were painful, and a fetid discharge from the nose and mouth excited sneezing and coughing.

M. du Bertrand extracted the two carious teeth, and on moving the tumour to and fro, ascertained that its roots were deep in the maxillary sinus. Finding it offer considerable resistance, he laid hold of it with the polypus forceps, and extracted it, taking care to remove the whole. The opening through the alveolus, that remained after the extraction of the tumour, was large enough to admit the little finger into the sinus. M. du Bertrand destroyed some portions of the maxillary bone and of the alveoli affected with caries, and as hemorrhage continued, he introduced into the sinus a plug of cotton steeped in eau de rabel, and into the nose some pledgets tied together.

The hemorrhage ceased, healthy suppuration took place in the sinus on the third day, the fetid odour ceased, and, by the use of medicine and proper injections, he entirely cured his patient in less than a month, and the gums closed healthily, and firmly over the opening of the sinus into the mouth.

The sarcoma we have just described, may be regarded as a

simple one, in which the nature of the malady having been apparent from the first, the means of cure to be adopted were obvious. Moreover, as the disease was early recognised, the treatment arrested its progress, and the cure was consequently easy. It deserves especial attention, however, that unless we absolutely destroy the base of the tumour, unless suppuration completely unloads the membrane, and if we content ourselves with merely extirpating the superficial parts of the tumour, and do not pursue it into the sinus, we obtain only temporary relief, the soft and spongy membrane becomes more and more congested, and the disease soon reappears. The preceding observation, and that which follows, clearly establish this point of practice; in each case the first attempts were fruitless, and complete success was obtained only when the treatment was applied to the actual root of the disease.

Obs. 2. A young lady, 10 years of age, had a swelling form in the left cheek, after an attack of smallpox; the tumour was about as large as a pigeon's egg, and seated below the malar bone. Poultices were applied, and a collection of matter took place, which was evacuated with a lancet. Some days after, a fungus appeared in the middle of the ulcer, to which various escharotics were applied; a molar tooth was extracted, which was carious, though it caused no pain. After a twelve-month's dressing the ulcer healed, the cure, however, was not of long duration; the cicatrix reopened; at the end of a month the excrescence reappeared, and the disease was concluded to be incurable, because it was a consequence of the smallpox; the patient herself had so firmly imbibed this prejudice, that she remained six years without seeking for relief; she at length had recourse to M. Caumont, who, on examining the patient, discovered in the centre of the fungus, which was as large as a nut, a fistulous opening, from which a very fetid sanies exuded. When speaking or eating, this sanies was more abundant, and ran down the patient's cheek. M. Caumont having passed a probe through the opening, discovered a callous basis, and a caries of the maxillary bone; he dilated the opening with prepared sponge, and on the following day, passed in his probe so deeply, and with so little difficulty, that he immediately ascertained that the caries penetrated the maxillary sinus. By introducing another probe through the fistulous opening left

by the removal of the tooth, seven years before, he passed it into the maxillary sinus, and by the contact of the two probes, satisfied himself that the disease originated in that cavity. He began the treatment by injecting through the external opening a little balsam of Fioraventi, but afterwards adopted a more efficacious treatment. To prevent the passage of the escharotics he was about to use into the mouth, he carefully plugged the opening through the alveolus with dry charpie, and then destroyed the fungus and the callosities by lightly touching them with a pencil dipped in a mercurial solution. The excrescence and all the indurations were destroyed in ten days, a healthy suppuration was established, injections of the same liquor, diluted with water,[1] were continued, and several portions of bone came away about the 27th day.

The membrane of the sinus being thus thoroughly deterged, healthy red granulations sprung up and quickly skinned over. Thus, by direct treatment, a disease was soon cured which had before been only palliated, and only apparently healed after a twelvemonth's dressing. The disease broke out afresh, and would have made greater progress but for the sound constitution of the patient. The disease, however, is not always so limited; there are complicated cases in which these fungous tumours seem to generate others; in such cases we can only hope for success by attacking the disease directly, and procuring suppuration of the tumours in the sinus. By directing our views to this end, our efforts will often be efficacious, and we sometimes obtain astonishing cures almost beyond our hopes. Of this the following observations will furnish examples, and prove that these excrescences sometimes separate spontaneously during suppuration.

Obs. 3. A girl, about 23 years old, had been suffering for two years from pains in her head and teeth; both jaws, and especially the upper, were painful, and a tumour about as large as a bean had made its appearance in the palate about a month before she consulted M. Dupont. On examining the tumour, he felt a fluid, which he conceived to be pus, in the maxillary sinus, in which opinion he was strengthened by the

[1] This may be made by adding three or four drachms of mercurial solution to a quart of water, mixed with a little vulnerary water.

patient's complaining of pain under the right orbit, and by the fact that the tumour, which receded on compression, again appeared on the patient's holding her nose and making a strong effort of expiration. The surgeon endeavoured to impress upon his patient the necessity for evacuating this matter, to which she would not consent; a month after, the tumour opened spontaneously during the night, and a large quantity of very fetid matter escaped.

The pains continuing, notwithstanding the opening of the tumour, the patient, who had become more tractable, allowed the introduction of a probe, by means of which a caries was discovered, apparently of no great extent. M. Morand was consulted, who agreed with M. Dupont as to the propriety of applying an actual cautery through the opening to destroy the local affection; they also thought it right to employ internally antiscorbutics assisted by the occasional use of laxatives.

These remedies were continued for three months, during which the actual cautery was applied eight times to different carious spots. At the end of this time two fleshy tubercles appeared at the roots of the incisors of the upper jaw, which seemed to arise from a caries. The actual cautery was applied to them, the alveoli were easily destroyed, and the teeth were removed; the second molar of the right side and the canine tooth being carious, were also drawn, and a communication was thus made between the two openings. During the fifth month of the treatment a molar tooth on the same side fell out, the accustomed dressings were continued until the eighth month, during which time the actual cautery was applied seven times more. The caries by this time appeared to have ceased, and it was agreed to allow nature to act; applications of tincture of myrrh and aloes were continued, slight exfoliations took place, and solid granulations occupied the place of the parts destroyed.

The maxillary sinus on the right side continued, however, to discharge fetid sanious matter through the opening; M. Dupont tried injecting detersive and desiccative lotions, such as barley-water and agrimony, either alone or mixed with wine and honey, vulnerary water, lime water, &c. But he was soon obliged to abandon these, as they caused severe pain in the face, and troublesome sneezings, notwithstanding every pre-

caution to avoid these inconveniences; he contented himself therefore with applying to the entrance of the sinus a pledget dipped in tincture of myrrh; when carried deeper in, the patient always felt severe pains.

At length, towards the middle of the ninth month, points of cicatrization began to form round the principal opening, when suddenly a considerable inflammatory swelling took place without the patient having committed any irregularity of diet, or had any derangement of the catamenia. Recourse was now had to a strict regimen, and after she had been purged six times with pills of Belloste the swelling and the fever disappeared.

The patient was dressed twice a day, during which she was used to make strong expirations with the nose closed, in order to force out the matter; in doing so five little white worms, two or three lines long, of which two were living, were forced out from the sinus, and another expiration expelled three more. Five worms escaped during the succeeding dressing, and on the following day twenty more. It was then determined, notwithstanding the inconveniences described above, to inject into the sinus a liquor for the removal of these worms.

During the next dressing the patient, making an expiration as usual, felt something in her mouth. M. Dupont removed thence with his forceps a fetid fungus, of the size and form of a small nut; there was only one worm in this fungus. The odour of the discharge was less fetid at the following dressing; it decreased gradually until another small portion of fungus came away; the suppuration then ceased almost immediately, and towards the middle of the eleventh month there remained an opening big enough to admit the thumb, which it was necessary to keep closed.

A silver stopper was tried, but was found less convenient than a bit of sponge inclosed in fine linen, and introduced into the opening, and which, closing the palate, enabled her to employ soft aliments, such as panada, rice, gruel, &c. Three months after, that is, in the fourteenth of the disease, the opening diminished a little and became oval; in another year it had lessened one half, and the patient then used a little soft wax, which she preferred to sponge. At length, after another eighteen months, complete union had taken place, and the

deformity of the mouth was corrected by artificial teeth. Thus this severe disorder was four years in coming to a close, Nature having responded but feebly to the efforts of art.

This observation might well have been placed amongst those complicated cases of which I spoke in the former Memoir, and which do not yield to the treatment which seems particularly suited to suppurations of the sinus; but it differs from them in presenting a complication of suppuration, extensive caries of the walls of the sinus, worms in the cavity, and a fungous tumour. We may conclude that the slowness of the cure was caused by the union of these several causes.

Obs. 4. A little girl, 5 years old, received a blow on the left side of her face, between the nose and cheek, which was followed by severe ecchymosis, pain, and swelling. These symptoms, which were rather severe, being dispelled, a small swelling appeared at the end of two months in the spot where she had been struck, the contents of which, although causing caries of the maxillary bone, were nevertheless discharged into the mouth, near the canine teeth; the patient then suffered severe pains, the tumour remaining in the same state. Affairs remained in this condition for a year and a half, the discharge was very fetid, the maxillary bone was swelled, and formed in the mouth a tumour which projected beyond the upper lip; the bones of the nose thrust outwards, interfered with the movement of the eye, and the discharge which had become very abundant, escaped by the mouth, by the nostril, and by the lachrymal duct of the left side.

The patient had become wasted, suffered from serous diarrhœa, and her body was covered all over with scorbutic spots, when M. Chastanet was consulted, the disease having then lasted two years. On examining the mouth, he found the maxillary and palate bones loose, and almost detached, and in the left nostril he discovered a fungus from which flowed an ichorous and fetid discharge.

Antiscorbutics, repeated detersive lotions introduced into the mouth, and resolutive fomentations of the face were employed. Care was taken to loosen the bones at each dressing, and in a short time the whole of the lower part of the maxillary and palate bones came away.

The fungus of the nostril, which originated in the maxillary

sinus, was removed with these bones, and the alveoli were found full of soft, fungous, putrid flesh. The cavity of the sinus was dressed with a mixture of tincture of gum lac, red vulnerary water, honey of roses, and barley-water. Some splinters were removed from time to time, and in a few days the mouth was cleaned, and the bad smell got rid of by the use of a gargle containing tansy-water and Peruvian balsam. These remedies were continued, care being at the same time taken to dress the interior of the sinus softly. By the help of these means the drink no longer escaped through the nose, pronunciation became free, the bones of the nose compressed resumed their level, the cavity of the sinus contracting gradually, became entirely closed towards the mouth, and the cure was completed in less than six weeks from the time the bones were removed.

The caries, which was very extensive, and the enormous mass of fungus which protruded from the sinus into the nose, and which was sufficiently large to thrust outwards the bones of the nose constituted a remarkable disease. On comparing it with the preceding observation, we see that, in both cases, the fungus of the maxillary sinus was accompanied with a very fetid suppuration; in the former it remained a long time undiscovered, while in the second the progress was more rapid, and the cure more prompt, because Nature pointed out, so to speak, the course to be followed, by causing dilatation of the bones forming the sinus, their decay, and internal suppuration; and, lastly, because a more abundant suppuration led to a more speedy separation of the sarcoma. This observation will serve with the preceding to confirm the statement we made above, that complete suppuration of the maxillary sinus is necessary to the cure of polypous tumours of that part, whether it occur naturally or by the help of actual cautery or caustics prudently employed.

The following fact not only proves the efficacy of the actual cautery in a similar case, but also furnishes an example of a bold proceeding followed by the most complete success.

Obs. 5. Acoluthus, a physician of Breslau, reports in the 'Memoirs of the Academia Naturæ Curiosorum,'[1] that a woman,

[1] Decad. 3, anno 4, Obs. 57.

30 years of age, came, in 1693, from Poland into Silesia, to seek for relief of a disease of the maxillary sinus. Some time after a tooth had been extracted from the left side of the upper jaw, a small tumour appeared in the socket, which grew so fast, that in two years it had reached the size of two fists. This tumour occupied almost the whole mouth, and so distended the cheek that it seemed ready to burst. The lower jaw was pushed down, so that the lips could not close; and in the last few weeks the growth of the tumour had been so rapid, that the poor woman was threatened with death from suffocation or starvation, as she could neither eat nor drink, and her life was despaired of. The urgent nature of the case determined him to employ prompt measures. The mass of the tumour was very hard, it extended over the greater part of the roof of the mouth, and in its centre were placed all the upper teeth of the left side. To facilitate the operation, he began by enlarging the mouth by a transverse incision from the commissure of the lips; he was thus enabled to attack the tumour at its external part with a curved bistoury; it had the consistence of very hard cartilage, and yielded with difficulty to the cutting instrument and to the efforts of the surgeon. He succeeded, nevertheless, in removing three or four teeth, with a considerable portion of the superior maxillary bone. The extirpation of the outer half of the tumour was thus effected; the remaining portion which filled the palatine fossa could not be cut round, and it could only be removed in portions, and by several attempts. The operation was long and laborious; and, as the surgeon observes, one of the most severe he had ever seen. The actual cautery was applied as it was required to the orifices of the vessels, and to the fungous flesh. This latter circumstance suffices to show that the eradication of the tumour was not effected at one sitting, and that it was only accomplished by a repetition of these effectual measures during several days. Shortly after the first operations, the appearance of the disease was such as to lead to augur favorably of the case. Fire and sword were alternately employed several times, and at length excrescences remained only on the spot from which the tumour had sprung. An attentive examination led to the discovery of some portions of carious bone, the removal of which was followed by a prompt and fortunate cure.

This recital proves, without doubt, that art can furnish effectual assistance in diseases of this kind, apparently almost hopeless; perhaps, after such an example, surgeons might with justice be reproached, who should remain idle spectators of the progress of disease in such a case, and should allow persons to become victims to their timidity. But can a similar success be always hoped for? To treat these diseases successfully, we should begin early; delay is hurtful, and the disease, when it has reached a certain point, becomes difficult to cure, if not absolutely incurable: of this the following observations will unfortunately furnish a proof.

Obs. 6. A prince, who had always bad teeth, lost at different times all his grinders, the canine and the second incisor of the left side of the upper jaw, some having been taken out by dentists, and other loose ones by himself. It must be observed, that he drew them out, not perpendicularly, but by loosening them gradually, and pushing them inwards and outwards so as to widen the sockets. These operations having caused no inconvenience, no attention was paid to the flesh which covered the parts where the teeth had been removed, and from which some indication might have been drawn.

Several years after, this prince became subject to bleeding from the nose on the diseased side; to this he paid little attention, but a swelling of the cheek sufficiently great to be readily perceived, and accompanied with pains in the mouth, led him to consult a surgeon. On carefully examining the parts, an ulcerated, florid tumour was found to occupy the place of the teeth which had been lost; it bled readily, and was broader than the alveoli, and extended forwards to the canine tooth, and backwards to the extremity of the palate bone, inwards towards the palate, and externally was adherent to the cheek. This tumour had pushed through the openings of the alveoli, and the elevation of the cheek, caused by that of the maxillary bone, left no doubt that the sinus was full of fungous flesh, similar to that which formed the tumour in the mouth. This was still further proved by the bleeding from that nostril only, the separation of the alveoli, the swelling of the maxillary bone, and the communication of the tumour in the mouth with the cavity of the sinus, as shown by the introduction of a probe.

The famous Boerhaave was consulted by this noble patient,

in whom there was no ground for suspecting either a venereal or scorbutic taint, whose constitution was in other respects good, who led a sober and regular life, and who suffered merely from extreme sensibility of the nerves. The tumour became painful; lotions, gargles, and various local applications were tried in vain; it degenerated into cancer, and extended on the face in such a way as to cause death.

It appears probable that the disease might have been arrested in its progress, or even cured, if attention had been paid to the nature of the flesh which followed the extraction of the teeth. But the disease was too far advanced when he sought advice, and the extent of the disease rendered vain the efforts to relieve it; and though it was proper to follow Boerhaave's advice, and to endeavour to soften the tumour and to produce suppuration by emollient applications, it was too late even to hope to produce healthy suppuration. We cannot, therefore, be too attentive in similar cases, to attack these diseases at their commencement; they sometimes begin slowly, and besides the particular signs of which I have spoken above, they may also be recognised by the difficulty of treating them, and by their reappearing after a seeming cure: the following observation deserves, on this account, particular attention, and may furnish suggestions for cases of this kind.

Obs. 7. M. Doublet was consulted, in 1755, by an unmarried lady, 39 years of age, who for four months had had a tumour as large as a small nut in the inner angle of the left eye, exactly over the os unguis. The tumour was hard and moveable, and the patient felt no pain in it; some time after, the patient complaining of difficulty of breathing through the left nostril, M. Doublet discovered there a polypus of soft consistence, which he thought it right to extract, before attempting the removal of the outer tumour. The extraction of the polypus having been carefully effected, the tumour of the angle of the eye was gone, and the patient continued pretty well for four months; at the end of that time a new tumour, nearly twice as large, appeared, and was extirpated, and followed by a cure a month after. At that time a fresh polypus was discovered in the left nostril, softer than the former, which was treated by escharotics. After some time a third polypus appeared, and a third tumour at the angle of the eye; the progress was more

first tooth had been extracted, a sort of canal extended into that part of the tumour occupying the maxillary sinus. This tumour was solid throughout its whole extent, and became hard on exposure to heat. The bones were softened, thinned, and destroyed, without the appearance of caries however.

Where any particular taint exists in the humours, the disease extends to almost all the sinuses, and produces irremediable disease. An observation by M. Léaulté, related amongst those by M. le Dran, deserves notice here.

Obs. 9. A man, 72 years of age, was attacked with severe pain above the left incisor teeth, and had one of his first molars removed. On the following day an excrescence appeared in the socket, and the neighbouring gums were much swelled. Efforts were in vain made to destroy this excrescence by actual and potential cauteries, nor had diet any greater effect; the tumour extended along the jaw to the last molar teeth, both on the outside and within, and in two months made such progress as to spread upwards between the bones of the nose and the cheek to the inner angle of the eye, which was pushed outwards by it.

M. Léaulté, who had charge of the patient, found the tumour solid, and perceived two canals, one of which penetrated by the socket into the sinus, and the other towards the palate bones, which were carious. The sarcomatous tumour occupying the sinus pushed the bones outwards, escaped from the sockets, and furnished a large quantity of discharge. Several teeth were in vain extracted, large incisions, the removal of the tumour as high as possible, and of that part occupying the anterior and lateral portions of the left gum, afforded no permanent benefit, although three of the tumours from the roof of the mouth appeared to have yielded to these operations. A small portion of the tumour, which was irremovable, grew rapidly in a short time; a fetid odour exhaled from it; splinters of carious bone came away, and hemorrhage recurred frequently. A fresh attempt was made to extirpate the tumour filling the sinus. This operation betrayed the extent of the disease, and gave rise to consequences which terminated his life at the end of a fortnight.

The examination of the parts showed that the maxillary bones, the malar bones, and even those of the base of the skull,

were softened and destroyed, all the sinuses were full of fungous excrescences, and only some portions of carious bone remained mixed with the soft matter. We can only conclude from the state of the gums that this disease was caused by a scorbutic taint. The patient not seeking relief early, the disease extended greatly; the growth of the tumour, the changes which took place in it, and the destruction of the bones rendered the disease incurable, and caused it to degenerate into carcinoma. In such a case we can only hope for success by attacking the disease in its earliest stage, and the difficulty of doing this is increased, because it is often undiscovered until it has made considerable progress.

SECTION II.

We have remarked, on a former occasion, that the diseases of the soft parts covering the sinus may often act on the hard parts, and communicate various changes to them; but the disease of the bones is not always a consecutive effect; it may arise directly from an unhealthy constitution, in which case it sometimes extends thence to the soft parts. We are about to treat of exostosis of the bones forming the sinus, and we shall consider the proper treatment, both as regards the destruction of the disease in the bone and the mode of preventing its extension to the neighbouring parts.

Exostosis of the maxillary bone is not as easily distinguished as that of other bones; dilatation of the walls of the maxillary sinus, from internal suppuration of a tumour, may sometimes be mistaken for it, and we can recognise exostosis of the walls of the sinus only by paying attention to the symptoms which have preceded it. We have spoken of the signs which indicate suppuration and sarcoma of the sinus, and they would be sufficient for distinguishing the dilatation of the sinus in consequence of these maladies from exostosis; but a more certain sign is that, in addition to the absence of the signs of suppuration and sarcoma, the enlarged walls of the sinus present a solid resistance in the case of exostosis; on the contrary, in the case of dilatation, the dimensions of the bone being increased at the expense of its walls, the attenuated bone offers very little resistance, and becomes even almost soft. When

Obs. 11. A man, 33 years of age, had for a long time had a large tumour in the region of the right maxillary sinus, which depressed the palatine portion of the maxillary and palatine bones of that side, so as to impede the actions of the tongue, whilst in the other direction it forced upwards the floor of the orbit, and thrust the eye outwards. In front, it had pushed out the portions of the maxillary and malar bones, which covered it beyond the level of the nose, whilst behind, it extended to the back of the fauces. Laterally, it had caused an equal displacement of the parts. Notwithstanding the extent of the disease, M. David was induced, by the courage of his patient, to attempt its cure.

After laying bare the bony shell covering the anterior part of the tumour, he sawed off all the projecting part, which constituted a portion of a sphere of about three inches in diameter. On removing this portion, he found the tumour to consist internally of a hardish, spongy, white substance, in appearance not unlike agaric; it occupied the maxillary sinus, of which it had entirely altered the form, and greatly enlarged the dimensions. By patience, and by adopting various modes of proceeding, M. David succeeded in removing entire this substance, which in parts was firmly adherent to the bony covering. Notwithstanding all his care, he broke the floor of the orbit, and the portion which extended back into the fauces was only extracted after a great deal of trouble, as that which was in connexion with the palatine bone could not be wholly removed without the removal of the lower wall of the tumour. The cautery was applied several times to portions which had escaped the cutting instruments, the hooks, the elevators, and the rugines. The operation over, a cavity remained, the dimensions of which from before backwards were four inches and a quarter, while from above downwards and from right to left it had an extent of three inches; the lower wall which remained was very thin, and the upper one supporting the eye still more so. Gradually, the surgeon observed this cavity disappearing, by the retraction of the walls and a regeneration of bone. The lower wall, which was very thin on the 27th June, 1770, the day of the operation, and which was left still thinner by the separation of the cauterized parts, had acquired an inch and a half in thickness on the 10th of August, and at that time the upper wall had

also thrown out such a crop of granulations as to have become very thick; and already, in several points towards the back part, these two walls, so far apart at the time of the operation, had come into contact and united. From day to day the cavity diminished in size, and by the sixtieth, only a small cavity remained at the anterior part.

M. David's conduct in this case is well deserving the attention of surgeons; he has shown how much may be hoped from the efforts of our art, and there is no denying that while the patient showed great courage in submitting to so difficult and hazardous a proceeding, the surgeon showed equal courage and sagacity, and was happily rewarded by seeing his efforts crowned with complete success. The disease is, however, sometimes so great that we could not without rashness undertake such operations. A skull presented by M. Beaupreau to the Academy in 1767 exhibits a tumour of this sort. This specimen of pathological anatomy exhibits an exostosis of so large a size and so peculiar a conformation, that it appears to deserve notice in this Memoir.

Although we have no account of the symptoms which existed in this case, since this curious specimen was turned up by accident by some gravediggers, we think a description of it may be useful as serving to convey a notion of this rare disease, from which we may draw an inference as to the principal symptoms which would accompany it.

The exostosis in question occupies all the right maxillary sinus, and involves in its mass a portion of the neighbouring bones; it projects greatly in front and extends downwards a good deal. It measures nearly six inches from the orbit to the lowest part, and its circumference at the largest part, passing from the right malar bone under the superior maxillary and the wing of the sphenoid on that side, is about a foot. The upper part of the maxillary bone projects into the orbit, and narrows its cavity; the os unguis is involved in the tumour, and scarcely perceptible. The exostosis, from its large size, has pushed the nasal bones over to the left side, has obliterated the right nostril, and projects on the left side almost to the left malar bone. The lower part of the maxillary bone has been carried down with the disease, and assumed an oblique direction towards the left side, whilst the pterygoid apophyses have acquired

increased length. Even the left maxillary bone has become affected by this remarkable disease. The malar bone is involved in the upper and outer part of the tumour. It follows, from this state of parts, that the movements of the eye must have been interfered with, and the organ itself have been partly protruded from the orbit; that the pituitary membrane could have been only imperfectly freed of its discharge; that the tongue must have been painfully thrust towards the left side, and could not without great difficulty have performed its functions; that the velum palati, stretched and distended, could have only painfully performed its part in the act of swallowing; that respiration must have been laborious, from the changes which had taken place in the fauces; and lastly, that the lower jaw could have no longer masticated.

This exostosis, externally smooth and polished, is very hard at its upper part; below, the solid part is thin, and in some spots deficient, so as to show the interior of the tumour. Within, the tumour consists of close spongy tissue, like pumice-stone; the walls are generally thick, in parts to the extent of an inch.

This observation, and the preceding ones, furnish examples of true exostosis of the sinus, which we ought to distinguish from the various affections which seem to distend the bone, and which may be mistaken for that disease. This consideration is the more important, since the periosteum is liable to become swelled, and to form on the surface of the bone more or less compact growths, which may be taken for exostosis, but which, if examined after death, will be found to be only elevations formed by thickened periosteum, which has become hard, and assumed sometimes a sarcomatous appearance, and sometimes a fatty character like hard bacon. The origin, nature, and progress of this disease, along with the smaller amount of resistance in the tumour, will always serve to distinguish it from exostosis.

These tumours, which should be properly called hyperostoses, are distinguished by Astruc, in his 'Treatise on Tumours,' as gummata or gummatous tumours.[1] He mentions two cases, which I shall, however, not quote here, as the tumours can-

[1] Tom. ii, chap. iii.

not properly be called gummata; they are rather true osteo-sarcomata supervening on disease originating in the periosteum or the lining membrane of the sinus. The fluids circulating there having degenerated from some cause, they have extended their action to the bones, which have become so softened and altered in texture as to be confounded in the tumour.

On comparing these cases with the account of cancerous tumours, and particularly with the eighth and ninth cases related above, it will be perceived that degenerated fungous or sarcomatous tumours have produced diseases exactly similar to those of which M. Astruc speaks, and it must be allowed that he has not been justified in quoting these as examples of the tumours he intended to describe, and which he blames authors for not noticing.

The profound erudition of this author is, undoubtedly, deserving of praise, but without wishing to disparage this, we think the above remarks will be sufficient to show how much we should be on our guard against the doctrines taught in some books, and how likely we are to be misled by mere learning unaccompanied by practical knowledge.

SECTION III.

The action of various instruments may produce penetrating wounds of the maxillary sinus with fracture of the bones. These should be considered as complicated wounds, and treated accordingly; they require special attention in the cure, on account of the moisture of the sinus and the probability there is that they may become fistulous; this latter accident is, however, chiefly to be feared when loose portions of bone or other foreign bodies are present, and the careful removal of these, and a proper mode of dressing, will generally be sufficient to effect a cure.

Obs. 13. In 1747 I saw, at the Charité Hospital, in Paris, a man who had a fistulous tumour in the right cheek, from which protruded the point of a long nail. This foreign body had been fired from a gun, and passed head foremost through the patient's cheek into the sinus, and thus caused a fistula. M. Foubert, then senior surgeon to the hospital, divided the tumour down to the maxillary fossa, loosened the nail, extracted

it, and easily effected a cure by proper dressings, during which time some small exfoliations took place.

The following observation establishes the same doctrine.

Obs. 14. An officer wounded by a hand grenade, which had penetrated the maxillary sinus, presented himself to M. Allouel, then chief surgeon to the hospitals at Ghent; the wound was already far advanced towards a cure. Although the wound appeared about to heal, there remained a hole about two lines in diameter, from which a mucous fluid daily escaped. M. Allouel was immediately convinced that the sinus had been laid open; and, on inquiry as to the history of the case, he found that the patient had been wounded in a mêlée, that the surgeon had not examined the case very thoroughly, and had simply dressed it. M. Allouel determined therefore to lay open the fistula, and, on doing so, found the maxillary bone driven in, and one end of a splinter filling the cavity of the sinus opposite to the fistula. The foreign body was removed with some fragments of bone. The wound suppurated, and it had drawn together a good deal in a fortnight, a small hole, however, still remained in the centre. As there was reason to fear the wound might still remain fistulous, it was lightly cauterised with a probe heated red-hot; but, as the mucus still continued to be discharged, the cicatrix was not completed after the separation of the eschars. As this means had failed, M. Allouel scarified the edges of the wound, and then dressed it methodically with a compressive bandage. The patient was made to lie on his left side, the dressings were left on for a fortnight, and by means of these precautions the mucus was prevented from flowing through the wound, which then healed. Another small splinter came away afterwards, and from that time the wound has remained quite sound.

The teeth may sometimes be driven into the maxillary sinus by a fall or some other such cause, fracturing the alveoli, and producing symptoms which will not cease until they have been extracted. M. Fauchard relates a case of the kind.

Obs. 15. A quack doctor drove a canine tooth almost crosswise into the right maxillary sinus. The tooth caused great pain in the part, and gave rise to a small tumour in the cheek near the nose, from which three fistulous openings extended

into the mouth, discharging a fetid sanies. The late M. Petit incised the tumour, discovered the tooth, and withdrew it with a forceps. The wound was properly dressed, and it soon healed.

The above observations suffice to prove that wounds of the maxillary sinus complicated with the presence of foreign bodies will not heal until these bodies have been extracted, their presence forming a direct obstacle to the cure. When removed, the wound soon heals; and should it prove obstinate, we must use slight compression, or place the patient on the opposite side so as to prevent the discharge of the humours.

As we are desirous only to treat of such points of doctrine as we can quote cases to support, we shall only allude to the possibility of worms passing from the nose into the maxillary sinus, or breeding in the latter place. We cannot doubt that worms have been found in the nose; the 'History of the Academy of Sciences' furnishes two examples.[1] Fabricius Hildanus[2] relates that an infant had severe pains in the head, and was only freed from them after having expelled by sneezing a quantity of very fetid matter and a large worm. We read also in Tulpius[3] that a girl, who suffered from headache, was cured by the escape of a worm. In the same way the presence of these insects in the sinus is possible, and the case by M. Dupont affords an instance of small worms breeding in the cavity. The treatment used for the disease in the sinus brought away the worms, which had been destroyed by proper remedies. The sinus was not indeed opened with that intention, but the case, which is perhaps unique in that respect, may serve as an example, and show the proper course to be adopted in a similar case, where there is sufficient evidence of the presence of these animals.

P.S. Practitioners who consider the actual cautery as the surest remedy in the cure of fungous excrescences of the maxillary sinus, will find in the second, fifth, and eleventh cases in this Memoir positive facts in support of their opinion; the sixth, seventh, eighth, and ninth cases furnish negative evidence of the same kind, and, if well considered, not less

[1] Ann. 1708 and 1773.

[2] Obs. 8, Cent. 1.

[3] Observ. Medicæ, lib. iv, Obs. 12.

convincing. Can we believe, in fact, that the diseases in question would have been incurable in the hands of Ambrose Paré, Marcus Aurelius Severinus, or Ruisch, who so successfully employed the cautery to destroy similar tumours, when a less heroic treatment would only have irritated them! An observation by the late M. Croissant de Garengeot, which was read to the Academy on the 30th of March, 1741, appeared sufficiently interesting to be published as an appendix to the Memoir of M. Bordenave: it proves the efficacy of this useful remedy when employed by surgeons in treating rebellious diseases which have resisted the influence of remedies and the power of instruments.

Case of disease of the maxillary sinus, by the late M. Garengeot.

A young lady of Picardy, obliged to be frequently on horseback in transacting her business, was during three years exposed to the severity of the wind and weather. Led on by the pecuniary profit derived from her numerous journeys, she paid no attention to an icy coldness of the left side of her face, which came on towards the end of the first year of her journeys; not only did this coldness increase, but the cheek gradually swelled. The upper molar teeth of that side became painful and loose, and in the following year two of them fell out.

In the succeeding winter, which was cold and very long, the patient was frequently in the open country, sometimes exposed to the north wind, sometimes to snow and rain: this so increased the swelling that her cheek became monstrous, she was waked in the night by stabbing pains, the coldness spread all over the left side of her head, her breath became very disagreeably fetid, and one more of her grinders fell out. The patient now became alarmed at her state, and went to Rouen for advice; but not being satisfied with the opinion given, came to Paris, where I saw her for the first time on the 20th of November, 1740. Having learned these particulars and examined the patient, I not only found the above description confirmed, but perceived that the mouth was thrust over to the right side, the left side of the nose was much elevated, the

left cheek extremely large, the upper lip very thick on that side, and that a fungus of bluish flesh projected beyond it to the size of an olive, springing from the alveoli, where three molar teeth were deficient. The roof of the mouth no longer formed an arch on the left side, but projected inwards, forming an equable tumour with the swelling of the cheek on the outside. On examining the tumour with my fingers, I found that the lower and anterior part of the left superior maxillary bone was softened to the consistence of flesh, that the front part of the sinus was converted into a similar soft substance, that all the cavity of the sinus was full of fungous flesh, and that the left nasal bone was beginning to swell and become soft.

After due consideration, I came to the conclusion that the disease was as yet but local, and that the proper mode of treating it was to remove with cutting instruments a portion of the superfluous flesh, and to restore and consolidate the remainder by the repeated application of the actual cautery. To this latter means the patient would not consent, and I was compelled to substitute escharotics. I began the treatment by raising the upper lip; and seizing the blue fungous tumour with a hook, I removed it with a bistoury, and cut through the buccinator from the inside, taking away a part of it, as well as of the tumour which so pushed out the cheek.

There was such an abundant discharge of blood that it was impossible to proceed further. The fungus grew again, and I repeated these operations seven or eight times during six weeks, and was each time deluged with blood. In the course of these operations I clearly perceived that the anterior part of the maxillary sinus was fungous, as I had foreseen; and after destroying part of the flesh contained in the cavity, I felt some bony asperities at the circumference, which I smoothed down with an elevator and forceps.

During this treatment I employed different escharotics, but neither these nor my operations were attended with any success; the fungus grew from day to day, and at the end of two months formed an irregular and horribly fetid ulcer. Greatly annoyed at having undertaken a cure of this kind, I told my patient that my consent to her obstinate rejection of the actual cautery would render her disease incurable, that it would become cancerous, that fistulous openings would form in all

directions, and that a prince had lately died of a similar disease in consequence of rejecting the wise advice of Messrs. Mareschal and De la Peyronie, and that she would certainly experience the same fate. This statement, the little success we had hitherto met with, her great confidence in me, and her own self-love, inspired her with courage. For the eighth time, therefore, I removed a bit of the fungus of the size of a nut, which had grown again in spite of my operations and the continued use of the strongest corrosives. In the evening I applied successively two cauteries, and repeated this application twice a day for a week. The success which attended this measure is inconceivable, the flesh visibly regained astonishing solidity, the roof of the mouth in great part recovered its natural position, the left cheek was reduced to the size of the right, and the bad odour of the mouth gradually disappeared. I continued the use of the cauteries once a day for three weeks, the patient only using a gargle of vulnerary plants and honey of roses. At length she returned home thoroughly cured. I afterwards heard that she daily improved in health, and that the cure was a radical one.

MEMOIR ON
CERTAIN EXOSTOSES OF THE LOWER JAW.

By M. BORDENAVE.

All the bones of the body are subject to morbid enlargements, to which the name of exostoses has been given. These tumours, in which we find a difference of structure according as the ossific juices have undergone dispersion or congestion, are either simple and formed merely by an aggregation of ossific juices, or they are complicated with suppuration internally. This latter kind is found chiefly in the cavity of the long bones, and is much more rare in the other bones; I shall, however, notice a remarkable instance of its presence in the lower jaw-bone.

The exostoses of the lower jaw will alone form the object of this Memoir, in which I purpose to examine their characters, their most common causes, and the simplest modes of relieving the local disease in such a way as to meet the difficulties of treatment, and prevent the deformities which may ensue from them.

The exostoses occurring in the bone of the lower jaw are almost always similar to those that take place in other bones of the body; that is, they are formed either by an enlargement of the whole thickness of the bone, or from some cause or other of one part only of the bone; so that this kind of exostosis produces in general only an enlargement, or an increase of density of the bone; or should it suppurate, it does so externally, especially in the alveoli, producing caries there.

The particular structure of the bone of the lower jaw would seem to allow only of this kind of exostosis. Formed externally of compact dense bone, containing internally only bony cells with solid walls, having within no cavity of any size, except the canal which traverses it on either side, the lower jaw-bone must almost necessarily swell, and become more dense from the different diseased actions affecting it, and thus give rise to a solid exostosis.

It may happen, however, that this disease may be complicated by an internal suppuration, and that an abnormal cavity may form in the thickness of the bone, in which case the exostosis becomes what authors have termed a spina ventosa. This case is very rare, and I have found only one other case resembling that of which I shall relate the particulars in the course of this Memoir.

External causes seldom give rise to exostoses of the lower jaw; more commonly they are due to an internal taint, such as the venereal, the scrofulous, &c., and they become more or less troublesome in proportion as this taint increases or gets better. Scorbutic exostoses are rare; scurvy more often produces caries and brittleness of the bones than exostoses, nevertheless, these may occur when the taint is first exhibiting itself, or when it is complicated with rickets, scrofula, or syphilis, as was observed by the late M. Petit.[1] This skilful practitioner adds, that at the end of 1692 and the beginning of 1693, he saw only three cases of exostoses in an hospital where there were four or five hundred cases of scurvy, whilst there were more than a hundred cases of caries; and, what is worthy of observation, the exostoses were all of the lower jaw, in the part where the large molar teeth are lodged, the jaw having merely become one third larger than natural. He, however, states that he had seen an exostosis on the foot of a soldier who was scorbutic.

Repeated colds in the face, pains and other diseases of the teeth, may also give rise to exostosis of the lower jaw, by causing congestion of the periosteum covering the alveoli, and consequent swelling of those parts, the texture of which is spongy and soft. Amongst these causes, *epulis* is one of the most common. This is a sarcomatous tumour, which sometimes grows at the roots of carious teeth, and by its increase of size pushes out the walls of the bone, from whence arises a sort of exostosis, which sometimes attains to a considerable size, and is even occasionally accompanied with suppuration and caries.

We may easily conceive the mode in which these kinds of exostoses grow: at first the congestion of the vitiated juices in the bone is determined to this or that part by a variety of causes

[1] Traité des Maladies des Os, p. 367.

which escape our perception; secondly, the tumour at the root of the teeth acts by distending the walls of the jaw-bone; in this way the bone acquires an increased size, and the circulation of the bony juices becomes deranged, these accumulate, the bone thickens, and the exostosis is formed.

Thus far we perceive that the exostosis of this bone is solid, and without cavity, and indeed authors enumerate only this form in the lower jaw. It is more difficult to understand how hollow exostosis, with a cavity of some extent, should form in this bone. The following observation will furnish us with an instance worthy of our attention.

Obs. 1. A young man, about 19 years old, had been troubled for several years with an exostosis of the lower jaw, which was making evident progress; and which, by interfering with the actions of the muscles, confined the movements of the jaw. The swelling had been painful, and the patient had felt throbbing in its internal parts. Remedies of various kinds had been tried for a considerable time at its first appearance, but without effect; amongst these were internal solvents, sudorifics, and local applications. The patient having experienced no relief, determined to submit to more vigorous modes of treatment, and even to undergo a severe operation, if necessary for his cure.

This patient came to consult me in the month of February, 1759. The exostosis was on the right side; it was of the size of a large egg, but somewhat longer and flatter, extending almost from the angle of the jaw to the symphysis, and projecting, especially outwards and downwards. Internally, the tumour projected most towards the cheek, the gums appeared healthy, and the teeth sound externally, but from the change in the form of the jaw they were inclined over towards the tongue.

On examining into the general state of my patient, and finding his tonsils enlarged, and that they had formerly been ulcerated, that he suffered from pains in all his limbs, and that he had a sister who was scrofulous, I came to the conclusion that his disease depended on an internal cause, and that we should not succeed in removing the local disease without, at the same time, destroying the constitutional taint. I therefore considered it was a case in which a course of the *grands remèdes* would be appropriate.

The man's regularity of conduct left no ground for suspecting a venereal taint; the kind of treatment I proposed to subject him to, and, lastly, the uncertainty of my being able to effect a cure in a case where the disease was not due to any very manifest cause, led me to recommend a consultation on his case. After examining the case, the consultants decided on submitting the patient to the proposed course, and at the same time we agreed to have a couple of teeth extracted, for the purpose of getting an insight into the nature of the malady.

The patient underwent careful preparation, and was kept under the course agreed on for a long time. During this time I had the second molar tooth extracted on the 24th of February, and thus obtained, with the interior of the swelling, a communication, which, though small, gave vent to a very fetid sanies. The root of the tooth had begun to decay. On the following day I had the next molar drawn, namely, the third, it was sound; the bottom of the socket was not open, but I broke through it with a punch; I then succeeded in breaking away a portion of the alveolus, and thus made a second opening.

These openings gave issue to some very fetid matter; through them I daily injected the cavity with a decoction of herbs, to which a little tincture of myrrh and aloes had been added, and afterwards dressed it with pledgets steeped in balsam of Fioraventi. The injection returned from the cavity of a yellow colour, and brought with it some grumous matter resembling hardened marrow. A fortnight after the first operation and employment of the above dressings, a pretty large portion of the alveolus came away, and this was followed by other smaller bits. The opening of the exostosis being thus increased in size, I was able more readily to clean out the cavity and examine it internally.

The patient being still under the course of medicine, I perceived that the matter which came away with the pledgets was less fetid and thinner, the interior of the exostosis was lined by a red, slightly elevated, and somewhat fleshy substance; I could perceive only a few carious points along the edges of this, and I found that the cavity extended as far or farther than the canine tooth. The salutary changes gave me great hopes of success, and I thought I might assist the operations of nature by lengthening the opening in the month, and thus facilitating

the return of the sides of the bone, which had been thrust out, to their natural position. On the 9th of April, therefore, I had the first molar tooth, the only remaining one on that side, drawn out, and perforated the alveolus, and ten days after I got away the whole of the exfoliated alveolus, by which an opening, an inch and a half in length, and four lines in width, was obtained, and through this I introduced six large pledgets.

The patient, when he had finished the course of mercurial frictions, was placed on diet drink; the suppuration became healthy, some other small exfoliations took place, and the interior of the cavity became lined with a firm, red, fleshy substance like that which forms the gums, with which it was also continuous. The discharge gradually decreased, and for a long time what flowed came only from a point of the exostosis near the ramus of the jaw, where no caries existed.

From the month of July I ceased to dress the patient; he every day injected for himself some water into the cavity, to wash out any moisture that might have collected there and become changed, and then filled it with pledgets covered with powdered colophony, without which precaution the food collected in the hollow, and a sort of resonance took place when he spoke, and changed the tone of his voice. I had a plug made for it, but discontinued its use, because it kept the parts too much separated; the charpie appeared to me to answer better. In about a year the patient was well, with the exception of the opening that led into the cavity of the swelling. The tumour had subsided a little externally, and the opening in the mouth was smaller. At the end of two years I again saw the patient, the exostosis had almost disappeared, the internal cavity was much reduced in size, and there is reason to think it may in time entirely disappear.

The above observation furnishes us with the history of an exostosis complicated with internal suppuration, which was painful, and was attended by internal pulsations. This may be considered as a *spina ventosa*, and it deserves attention, not only on account of its nature, but also as regards its mode of termination. There would be little advantage, however, in relating an isolated case of this kind, unless we could draw from it some deductions as to the treatment of exostosis of the lower jaw.

washed out with an injection. Notwithstanding this precaution, the matter acquired a fetid odour, and became thicker. The opening having become partially closed, it was dilated with the same instrument, as much as the resistance of the bone would allow of. The cavity of the bone was found lined throughout with a membranous substance. The wound was dressed with a tent of calamus aromaticus, covered with balsam of Arcæus, and some aromatic spirit mixed with a few drops of elixir of vitriol was daily injected to correct the smell of the discharge. The tent, after a time, was diminished in size, and steeped in Peruvian balsam as the parts got well. Little by little the cavity became smaller, and in the course of six months the cure was completed, the bone having recovered its natural size, and no deformity nor other inconvenience remaining behind.

If we compare this observation with the one I have before related, we shall see that there is a good deal of resemblance between them, inasmuch as both exhibit a hollow exostosis of the lower jaw; there are, however, also marked differences between them, which exhibited themselves in the history of each. In the last case, the tumour was only of a twelvemonth's standing, it was of moderate size, and its bony walls were not very thick, as they yielded to the bistoury. In the case which I treated, the tumour was of long standing, the bony parietes were very thick, and the swelling extended both inwards and outwards; it is therefore not surprising that the tumour should only have decreased in size, and the bone should not have entirely recovered its natural size; the great solidity of the exostosis formed an obstacle to a perfect cure.

But in cases of this kind should we content ourselves with cutting through the bone as M. Runge did, or is it better to effect a cure by extracting the teeth, and destroying the alveoli as I did? The latter seems to me the preferable plan. In fact, if the bony walls are pretty solid, it becomes difficult to cut through them, and should we fail to do so we shall uselessly bruise and lacerate the soft parts covering them. Again, it often happens that the roots of the teeth are decayed, or if not already carious they will become so during the treatment, and afterwards fall out. Runge's success does not therefore prove his treatment to be the best. It is better to extract the teeth and destroy the alveoli; for we often find a passage into

the tumour ready made, or should we have to make one, we shall accomplish it more easily through the alveoli with the punch or trocar. By thus destroying two or three teeth, we get a more extensive exfoliation and a larger opening, and the tumour then more readily falls in.

If the exostosis is attended with caries of the teeth, or is a consequence of this, if the gums are fungous, if there is reason to suspect the presence of a fleshy tumour at the root of the teeth, if there are internal pains,—in all these cases the extraction of the teeth is still indicated as a means of reaching the interior of the tumour, procuring a free discharge, and facilitating the drawing together of the bony parietes. This plan of treatment succeeded in M. Runge's hands in one of these cases.

Obs. 3. A woman had a hard indolent tumour, about as large as a pigeon's egg, on the right side of the lower jaw, in the situation of the last two molar teeth. These teeth were carious down to their roots; they had been occasionally painful, and the patient had, for some time past, felt a dull pain in the part. These carious teeth were readily removed; the roots of the front one were healthy, while to those of the back tooth were attached an encysted tumour, as large as a little bean, containing some thick gray matter. The sockets were filled with charpie steeped in essence of cloves, and resolvent spirituous fomentations were applied externally, under the use of which the tumour disappeared in about five weeks, the walls closed in, and the gums recovered their firmness.

In this case success attended the removal of the teeth, because the tumour of the jaw was caused principally by the encysted tumour attached to the tooth, and the cause being removed the effect ceased.

The local treatment proposed above in exostosis of the lower jaw is simple and sure, and is attended with no alarming consequences; the cases we have related exhibit the advantages attending it, and may furnish useful suggestions for lessening the difficulties attending the treatment of diseases of this kind. In some cases, however, the resources of art become unavailing, where proper treatment has not been employed at first, or where the disease has made too much progress. In the Memoirs of the Académie Royale des Sciences for 1727 we

wholly destroyed, as far forwards as the first molar, which, with the canine, &c. remained sound; the softened tissue of the bone was spread out around a cavity large enough to contain a large pullet's egg. The body which had been taken for an exostosis was lodged in the cavity, and when the integuments were removed it separated spontaneously, as it had only feeble attachments to the soft parts around it. This body was very irregular externally, in some parts brown, in others gray, or even whitish, friable, and about as large as an egg. It weighed three ounces and forty-eight grains. On sawing it across it was found more solid internally than at the surface, and exhibited irregular layers, whilst externally it seemed to be made up of a collection of small grains like those of freestone.

A fragment of this mass, weighing two drachms and forty-four grains, having been placed in nitric acid by M. Tenon, who was appointed by the Academy to examine it, gave one drachm and sixty-seven grains of a white earth, and thirty-seven of a substance resembling greatly the parenchyma of bone. Having replaced this substance in nitric acid, I observed that it remained of a yellow colour, and that it did not dissolve, while a portion of human calculus soon disappeared in the same liquor.

Is this body to be regarded as a stone formed in the interior of the bone, or rather as a concretion produced by the effusion of the bony fluids, resulting from a disease of the teeth and maxillary bone? The latter is the more probable opinion, as the body did not appear to be simply a stone, seeing that it was not entirely dissolved in the nitric acid; it emitted an odour similar to that of bones; it appeared to have considerable analogy to the matter which constitutes bones; it owed its origin to a disease of the teeth, and there seems reason to think that the disease of the bone, its softening and its decomposition, may have given rise to a collection of earthy matter, which produced this singular body, holding an intermediate place between bone and calculus.

This very rare, if not unique disease, was susceptible of a different mode of treatment, and perhaps of cure, had its nature been recognised in the first instance. Further inquiries into the mode in which the tumour had originated, manual examination, by which the loose moveable body might have

been felt, its complication with suppuration and softening of the bone, might have furnished hints towards the treatment; and if, instead of a succession of minute openings, an ample and sufficient opening had been made, in the first place, inside of the mouth, there is reason to think the malady might have been discovered, the foreign body extracted, and proper applications have been made to the bone. There would have been the more reason for this hope, as the foreign body was detached from the substance of the bone; and as the disease appeared to be entirely local, the bone might have recovered its firmness and healthy state under proper treatment, as has often happened in curious cases of disease in bones.

It is not to be wondered at, however, that the disease was not as successfully treated as might have been desired; new and rare cases are often misunderstood, and the faults we commit in treating them are then very excusable; we ought, however, to record them with care, since they contribute to the progress of art and to the interests of humanity.

MEMOIR ON BRONCHOTOMY.

By M. LOUIS.

From the moment of his birth, man is under the necessity of breathing; the preservation of life depends on the alternate entry and expulsion of air by the alternate dilatation and contraction of his chest. Although respiration is one of the most important functions of the animal economy, it may be injured in various ways, without placing life in imminent peril; thus, in opening bodies, we daily see with surprise the lungs filled with scirrhous tubercles, which, during the several years that they have existed, have only caused more or less difficulty of breathing. In consumption, the patient dies worn out with hectic fever and colliquative discharges; the lungs are almost entirely destroyed by erosion; the cough caused by the presence of pus and by the combined necessity and difficulty of expectorating, has been the only local symptom of which the patient has complained; respiration is effected without difficulty, whatever the disease of the lung, as long as the air has a free entry and exit. The blood, as we know, returning from all parts of the body to the right auricle and ventricle, is conveyed by the action of the ventricle into the ramifications of the pulmonary artery; it there undergoes the proper changes under the influence of the fresh air which we inspire, and passing thence by the branches of the pulmonary vein into the left auricle and ventricle, is conducted into all parts of the body to vivify and nourish them, and to furnish to the several secreting organs the matter which they are to elaborate. The lung is the organ of sanguification, which process the ancients attributed to the liver; the smallest obstacle offered to the entry and exit of the air, necessarily deranges that function; if a man can only inspire half or a quarter of the air he requires, however healthy may be his lung, the vessels become congested, the progress of the blood is retarded, and the patient soon experiences symptoms of suffocation: these effects are more or less speedy,

according to the violence of the cause, but they are always fatal.

This danger shows itself especially in inflammatory quinsy. It is a very common malady, and has been divided into several varieties, according to the precise seat of the inflammation, and the nature of the functions which are disturbed; the difficulty of speaking or swallowing, and that of breathing, in inflammation of the throat, show themselves with certain variations in different cases, which has given rise to a multiplication of terms more embarrassing than useful. Galen long ago disapproved of these scholastic divisions, because they are not founded on such signs as should characterise different species. I propose here to treat only of that kind which presents no visible appearance either in the swallow or in the throat, which, while narrowing the glottis, renders the voice acute, and quickly manifests symptoms of strangulation.

Amongst modern authors, Van Swieten is the one who has discussed this subject in the most extensive and learned manner; he agrees that the danger of suffocation is very urgent; and no one has drawn a more vivid picture of the primary and consecutive effects of this serious disease. He compares the sufferings of unhappy patients who have the misfortune to be attacked with it, to those of criminals condemned to be hanged. The parallel can only hold good where the swelling so compresses the jugular veins as to prevent the return of blood from the upper parts; under these circumstances, the blood-vessels distributed to the brain would be first surcharged, the substance of the viscus would be compressed, and the patients would perish with symptoms of apoplexy, which always abolishes sensation and the animal functions before attacking those essential to life, unless indeed the attack be extremely severe.[1] But when respiration is obstructed in inflammatory quinsy, it is the lung which suffers in the first place: it cannot expand itself, the blood stagnates, and causes symptoms like those of suffocative peripneumony. I shall not deny the possibility of a metastasis to the lungs in

[1] See the dissertation published by me in 1763, under the title 'Memoir on an Anatomical Question relating to Jurisprudence,' in which are established the principles by which we may distinguish between suicide and assassination in the inspection of a body found suspended.

enough," continues Galen, "jokingly to describe ancient medicine as *a meditation on death.*" To him we are indebted for the happy discovery of bronchotomy, which is all we need remark on here.

Pliny had spoken disparagingly of our author before Galen, but could not avoid praising him for some useful reforms; amongst other things, he says that he had rendered medicine less cruel in the treatment of some diseases; and mentions as an example the canula which the ancients were in the habit of introducing into the throat in quinsy.[1] But Galen considers Asclepiades as the inventor of the incision of the trachea in quinsy,[2] without stating his own opinion on the advantage of this practice. Cælius Aurelianus[3] was less guarded; depreciating all that came from Asclepiades, he rejected the operation with disdain, treating it as fabulous or visionary, and as one which none of the predecessors of Asclepiades had spoken of; a rash suggestion of this physician, which no one had put in execution; and promises to recur to the subject that he may not pass over such a crime with too brief a notice.[4] Celsus, who wrote before all those authors, and who knew the practice of Asclepiades, does not mention bronchotomy. The last resource which he proposes in suffocating quinsy, was deep scarifications beneath the lower jaw, in the palate, and near the uvula, to give vent to the humours which distend those parts; should those scarifications fail to produce the desired effect, the patient is lost: "*Quibus si non fuerit æger adjutus, scire licet a malo victum esse.*"[5] Aretæus, a contemporary of Galen, speaks of bronchotomy as of an unwise speculation;[6] and bad as are the reasons which he adduces for disapproving it, he

[1] "In quibusdam morbis medendi cruciatis detraxit, ut in anginis, quas curabant in fauces organo demisso."—Plin. Hist. Nat. lib. xxvi, cap. iii.

[2] "Asclepiades ultimum auxilium posuit in iis qui maxime suffocantur, laryngem incidere."—Galen. in Medico. cap. xiii.

[3] "Est etiam fabulosa arteriæ ob respirationem divisura, quam laryngotomiam vocant et quæ a nullo sit antiquorum tradita, sed caducâ atque temerariâ Asclepiadis inventione affirmatâ."—Cæl. Aurel. de Acut. Morb. lib. iii, cap. iv.

[4] "Ne tantum scelus angustâ oratione damnemus."—Loc. cit.

[5] Cornel. Cels. de Medicin. lib. iv, cap. iv.

[6] "Quicumque strangulationem ab anginâ verentes, quo laxius spiritus duceretur, arteriam secuerunt, non sane experimento rem comprobasse videntur."—Aretæi, Curat. Acutor. lib. i, cap. vii.

can, at least, boast the melancholy advantage of having given a reason for his advice. "The wound," says he, "increases the heat of the inflammation, the constriction increases, and the cough is excited. Moreover, should the patient escape this danger, the lips of the wound cannot reunite, for being cartilaginous they cannot be agglutinated." We need hardly ourselves undertake to refute this author; the subsequent history of medicine will furnish the answers to these and other equally frivolous objections, contradicted alike by reason and by experience.

Notwithstanding the declamation of Cælius Aurelianus, and the erroneous notions of Aretæus, the advantages of bronchotomy were not overlooked by the cultivators of our art who succeeded Galen. Paulus Ægineta, who lived about the middle of the seventh century, states positively that the best surgeons had described the operation,[1] and quotes the words of Antyllus on the subject. These two writers were not, however, contemporaries. The writings of Antyllus are known to us only by the fragments which ancient authors have handed down to us. Aëtius, who lived in the fifth century, has entire chapters taken from Antyllus, and which show his science and dexterity in the most delicate operations.[2] Oribasius, who was physician and surgeon to the Emperor Julian, and who preceded Aëtius about a hundred years, often quotes Antyllus.[3] The description which he gives of bronchotomy, and the distinction he draws between the cases in which it should and those in which it should not be performed, show that the operation was employed in his time, and its use subjected to well-considered rules. Its adoption by Paulus also affords incontestable evidence that the proceeding had been approved of by practitioners for several ages.

"We are to make an incision in the trachea below the top of the windpipe, about the third or fourth ring; for this is a

[1] Paulus Ægineta, de re Medica, lib. vi, cap. xxxiii; vel vol. ii, p. 301, Edit. Soc. Sydenham.

[2] See the works of Aëtius in the collection by Henry Estienne, entitled 'Medicæ Artis principes post Hippocratem et Galenum;' and Manget's 'Dictionary of Medical Writers,' at the name Antyllus.

[3] See the works of Oribasius in the same collection by Henry Estienne, and a work entitled 'Conspectus Hist. Med. Chronologicus,' &c.; Göttingen, 1761.

convenient situation, as being free of flesh, and because the vessels are placed at a distance from the part which is divided. Wherefore bending the patient's head backwards, so as to bring the windpipe the better into view, we are to make a transverse incision between two of the rings, so that it may not be the cartilage which is divided, but the membrane connecting the cartilages."[1]

At the destruction of the Eastern Empire the sciences passed from the Greeks to the Arabians: the latter appear to have practised surgery, but made no improvements in it; on this point we must depend on the testimony of authors who appear to have studied the originals, or at least to have studied the Arabian writers in translations of their works, which are now very scarce.

Dr. Freind[2] states that Avenzoar is the only Arabian physician who thought well of bronchotomy in desperate cases of quinsy. Never having seen the operation, and supposing it to be difficult, he only speaks of it cursorily; and says he would not be the first to recommend it, although from an experiment he made upon a goat he thinks it possible. He made an incision in the windpipe, dressed the wound every day with honey-water, and when the cicatrix began to appear he applied the powder of cypress nuts, and thus completed the cure. But Freind had before stated, in speaking of Paulus Ægineta, that Albucasis, an experienced Arabian surgeon, and whom he elsewhere designates as the restorer of surgery, which was almost forgotten in his time,[3] had transcribed from Paulus the mode of performing bronchotomy. Although he had never seen the operation, he thought it practicable. He was led to this opinion by the case of a woman who had cut her throat, and made a sort of lowing sound as if in the last agony; he found that air issued from the wound, and that she had not opened the jugular veins, and succeeded in curing her speedily without her suffering any other inconvenience than a huskiness of voice. Freind refers on this subject to the practical observations of Gulielmus Salicetus, professor of surgery at Verona, in the thirteenth century. We shall recur to him by and by.

[1] Loc. cit.

[2] History of Medicine from Galen to the Sixteenth Century.

[3] About the middle of the twelfth century.

The information we possess on the doctrines of Arabian surgeons respecting bronchotomy is not confined to the statements of the historian of medicine.

Gui de Chauliac, surgeon, physician, and household chaplain at Avignon, wrote, in 1363, that he had formed his compilation from the best authors, to whose opinions and decisions he had added the result of his own experience. He appears to have especially formed himself by the study of the Arabian authors, whom he compares and appreciates; he treats of bronchotomy after Avicenna chiefly, whom Freind does not mention; he relates the evidence of Albucasis who saw a wound of the trachea heal, and of Avenzoar, who had practised bronchotomy on a goat.[1] The works of Avicenna can be readily consulted in the splendid Latin edition, published at Venice in 1608. He says that in violent quinsies, when medicine has exhausted all her resources, and we suppose the death of the patient to be at hand, we may hope to save him by opening the trachea: *Quumque; synances vehementiores fiunt et non valent medicinæ, et creditur quod perditio futura sit, illud per quod speratur evasio est scissio cannæ.*[2] No doubt this name for the trachea has led to the use of the barbarous term 'subscannation' for bronchotomy, a term which, according to Fabricius ab Aquapendente, frightened the surgeons of his time.

This latter author is one of those who has given us the most information respecting the surgery of the Arabians. In treating of this operation he cites especially Rhazes, Avicenna, Avenzoar, and Haly Abbas; he admits that their writings had inspired modern surgeons with a timidity, from which he was not himself exempt.[3] "Mesué said that this mode of cure appeared to him very difficult."[4] Albucasis said he had seen no one in his country who had practised bronchotomy for want of experience and for fear of blame; *propter infamiæ metum.* A fear increased by the desire which authors express that the operation should not be performed until the last extremity, when

[1] "Quod probat Albucasis ancillæ testimonio, quæ cum cultello partem canalis pulmonis inciderat et Avenzoar dictam operationem in caprâ probavit."—Guidon, tract. iii, de Apost. et Exit. Membr. Simpl.

[2] Lib. iii, Fen. 9, tract. i, cap. ii.

[3] Fabricius ab Aquapendente de Operat. Chirurg. cap. xliv.

[4] "Mesue dicebat, cura hæc difficilis est apud me."—Ibid.

the affair is becoming desperate, and everything else having been tried the patients are about to be suffocated. Avicenna, in like manner, said that we must not incise the windpipe except in the most violent quinsies, when medicines have produced no effect, and we suppose the patient to be expiring. Rhazes also asserts that we must not operate until the patient is menaced with death: *Nisi cum mors fuerit indicata.* The surgeons of our time, continues Fabricius ab Aquapendente, frightened by all these authorities, dare not undertake the operation, and I, following their example, have never performed it: *Et ego quoque eorum vestigia secutus, nunquam administravi.* It would not be difficult to prove that many a victim has fallen a sacrifice to this neglect of so essential a means of relief; the fruit of our inquiries will be perhaps for the future to inspire as much confidence as there has been fear hitherto.

Upon the revival of learning in Europe, the doctrines of the Arabians were predominant: subsequently to that time materials are to be found in all directions for usefully continuing the history of our operation. Jaques Houllier,[1] one of the most eminent members of the faculty of medicine of Paris, published, among other valuable works, a Treatise on the Cure of Internal Disorders. He there speaks of quinsy,[2] and particularly of the danger which the patient incurs of dying from suffocation. Bleeding, cupping, cataplasms, and various gargles are diligently to be employed. Should all these means fail, we employ, says he, the resource of Asclepiades.[3] If Houllier, as we suppose, intended to refer to bronchotomy, he has been but ill understood by the author of the marginal notes, who supposes the resource alluded to to be a compound of aloes and colocynth, of which he says mention is made in Aëtius.

Although Fabricius ab Aquapendente never performed bronchotomy, he has spoken with more judgment than any one of it as a curative measure, regarding it as the most important operation of surgery. "Amongst all the operations practised on man for his relief, I have always thought," says he, "that that should be placed in the first rank which speedily restores to health those who were at the point of death, and thus assimilates

[1] Died in 1765.

[2] De Morbis Internis, cap. xxii.

[3] "Quod si his artibus nihil proficimus, utimur auxilio Asclepiadis."—Ibid.

the surgeon to the god Esculapius. Such an operation is tracheotomy, by which patients on the point of suffocation from an obstacle to respiration, cease on a sudden to suffer from it: from the moment of their being able freely to inspire the air necessary to life, they are snatched from the arms of death, who was on the point of seizing them."

After this introduction, he takes an enlightened survey of the different opinions of Greek and Arabian authors, in the course of which he considers the diseases to which the operation is suited, when it ought to be performed and when not. His conclusion is, that it should be abstained from in difficulty of breathing, arising from disease of the lungs and trachea; that the disease ought to be situated exactly in the larynx or above it. Excessive swelling of the tongue, of the tonsils, or uvula, are expressly mentioned as indicating bronchotomy. Some restriction is, however, required here, since we have means for dispelling tumefaction of these parts situated above the larynx, by more simple and direct means than an incision into the trachea. Of this mention will be made elsewhere.

Signs that the trachea was full, would not, according to Fabricius, afford a counter-indication to incision of this canal.[1] Without doubt, this must refer to obstruction of the tube from a copious secretion of mucus, which cannot be gotten rid of by expectoration. In such circumstances the operation would appear more necessary rather than less so. Be this as it may, our author says that it should be performed, because great good may result from it, and that the operation is absolutely free from danger: he afterwards recalls instances of wounds made in this part, and which have been healed without any difficulty. He requires, however, that whoever undertakes to perform bronchotomy, should know anatomy well; since, with a skilful man, all is done with the greatest safety and success. "Qui secat sit anatomes peritus; quia sub hoc medico et artificè omnia tutissimè et felicissimè peraguntur." The veins and arteries of the neck are far removed from the part operated on; there is no nerve at the anterior part of the neck; the muscles are not divided, for he directs them to be drawn aside, that the opening

[1] "Immo vero etiam si asperæ arteriæ repletionis aliquot signa adsint, nihilominus secarem, cum sectio sit tutissima."

may be made between them; lastly, there is no part of the least consequence exposed to injury in this operation.

We see that the author, guided by the light of anatomy, declares himself favorable to bronchotomy. He satisfactorily refutes the objections of Aretæus, and examines thoroughly in detail all that concerns the manner of operating: his anatomical and surgical views enable him to improve on the method of Paulus. He fears lest the muscles lying along the trachea, if wounded by the transverse incision, may give rise to hemorrhage, inflammation, and convulsions. Our modern authors might be proud to be compared with Fabricius ab Aquapendente in the wisdom, science, and skill displayed by him in all he says of this operation. He is the first, as far as I see, who speaks of the canula which it is necessary to place in the opening made in the windpipe between the two cartilaginous rings. It should have wings to prevent its being drawn into the trachea during inspiration; it should be short, that it may not touch the internal part of the trachea, otherwise it will excite cough and cause pain; the straight form appears to him more convenient than a curved one; for the curved canula is liable to be shaken by the air in passing, he therefore prefers one which should only reach to the level of the trachea, and which should be winged for the reason given above.[1] When the danger of suffocation is passed, the wound is readily healed.

It is surprising that Casserius, the pupil and successor of Fabricius, and one of the most zealous defenders of bronchotomy, does not mention the name of his illustrious master in what he has written upon this subject.[2] He assures us that great and experienced surgeons have, by means of it, recalled to life persons about to perish for want of breath. He instances Antoine Musa Brassavole, known to Fabricius, who slightly mentions him. A man was at the point of death from quinsy, a timid surgeon did not dare to venture on the operation; Brassavole opened the trachea; the patient, instantaneously snatched from life to death, soon regained perfect health. He subsequently afforded the like assistance to other persons, and always with the same success. Casserius,

[1] "Itaque fistula exigua quæ non superat intus ipsam arteriam, hoc est interiorem ejus faciem, et alata est commoda existit."

[2] De Laryngotomia, cap. xx; De Laryngis vocis Organi Structurâ, lib. i.

immediately after, mentions an observation by Benevenius, in favour of bronchotomy, in a case where it was probably indicated; and where it would certainly have been preferable to the means by which the cure was said to have been effected. "Nicolas Rota had a quinsy, no redness nor swelling was perceptible internally or externally; he returned by the mouth or nostrils all that he attempted to swallow, and he was scarcely able to breathe; the patient lay in the agonies of death, abandoned by the physicians who had attended him. Benevenius, then quite a young man, determined on making some deep scarifications below the jaw and in the neck; this was followed by a relaxation, which allowed the patient to breathe and to swallow, and by this means he regained his health." This operation was successful, though undertaken by a young man, without rule or method; cupping-glasses and the scarifier, recommended by all authors, would have answered the purpose; but bronchotomy would have been much more simple and less painful, and would have been surer and more rapid in its effect. Casserius relates several instances of wounds in the trachea cured without inconvenience; he confirms his opinion in favour of laryngotomy, by that of the Greek and Arabian physicians; and, after having rejected the error of Cælius Aurelianus and Aretæus, he describes with great precision the mode of operating. The first incision is to divide the skin and its muscle along a line previously traced with ink; the second is to be made between the muscles of the windpipe down to the trachea, which is then to be opened between two rings below the gland. Morgagni[1] has remarked, that the enlarged thyroid gland may present itself in the line of incision, and that it is well to be aware of this beforehand. He praises our author as the only one who has mentioned this gland, in speaking of the mode of performing bronchotomy. We have nothing to fear, says Casserius, from the slight hemorrhage caused by opening the trachea; he considers it as salutary and likely to further the cure.[2] He recommends the use of a flat curved silver canula, pierced with holes in all directions, and kept in place by a riband passing round the

[1] Epist. Anat. ix, add. Op. Valsalva.

[2] "A cujus vulnere, imo et subsequente hæmorrhagiâ (licet parva nec pertimescenda) operationi portenditur securitas, ægritudini cita curatio."

neck. This, however, has all the inconveniences which Fabricius ab Aquapendente pointed out. It is a foreign body in the trachea, liable to be agitated by the motion of the air, and consequently to cause pain and coughing, which it is very desirable to avoid.

The first professor of practical medicine at Padua, agreed in opinion respecting bronchotomy with the professors of surgery and anatomy. Roderiguez a Fonseca, in his collection of Medical Consultations,[1] speaks of quinsy, with which a strong vigorous woman was attacked at the age of thirty. About ten o'clock she felt a pain in the throat, drew her breath with difficulty, could only rest sitting up, and could not swallow at all; no redness nor swelling was visible in the throat; her voice was gone, and her eyes were prominent.

These symptoms denoted a quinsy of the first species, produced by erysipelatous inflammation of the internal muscles of the larynx, the swelling of which impeded the passage of the air. The malady was urgent, and was considered mortal, according to the prognostic of Hippocrates. Rodriguez, who was immediately summoned, took a pound of blood from the right cephalic vein; two hours after, a similar quantity was taken from the same vein in the left arm. The disease was not diminished; at the end of three hours, another vein was opened in the right arm, and ten ounces of blood were drawn. The symptoms persevering, the ranular veins were opened, and she was cupped behind the ears, under the chin, and in all parts of the body, from the feet to the arms. Embrocations of warm almond oil were rubbed into the neck; drastic clysters were administered; and, notwithstanding all these revulsive measures, the patient died in ten hours.

The author justifies himself for not having bled the patient from the foot, because there was neither suppression of the menses nor of an hemorrhoidal flux; that the fulness was in the upper parts, which are best relieved by derivation; and that he had attempted revulsion, by applying cupping-glasses to the thighs.

There remained, says our author, one means of relief for the patient, namely, tracheotomy; but to this she would not

[1] Consult. xxii, tom. i. This book is dedicated to Sigismund III, King of Poland and Sweden, in an epistle dated from Padua, May 1, 1619.

submit. It is, however, the only remedy to which recourse should be had, and it is not dangerous. This is sufficiently proved by the case already mentioned, in which Brassavole de Ferrara practised the operation with success. Rodriguez adds to the account of this case the following statement, that if dogs are hung after the trachea has been opened, as in bronchotomy, it does not kill them.[1] It is therefore proper, according to him, to propose the operation to the patient and his friends, representing to them the extreme danger of the disease, or rather its certainly fatal character : should they consent to bronchotomy, we must boldly undertake it.[2]

Many similar observations are to be met with, in which the patients died for want of an operation that was not even proposed. Roderiguez de Fonseca is exempt from this reproach ; he was aware of its necessity. The experiment he mentions in proof of the utility of bronchotomy, was practised in England on a man destined to the gallows. The history is curious, and will allow us, without wandering fron our subject, to escape for a time from medical books, and the somewhat tiresome monotony inevitable in detailing opinions upon the same point of doctrine.

A Londoner, named Gordon, added to his occupation as butcher the profession of a highwayman, and carried on so brisk a trade for thirty years, as to have acquired considerable wealth. At length justice, under the guidance of heaven, detected in him the perpetrator of innumerable crimes, and he was arrested when least expecting it. He was quickly brought to trial, and condemned in the usual manner.

Gordon, condemned to death, would have willingly sacrificed his riches to save his life. He vainly tried to bribe his jailors, and even essayed to interest some of a higher rank in his favour. A young surgeon, tempted by the reward, undertook to save his life. He readily obtained permission to see him in prison, and there, after having informed him of his plan, and secured a handsome sum, he made a small cut in the throat, down to the windpipe, and inserted a small tube. We may easily understand what effect the surgeon expected to ensue

[1] " Est enim remedium unicum, ad quod confugiendum est in his casibus nec periculorum ut adparet."

[2] " Si annuerint, tum aggredi oportet intrepide ; sin minus abstinendum est."

from this, when Gordon was hung. It is said that he had tried the experiment on several dogs, and always with success. A little blood spilt in the operation led the jailors to suppose that the criminal had made an attempt on his life. A report to this effect got abroad, but it only served to hasten the period of execution.

The hangman having performed his duty, and Gordon having remained for some time suspended, for the populace to look at, he was, according to custom, handed over to his relatives. The surgeon, who was anxiously waiting for this, had him brought into the nearest public house. He immediately opened a vein in his arm, and set about administering such remedies as he had prepared. Gordon was not dead. He opened his eyes, and heaved a deep sigh; but, having relapsed into a fainting state, died after a few minutes. The surgeon attributed his failure to poor Gordon's bulkiness, which made him hang too heavily on the rope. However this may have been, the use of the tube was very ingenious. The undertaking was so bold a one, that it was thought at first, that Mr. Chovell, the surgeon, would be prosecuted for his interference. No doubt, however, he would have been protected from annoyance, since in London every encouragement is given to improvements in the arts.

I may add the following anecdote as an appendage to the above more serious one. "Three London citizens, returning one evening from the country, were stopped on the highway by thieves. One of the three, wishing to save his purse, determined to pass himself off as the surgeon who had tried to save Gordon. Gentlemen, said he, you use me very ill, I had a right to expect different treatment for my discovery of the silver tube; I am Chovell the surgeon. This name rendered them so polite, that they not only returned him his purse, but accompanied him to London, to protect him from any other attack."[1]

A surgeon of Paris, contemporary with Fabricius, Casserius, and Fonseca,[2] but who was unacquainted with their works,

[1] Extracted from a periodical work entitled 'Le Pour et le Contre,' 1733, tom. i, p. 154; article "Invention nouvelle de l'art."

[2] Casserius died in 1616, aged 60; Fabricius ab Aquapendente, May 24, 1619, aged 82; Habicot, June 17, 1624, at least 60 years of age. These facts, with the dates of their works, show that they were of a mature age when they wrote in favour of bronchotomy. In youth the active imagination may lead to the adoption of means which greater experience and a judgment strengthened by reflection would reject.

published in 1620 a small treatise with the following title: 'Surgical Inquiry, in which it is shown that the Surgeon ought undoubtedly to practise the operation of Bronchotomy, vulgarly called Laryngotomy, or perforation of the reed or pipe of the Lung, by Nicolas Habicot, sworn master-surgeon, of the University of Paris.' This production is the fruit of enlightened theory, combined with successful practice. The author, an excellent anatomist, first gives a very detailed description of the larynx, and the muscles which move the cartilages composing it; but we must pass on to that which especially concerns us, namely, the operation in question. A girl, of about 25, stooping forward to open a low door for her master, who was pursued by assassins, received a wound from a ball, which struck the larynx, damaging especially the left side of the thyroid cartilage; the ball passed across to the other side, breaking the lower angle of the scapula, and lodging under the skin. Such assistance as the urgency of the case seemed to require was immediately rendered. So much swelling supervened, that the patient would have been suffocated, but for a leaden tube introduced into the trachea, through which she might breathe.

The author says expressly that the canula remained in about three weeks, until the inflammation and suppuration had ceased. The efforts of the skilful surgeon were crowned with success.

The canula employed in this case, we must remember, could only have served to admit air between the tumefied soft parts, for the cartilages were so much injured that they could have offered no obstacle to its entry. Habicot also employed the canula in a case where the trachea had been wounded with a cutting instrument, although we do not understand his reasons for using it there. These two observations, of value in other respects, are chiefly so at present, in consequence of the conclusions drawn from them in favour of bronchotomy. Ambrose Paré, to whom we are indebted for several important observations on the cure of wounds in the trachea, thought only of reuniting them as exactly as possible; now nothing less resembles bronchotomy than that, the object of the operation being to open a new channel for the access of air. Ambrose Paré attempted reunion; had he introduced a canula it would have interfered with this indication, in which he always seems to

have met with success. We cannot refrain from praising his method even on the ground of its moral effect, for, by the exact reunion of the wounds, Paré enabled the persons wounded to speak, to name the assassins, or to declare that they had attempted their own lives; and thus to save innocent persons accidentally placed in suspicious circumstances from the frightful suspicion of having been guilty of murder.[1]

The readiness with which very complicated wounds of the trachea have been healed, has ever appeared to offer an incontrovertible argument in favour of bronchotomy; these cases have always been adduced by the supporters of the operation. Freind cites the cures of this kind performed by Gulielmus Salicetus;[2] and Casserius[3] mentions them still more in detail. But, on examining them somewhat less superficially, we shall hardly find them affording such conclusive proofs as has been generally imagined. In fact, I find four of the observations related by that old surgeon which have no connexion with bronchotomy. The first case is that of a Signior Boniface, nephew of Hubert, Marquis of Palvicini, who was wounded in the neck by a very small arrow near the windpipe. Only a few drops of blood appeared externally, but all the cellular tissue was deluged with it; one of the principal vessels had been wounded. The patient died not long after. The symptoms denoted great difficulty of breathing, which should have been treated by an incision, venesection, &c. Gulielmus saw nothing but a large ecchymosis, which at first led him to think the arrow was poisoned, but on inquiry, and on trying with some steel instruments, he found this was not the case.[4] The second observation is merely a brief notice of the cure of a lawyer, who, for an hour, was thought to have been killed by a sword wound in the trachea inflicted on him by a military man. A citizen of Cremona cut his throat in despair while prisoner; air and food passed through the wound. Gulielmus

[1] Ambr. Paré, liv. ix, des Plaies en particulier, ch. xxx, xxxi.

[2] Lib. ii, cap. vii, De Vulnere in Gulâ cum ense aut sagittâ, &c.

[3] "Et habuit rugitum ipse in cannâ, vel sonitum velut oregmonem, usque ad finem vitæ ejus."

[4] "Denigratus subito locus est vulneris, et circa eum. Consideravi quod illud foret propter venenositatem sagittæ vel aliud venenum. Sed inveni per relationem et inquisitionem meam cum instrumentis meis ferreis, quod non fuit venenum."

de Saliceto united the wound by suture, and covered the edges of the wound with a protective powder, and over this laid pledgets of tow saturated with a mixture of this powder and of white of egg; the whole was kept on by a proper bandage; the patient was well in a month. In a fourth case, which is related with equal brevity, the same treatment was pursued with similar success. It is from these and other more recent cases, of which many are to be found in the works of authors, that the conclusion has been come to, that bronchotomy is possible. Nothing, as I have before observed, less resembles the cases in which it ought to be practised, since there was in these no prior mortal disease for which the operation would be a certain means of relief. In bronchotomy, a canula is to be introduced to give free ingress and egress to the air; in the cases cited, on the contrary, care was very properly taken to effect the most perfect reunion of the divided parts. It might indeed be fairly observed, that if such considerable wounds could be healed without difficulty, there can be nothing to fear from a very simple wound methodically made; but in truth a little consideration as to the parts to be divided, and the mode of doing it, would have sufficed to show that the operation could not be attended with the least danger. This truth is firmly established, after a learned discussion of the question in the work of our old brother surgeon. His reasons are not only sufficient to justify a surgeon in practising bronchotomy, but really make timidity a crime in such a case. Habicot adduces from analogy arguments capable of persuading even those who are not members of our profession. "In dysury," says he, "where there is entire suppression of the urine, we make an incision, and introduce into the bladder a canula to give vent to the urine until the inflammation of the urethra has subsided. In a bubonocele, that is, when the gut has come down into the groin and is detained there, we divide the parts, both the common parts and those which are peculiar to the hypogastrium, in order to free the strangled intestine, and to give passage to the excrementitious part of the chyle, which would otherwise be returned by the mouth. If, then, we employ cystotomy to give vent to the urine, and bubonotomy in hernia to give passage to the fecal matter, why are we not to practise bronchotomy in severe quinsy to afford passage

to the air, seeing that it is a more feasible and less dangerous operation than the foregoing ones? Wherefore, on such authorities, reason and experience, the surgeon ought to undertake bronchotomy to save the patient from sudden death."

Habicot's experience consisted essentially in two operations performed on persons who were not attacked by quinsy; which shows that the operation, happily for humanity, is adapted to afford relief in a greater variety of cases than was anticipated. A young lad received twenty-two wounds with a sword, a knife, and a penknife in the throat, hands, arms, breast, back, penis, and thighs. He was in such a frightful condition that the physicians and surgeons who were called to him left him for dead without dressing his wounds. Habicot, being summoned, had about half a bucket of hot wine and water prepared, with which to free the patient from his clothes, which were glued to him by coagulated blood. He was engaged, he says, with three of his pupils from seven in the morning until one in the afternoon dressing the young man. "Finding in the evening that, from the wounds in his throat and the clotted blood, he could not draw breath, and that his throat heaved and swelled, I judged it was for want of air; for which reason I made an opening into the body of the windpipe (below a wound which was situated above the larynx), between two rings, by which respiration was immediately effected, the air passing in and out with a rustling sound; this wound was kept open by a canula until the swelling of the pharynx had subsided. The patient was cured in three months, and the bronchotomy saved his life."

Judging from the above recital, the use of the canula would appear to be rather to keep apart the lips of the external wound than those of the tracheal opening, which, from the first, readily permitted the entry and exit of the air without the help of any tube. That circumstance is still more evident in the following case, where nothing is said about the employment of a canula. The case is interesting, and may teach us that bronchotomy is, in certain cases, of essential assistance in relieving the urgent symptoms arising from the presence of foreign bodies impacted in the œsophagus.

A country lad, of about fourteen, had heard that gold, if swallowed, produced no injury, "Having sold some goods in

Paris, for which he had received in payment some nine pistoles, for fear of robbers, he wrapped them up in some linen, and swallowed them. But they would not pass down the œsophagus or gullet, and his face became so hideously swelled and distorted that his companions did not know him. They brought him to my house, but I could neither get the packet up nor down, it was so fixed by the swelling of the throat, and, finding he would choke, I performed bronchotomy on him, having first held out hopes of relief; as soon as the operation was done, he made such a rattling from the air passing violently, that those about him were frightened; but the blackness and swelling of the face having disappeared, I assured them he would not die, especially after I had succeeded in pushing down the plug into his stomach, with a leaden sound introduced into the œsophagus; eight or ten days after, he passed it by stool, at several times, and so did not lose his money, nor indeed risk it so much as he did his life, for which he was indebted to the wound made in his trachea, which afforded him such speedy relief."

The relief having been so immediate, it would seem that Habicot immediately set about healing the wound; there was no necessity for maintaining artificial respiration, and he therefore says nothing about a canula. The size and substance of the canula are described in the sixteenth and last chapter of the dissertation: "As regards the substance of the tent, it should be of gold, silver, or lead, of such a size as to enter into the cavity of the trachea, to allow of the entry and exit of the air; for this purpose it should be a little curved, hollow and flat, with a sufficiently large canal internally; externally, it should have a head furnished with a largish rim, both to prevent its slipping into the wound, and to keep it better in position by the aid of two strings passing round the neck. It should be of sufficient length to pass into the cavity of the trachea, without extending to the opposite side, as this would excite an insupportable cough."

The plate which Habicot had added represents a little, straight, round canula, which does not correspond to his description. If the terms length and size were not synonymous, and that we might understand by the latter the diameter of the canula, it would prove the author to have intended us to use a

pretty large canula; for, after having desired a longitudinal wound an inch long to be made in the integuments, he says expressly that the form of the wound, which could only be transverse, like the intervals of the cartilages, should not exceed a thumb's breadth, or the size of the canula to be employed. A relation between these proportions would no doubt assist in keeping the canula in the wound. This is unquestionably the principal difficulty of the operation, but the progress of art, as we shall see, has overcome it.

Justice has not, hitherto, been done to Habicot for his services to humanity in his work on Bronchotomy; it is scarcely known in other countries, where the work of Frederick Monavius,[1] Royal Professor of Medicine at Stettin, is honorably mentioned. This work is, however, only a translation of that of Habicot, with some slight changes in the text, or in the turn of unimportant phrases. The cases are those of our author, which, together with the plate, are servilely adopted, while his name is not mentioned. The French surgeons are honorably mentioned, but collectively: it was their example which led Monavius to study the subject, *Nobilissimæ et ingeniosissimæ Gallorum gentis exemplo.* This compliment to our ancestors was, no doubt, to serve as an answer to any charge of plagiarism which might be brought against him.

Thomas Fienus, Professor at Louvain, is the author of twelve books on the principal surgical controversies. The fourth is entitled, *De Laryngotomia, sive sectione asperæ arteriæ.* He is of opinion that we should not have recourse to bronchotomy until the last extremity, because it is a dangerous remedy.[2] It may even be doubted, according to him, whether it would be proper to practise the operation in any case whatever. The sophisms of Cælius and Aretæus are repeated, and the instances of happy recovery from wounds of the trachea only lead him to conclude that the operation, though very

[1] Heister mentions this author; and according to Haller, in his 'Consilia ad Chirurgiam Meth. Stud. Medic.' there have been three editions of Monavius; one at Königsberg in 1644, a second at Gryphswald in 1654, the third at Jena in 1711. This latter I have seen in the King's library; the dedicatory epistle is addressed to the Magistrates of Stralsund, and dated Nones of Sept. 1652.

[2] "Est autem hoc remedium periculosum et ideo non licet eo uti, nisi in deploratissimo casu."

dangerous, is not necessarily mortal. The testimony of those authors who have adopted bronchotomy[1] at length leads him to decide in favour of it; and, in the directions for operating, he shows himself a literal copyist of Casserius.

Scultetus,[2] who practised surgery with great success at Ulm, before the middle of the last century, thought well of bronchotomy. He was a disciple of the school of Padua, where Malavicini, a skilful surgeon, and son-in-law to Casserius, was his master. It is easy to see that it is from this latter author that he takes his descriptions of the mode of operating, preceding it with the following simple remark, which sufficiently shows that he thought the practice safe: "*Aspera arteria in affectibus laryngis qui suffocationem minantur, Chirurgo anatomiæ non ignaro tutissimè perforatur.*" J. B. Lamzwerde, a commentator on Scultetus, thought to increase the value of the observations on bronchotomy by adding those of Monavius Guichwicius: we claim the honour for our old friend Nicolas Habicot, from whom they were stolen. There have been few plagiaries more shameful nor less known.

Bronchotomy had, at Naples, an illustrious advocate in Marcus Aurelius Severinus, one of the greatest surgeons of the last century: he calls it a divine invention; if unemployed, it is from the cowardice of surgeons rather than from the unwillingness of patients. Such men allege that it is dangerous, but is it more dangerous than being suffocated? All the reasons and authorities which can be adduced to persuade surgeons to the adoption of so efficacious a remedy are learnedly set forth by Severinus; and he ends his chapter on laryngotomy by saying, that only a want of common sense can lead a man to commit the gross fault of neglecting a remedy approved of by so many authors, and depriving his unfortunate patients of so valuable a means of relief.[3]

We feel it to be necessary to make an important remark here, showing the little value to be attached to most elementary works. We read in the Lexicon Medicum of Castelli, a work in other respects worthy of some estimation, under the

[1] He has given us the opinion of Columbus, who says, that in case of great danger we may open the trachea. "Etiam in summo periculo tracheam incidi posse fatetur Columbus."—Th. Fienus.

[2] Armament, Chirurg. Tabul. xxxiv.

[3] De Medicin. Efficac. part ii, cap. xl.

head Laryngotomy, that the operation is of very doubtful value, and very dangerous. "*Periculosum profecto et valde anceps remedium.*" Reference is then made on the subject to Fabricius ab Aquapendente and Marcus Aurelius Severinus, who have both spoken of bronchotomy as a divine invention. How are such inconsequences to be excused? The assertion is the more reprehensible too, because it gives importance to a false and most dangerous doctrine.

In the French Questions on the Surgery of Gui de Chauliac, by M. Ranchin, Professor of Medicine at Montpellier, laryngotomy is expressly recommended, after Albucasis and Avicenna, when quinsy cannot be cured in any other way, and the patients are in danger of dying, from the impossibility of drawing breath. To the inquiry at what time it should be performed, he replies, that that must depend on the urgency of the case, for it is not well *in talibus retardare.* If the latinity be not first-rate, the excellence of the precept may well excuse it.

Lazare Riviere, Dean of the Faculty at Montpellier, who wrote his Practice of Medicine in 1646, is not so decided as his predecessor Ranchin. At the end of a long chapter on quinsy, he refers to bronchotomy merely by way of conclusion, "*Pro coronide aliquid dicendum est de laryngotomia;*" which shows he had not a correct idea of the value of this measure. He points out the authorities in favour of the operation, notwithstanding which, he says it is very seldom practised for fear of blame, should it be unsuccessful. From such considerations the most important remedies are often neglected, or altogether abandoned. In an art having for its object men's lives, we can scarcely overrate the mischievous effect of so erroneous a notion, especially on the part of a professor, whose pupils will always think it right to uphold his credit, if it be but to gratify their own self-esteem.

René Moreau, one of those physicians who did most honour to the faculty of Paris, in the preceding century, took a view of this operation worthy of his great knowledge. Bartholin entertained doubts respecting the use of bronchotomy in quinsy, especially in infants. He states that he was acquainted with a woman at Padua, on whom Spigelius appears to have operated, or who had seen it performed by him, or by

his direction.[1] Nothing, however, is said about it in the works of that illustrious anatomist.

According to René Moreau, in his reply dated from Paris, on the 1st of March, 1646, bronchotomy was of no service in the epidemic quinsy of children, which Severinus described,[2] and which is accompanied by fatal hemorrhage, pustules in the mouth, ulcers in the throat, and gangrenous scars. Amongst the patients whom he saw attacked by simple quinsy, a large proportion were cured by repeated bleedings; a few fell victims to the violence of the disease, and very few required the operation of bronchotomy. This operation was twice performed by his direction: first, on a gardener, who was still living; secondly, on a soldier, whose voice remained hoarse for some time after. Our author declares that the operation is neither difficult nor dangerous; his description of it resembles that of Casserius, but he recommends a canula slightly curved. He dispenses with the suture, which all preceding authors had recommended for closing the wound after the withdrawal of the canula, and when the inflammation had subsided. He judiciously points out that a position with the head bent forward on the chest, is of itself sufficient for effecting reunion.[3] He objects to waiting until the last extremity before performing the operation. "A skilful and prudent man will avail himself of an opportunity when there will be no danger of the patient's perishing during the operation, or shortly after." Moreau speaks of tempering the air by means of a little external warmth. Cæsalpinus fifty years before, according to Severinus, had suggested the same precaution. The air which the patient breathes through the canula would undergo the same modification as in passing through the mouth or nostrils, if it were rendered moist with the vapour of warm water. The mode of warming the air should be very different from that recommended by Vauguyon,

[1] "Ab ea (laryngis sectione) non abhorruit nostro ævo Spigelius, ut superstes adhuc muliercula amicorum hospitio Patavii cognita fidem facit."—Barth. Epist. Med. cent. 1, epist. lxxx.

[2] "De Pædanchone, seu de pestilente ac præfocante pueros abscessu."—Diatriba Singularis, 1642.

[3] "Labra vulneris inter se junguntur perpetuâ capitis versus sternum inclinatione ac depressione, quæ instar vinculi est et suturæ."

a physician and author of a complete treatise on Surgical Operations, published in 1696, where we are told under the article bronchotomy, that to prevent the air from being too cold when it enters the trachea, we should warm that of the chamber with a good fire; or if the patient's circumstances will not afford this, we must put a good pan of charcoal on his bed, and close the curtains. Such advice carries its own refutation with it. René Moreau insists on the small amount of danger attendant on bronchotomy: when trepanning is needed, it is done. The operation for stone, which is far more cruel and dangerous, is nevertheless performed. We often alarm ourselves, says he, with things we have not tried; but as soon as we have once put them in practice, we readily admit them, and perform them with facility.[1]

The solid reasoning of Moreau served to convert Bartholin to the use of bronchotomy, as appears by his reflections on the cure of a wound in the trachea, in the fifth century of his Anatomical and Medical Cases, obs. 89.

Trophine Serrier, Counsellor and Physician to the King at Arles, was the author of a collection of Medical Observations published in 1673, in which several cases are reported of quinsy ending in death, on the third or fourth day, with all the appearances of suffocation. He declares himself a partisan of bronchotomy, after the precepts of Asclepiades, Aretæus, and Cælius Aurelianus. The two latter authors were nevertheless strongly opposed to the operation, as we have already shown.

Purmann, First Surgeon to the Armies of the Great Elector, an ancestor of his Majesty the King of Prussia, performed bronchotomy with success. Muys[2] tells us, that Antony de Heyden successfully performed the operation on a dog, and considered it as free from danger: he adds, that Blanckard, in his Medico-Physical Collection, reported that Smalsius, a celebrated surgeon of Leyden, practised it on a man who recovered perfectly.

The Leipsic Acts for 1693 mention a German translation of a Treatise on Operations, published in Holland in 1685 by

[1] "Tenemur sæpe rebus inexpertis, quæ in usum semel revocatæ eadem securitate admittuntur quæ peraguntur facilitate."

[2] Prax. Chir. Ration. 1689, Decad. v, Obs. ix.

Cornelius Solingen, Doctor of Medicine and Surgery at the Hague. It is observed that the author rejects from the operation of laryngotomy the curved canula, pierced with holes, because it excites cough. He recommends it to be flat, corresponding with the wound, and having the extremity, which is to enter the trachea, a little bent and smoothed, and that the other end should be furnished with at least two wings. This is very much the same as the canula of Aquapendente, which is with reason preferred to that of Casserius.

Ten years after, Dekkers[1] proposed to perform bronchotomy with a small trocar, furnished with a canula. The thought was a happy one; the operation became, in consequence, more simple, and very easy of execution, and it avoids many inconveniences: the advantages of this instrument have not been sufficiently known. Pauli, in his notes on Van Horn, claims the invention for Sanctorius, who recommends for piercing the trachea the same instrument which be proposed for paracentesis of the belly.

The author of the History of Diseases at Breslau, in 1699, regrets that permission was not given to open the trachea in many cases of quinsy, which had ended in fatal suffocation: he approves of the operation, from what Scultetus says of it, and regrets the omission of this remedy from caprice on the part of the public, and gross ignorance of anatomy on the part of the surgeons.[2] To carry on this historical account of the progress of art as regards bronchotomy, from the time of its inventor, Asclepiades, up to the period in which we live, there remains to be noticed a letter in the Philosophical Transactions, from William Musgrave to Sloane,[3] the object of which is to show that we ought more frequently to have recourse to bronchotomy. This letter was written on the occasion of a singular cure performed by Mr. John Kean, of Roch, in Cornwall. The case was one of a transverse wound dividing entirely the trachea with the adjacent muscles and vessels: it was perfectly healed by employing a proper position of the parts. The union was

[1] Exercitationes Practicæ; Lugd. Batav. 1695.

[2] "Hâc enim viâ certissime non pauci liberarentur; sed quo minus id fiat in causa est circumstantium morositas, et crassa chirurgorum in anatomicis ignorantia."—Hist. Morb. Vratisl. ann. MDCXCIX.

[3] For the year 1699, No. 258.

thus effected, without the employment of the painful twisted suture, as used in hare-lip.

Most of the modern authors sink below the standard of knowledge acquired by their predecessors. The experience of several ages, and the reflections to which that experience had given rise, might and ought to have been incorporated with the doctrines of surgery, until new facts or more luminous views should lead to greater perfection, either by enlarging, by reforming, or by annulling such rules of practice. Lanzoni, who filled the first chair of medicine at Ferrara, his native place, at the beginning of this century, and who held a distinguished place amongst learned men of all kinds, asks if bronchotomy is an appropriate measure in quinsy. "*An Laryngotomia conveniat in curatione Anginæ?*"[1] He only proposes the question problematically, because Hippocrates had said that cartilages did not reunite, and because Fabricius ab Aquapendente had never performed the operation: however, as it is better to try a doubtful remedy than none, as good authors are of opinion it should be performed, as it is certain Brassavole practised it successfully, and as there are examples of wounds in the trachea healing perfectly, he thinks himself authorized in concluding that bronchotomy is allowable in desperate cases of quinsy. Such reasoning is tame and unconvincing enough, considering that, at the period when this author wrote, our art was not circumscribed within such narrow limits as it had been.

In treating of the cure of wounds of the trachea, he alludes to an observation by Tulpius, the fiftieth in his book. A young man in a fit of despair divided his windpipe. The wound was healed by sutures; but the wounded man, in his fury, tore off the dressings, and lacerated the parts in such an irregular manner, that the lips could no longer be stitched together: the dry suture was therefore employed, and the adhesive plaster stuck so firmly to the skin, that it was impossible the patient could get it away. The wound was perfectly healed in a month, and no inconvenience ensued from it, except that, in singing, his voice had a higher pitch than before. In the next observation Tulpius treats of quinsy, which prevents the passage of the air by narrowing of the larynx. He relates the case of a sailor

[1] Lanzoni, Oper. tom. iii, Animadv. cxv.

who died notwithstanding the use of bleeding, cupping, gargles, clysters, and cataplasms: he thinks that these remedies often fail in severe cases, but he says not a word of bronchotomy, although he had just related the cure of a complicated wound of the trachea. It is inconceivable how such an oversight could be committed by so skilful a man. Tulpius had a large practice, and performed many able cures; but had he always kept in hand the thread of science amid the labyrinth of practice, he would have saved the poor sailor's life whose case forms the subject of this observation.

Such a guiding thread was also wanted by Dionis in his 'Course of Operations.' He knew the writings of Habicot, but did not profit by his observations and his principles, which were in such esteem amongst foreigners that they stole them. Dionis rejects the term laryngotomy given by some authors to the methodical incision of the trachea, because, in truth, the larynx is not touched; nor, in truth, are the bronchi implicated, as he justly observes. This has led more modern authors, as Heister, for example, to consider the term tracheotomy as more appropriate; the Greek word *bronchos*, however, corresponds to *guttur*, the channel for the air in the front part of the neck, and the ancients having employed the term bronchotomy, we think that etymological strictness, as well as custom, justify its being used to designate the operation in question.

We perceive by the mention which Dionis makes of Fabricius ab Aquapendente, that in composing the article on bronchotomy he had before his eyes the works of that great master. There is, says the French author, a great dispute as to whether this operation should be practised or be rejected; reasons are not wanting on the one side and on the other; these he repeats, and decides in favour of the operation. But we shall never get done with quibbling and indecision, if, after an affair has had judgment already passed on it, we are again to go through the trial: all that had been said and done from the time of Fabricius had put the false reasoning of Cælius and Aretæus quite out of date, and yet they are perpetually to serve as a basis for futile objections against the operation. Why reproduce them? Dionis limits the employment of bronchotomy to that kind of quinsy in which we are certain

that the obstacle to respiration is in the larynx, that the patient has strength enough, that there is ground to hope that the admission of air into the lungs will save his life, and that he will inevitably perish without the operation.

We will not lay blame to this author for having considered this important means of relief as one to be employed only in extremities, and when the patient was on the point of suffocation, and after all other resources of art had been employed unavailingly. This pernicious doctrine has, up to the present day, been always recognised. But Habicot should have taught him that the operation might be practised with advantage in other cases than quinsy.

After describing the operation as we have seen it performed by Casserius and Habicot, he mentions another mode, which he calls the *good practice of some;* it consists in "executing the operation by a single puncture, with a bronchotome[1] or lancet, which is to pierce the skin and the interval between the bronchial cartilages, and to be kept in the wound of the trachea until a stilette is introduced as a guide for the canula. In this way the operation is more quickly finished, less cruel, and more easily cured."

In the time of Dionis it was quite possible to give a better account than this; he should have been better informed, and have given better directions, drawn from the improvements already made. On examining the three reasons adduced for this preference we do not find him express himself as if he were master of his subject. The mere rapidity of the operation is a very slight advantage, and of no essential importance. A simple incision through the skin, an inch long, does not deserve the epithet cruel, and it will often be required in order to discover the trachea when the patient is a fat subject, or where there is much swelling. Dionis was aware of these circumstances, for he has mentioned them; lastly, the readiness with which the wound would heal would be alike in both operations, and would form no essential ground of preference; the great object is to save a life placed in the most perilous circumstances, by making an opening in the trachea for the free entry and

[1] Dionis employs the term bronchotomiste instead of bronchotome; the former would be the right term for the operator, not for the instrument.

exit of air. The best process is that which will most advantageously effect this object. The longer or shorter time that the subsequent cure of the wound may require ought not to withdraw our attention from the other much more interesting point.

Dionis's reasoning is not well founded therefore; moreover, the operation which he considers the most perfect is in fact very defective: a transverse puncture through the integuments and into the windpipe, the introduction of a stilette along the lancet with which the puncture was made, by which to introduce the canula through which the patient is to breathe—all this may appear simple and very easy to execute; but if the blood should flow from the wound into the trachea, which may easily happen in this mode of operating, the patient might be suffocated under the hands of the surgeon, directly from the effects of the operation; this indeed would deserve to be called cruel.

When Dionis published his 'Course of Operations,' surgeons had already had in their hands for some years the third edition of Verduc's 'Treatise on Operations,' which he does not mention. In that treatise we find the following remarks: "When there is neither swelling nor inflammation of the external parts of the neck, which is the case in the true laryngeal quinsy, the most dangerous of all, the operation is then much more quickly done, and with less pain, and fewer instruments, by employing a simple puncture between the rings. . . . . It is known that the late M. Binart, master surgeon, operated in this way on a baker, who having come to Paris to sell his bread, was attacked with so violent a quinsy, that it was thought he could not survive the night. Nevertheless, in consequence of this paracentesis, he was sufficiently well to go home twenty-four hours after."

A fact so instructive should not have been passed over in silence; it shows the value that should be set on bronchotomy.

Dionis says, "that Fabricius ab Aquapendente always regarded this operation as one of the most important and most necessary; and, in truth," added he, "as soon as one has made for a poor patient gasping for breath a little opening between two rings of the trachea to admit the air, one suddenly sees him return as it were from life to death, and that so

evidently, and so promptly, that the effect is little less than miraculous."

By puncturing with a trocar, the trachea is opened, and the canula placed at the same moment. Not a drop of blood is spilt, because the canula compresses the vessels which the trocar may have divided. We have said, in speaking of Dekkers, that he deserves the greatest credit for this happy thought; the operation is greatly simplified by it, and is freed from all difficulties, a fact which will appear more striking as we pursue our history. We must observe here, that Verduc was the first to amend the directions for placing the patient during the operation. The direction generally given, was to bend the head backwards, and to pinch up a transverse fold of the skin, in order to make a longitudinal incision down to the muscles. "There is reason to fear," says Verduc, "that in bending the head back, the suffocation may be increased. I would add, that it is difficult to pinch up the skin on the front part of the neck, when the head is thrown backwards." A surgeon-anatomist (such is the expression of the time, as if men could be surgeons without being anatomists) will leave his patient in a position in which he can breathe with the least inconvenience, and he will accommodate himself to that position while operating; a little more or less trouble will not interfere with the skill of the surgeon. Pauli, in his Notes on Van Horne, gives credit to Verduc for his advice as to the position of the patient.

In 1714, M. Detharding, Professor of Medicine at Rostock, published a dissertation in the form of a letter, the object of which was to recommend bronchotomy in the treatment of persons who had been drowned. '*De methodo subveniendi submersis per laryngotomiam.*'[1] The author thinks that no more useful means can be employed for recovering drowned persons from apparent death to life than this operation. The following are the principles he lays down: drowned persons have no water in their chests, nor in their bronchi; they die suffocated for want of respired air, and during submersion, the epiglottis is in close apposition with the glottis. Such are the

[1] This treatise has since been inserted amongst the Theses in Surgery collected by Haller. See his Disput. Chirurg. Select. tom. ii, p. 419.

reasons which have led M. Detharding to recommend the operation. It is, however, certain, as I have shown by the uniform results of the experiment of drowning animals in coloured fluids, that people in drowning inhale the water, and that their bronchi are found quite filled with it.[1] I have opened the bodies of men who have been drowned, and have never found the epiglottis closing the glottis, which indeed anatomical considerations would show to be impossible. Although bronchotomy is inapplicable to the treatment of persons drowned, the reasons adduced by the author against the supposed danger of the operation deserve, however, to be recorded. An error on one point does not impair the correctness of his notions respecting the nature of the remedy and its absolute advantages. The skin only is divided, and a small portion of membrane. "*Sola cutis est quæ incidatur, et tantillum membranulæ cultello dividitur.*" There is no ground for fear, even from the least dexterous operator. "*Nullus metus vel ab imperitiori sectione adest.*" No blood-vessel from which one need fear hemorrhage, no nerve of which the division can produce any inconvenience; the wound is healed most easily: in short, everything encourages us to undertake the operation in cases where it is indicated.

It is, however, not necessary that vessels should be large to furnish a troublesome hemorrhage. M. Virgili, Surgeon-in-chief to the Marine at Cadiz, has remarked on the danger caused by the blood from small vessels when flowing into the trachea. The case which proves this is recorded in the third volume of the 'Memoirs of the Academy,'[2] and Van Swieten has quoted it in his Commentaries,[3] but with a different object from that which leads to its introduction here.

A Spanish soldier, twenty-three years old, was in the most imminent danger from an inflammation of the throat; it was thought that nothing would save him but bronchotomy. After a longitudinal incision had been made through the integuments, and the muscles had been separated, the trachea was opened between two of the cartilaginous rings; but the blood escaped into the canal, and excited such violent coughing, that

[1] Expériences sur les Noyés, à la suite des Lettres sur la certitude des signes de la mort. Paris, 1751.

[2] P. 141. [3] Comment. in Aphorism. 813, Boerhaav.

it was impossible to keep in the canula, although it was several times replaced.

This accident happened in no other case on record. It would appear likely to be best obviated by making the patient lean forward, with his head supported over the side of the bed, and his face to the ground, in order to prevent the blood from running back into the trachea. It is alleged that, in consequence of the convulsive action of the muscles, the opening in the windpipe no longer corresponded with the external opening except in certain motions, and that the patient could scarcely breathe, if at all. This decided M. Virgili to take a step which shows the necessity for coolness and courage in such perilous circumstances. He boldly slit the trachea longitudinally down to the sixth ring, and then placed the patient with the head leaning forward. The blood then ceased to flow into the trachea, the patient breathed freely, and a piece of lead pierced with several holes, and furnished with two wings bent back, was adapted to the wound. On the second day the inflammation had subsided sufficiently to allow the patient to breathe by the glottis, the leaden plate was removed, and steps taken to reunite the wound, which was accomplished without any difficulty. His voice remained much enfeebled. In this case puncturing with a trocar would have prevented the occurrence which gave the surgeon so much trouble; his patient being in imminent danger of dying by the very means employed to save him.

M. de Garengeot states, on the faith of an oral tradition, a medium often defective, and always insufficient, that the late Messieurs Petit and Arnaud were convinced that the longitudinal incision of the integuments, the separation of the bronchial muscles, and the division of the thyroid gland, recommended by some, had often rendered the operation unavailing; because the vessels necessarily divided in these incisions pour out blood which runs back into the trachea.

Without adopting a variety of precautions, more injurious than useful, M. Petit, it is said, advised the surgeon to feel for the interval between the third and fourth ring, to mark the spot with his nail, and to push in a guarded lancet, that is, a lancet the blade of which was fixed by a band wound round it, &c. But Dionis had said the same thing before Petit and

Arnaud. Garengeot advises us to cover the external opening of the canula with a bit of gauze, to prevent the entry of foreign matter with the air. The canula which he recommends ought to be six lines in length, flat, and two lines and a half wide at the orifice, while at the other end it is to be slightly curved, and to be a line in diameter.

In the first edition of his 'Operations' in 1720, M. de Garengeot says that bronchotomy is very dangerous; probably because it is performed too late: he afterwards relates some cases of wounds of the trachea, which had been successfully healed. The operation, then, should not have been called dangerous, though the disease is extremely so; nor is the operation itself more dangerous from being delayed too long. There is neither good surgery nor good logic, then, in stating that the operation is very dangerous because it is not performed until too late, and then directing us to wait until the patient is in extremes.

In the 'Conspectus Chirurgiæ' of a celebrated Professor at Halle, the late M. Juncker,[1] the subject of bronchotomy is treated with great clearness, order, and method. He enumerates the following as the causes which require it: 1. True quinsy, with difficulty of breathing. 2. Foreign bodies introduced into the trachea; which no one had before mentioned in a dogmatic treatise. 3. He says it has been proposed to perform this operation for the purpose of inflating the chests of persons who have been submerged. In treating of the prognosis, he gives it as his opinion that this operation has been too much neglected, since it is one that does not require great dexterity, and makes but a small wound, which is susceptible of being very readily healed. He only mentions the second method proposed by Dionis, that is, a puncture with a lancet in a transverse direction, without a preliminary incision in the integuments, but he prefers a trocar: the longitudinal incision, not only through the skin, but through the trachea, is indispensable when foreign bodies are to be removed from that canal. In this case no canula will be required, and, after their extraction, nothing more is required than to heal the wound. Here, then, is the first author who has judiciously availed himself of the knowledge and labours of his predecessors.

[1] De Operat. in Collo. Tab. xciv.

Except in regard to precision, Heister possesses similar merit.[1] He admits the three indications established by Juncker. His observations on the second of these are interesting; they have furnished me with materials for a Second Memoir, which will immediately succeed the present one, and will conclude the subject. I have sufficiently shown that the employment of bronchotomy in drowned persons, as advised by Detharding, is improper. Heister describes three modes of operating, and decides in favour of the trocar in cases of angina, attributing the invention to Dekkers, a former Professor at Leyden, of whom he had been a pupil; he particularly insists that we should not too long delay so valuable a remedy, a precept of which the importance is shown in all we have said.

Sharp[2] considers the operation not adapted to quinsy, because, on examining some cases after death, he found no such constriction as could intercept the passage of air, forgetting that the state of constriction would be destroyed by the relaxation consequent on death. Should the operation, however, be thought necessary, it is, says the author, so easy, and so exempt from every kind of danger, notwithstanding the alarming precautions that have been recommended to guard against this, that he does not absolutely discountenance its performance until further proofs have been given of its inutility.

Sharp recommends the old method, that is, by a longitudinal incision. He knew that the operation could be effected by a single incision through the skin and trachea with a lancet or bistoury, and that such a mode of performing it had been advised as more easy and shorter. He had once seen it accomplished in this way, but a good deal of difficulty was experienced in introducing and keeping the canula in place in consequence of the alteration in the relative position of the openings in the skin and trachea, caused by the movements of the latter during respiration. He considers it quite an unnecessary precaution to separate the sterno-hyoid and sterno-thyroid muscles, but he argues in favour of a longitudinal incision.

The employment of the trocar in this operation, which had been recommended thirty years before, and the reasons for

[1] Instit. Chirurg. part ii, sect. iii, cap. cii; 1739.

[2] Treatise on the Operations of Surgery, third edit.

preferring it adduced by Juncker and Heister, were, it seems, unknown to this able English surgeon.

In the treatise on Surgical Operations, published by M. le Dran, in 1742, only the common method is proposed, but with a very long external incision.

Platner, Professor at Leipsic, whose Surgical Institutions were published in 1745, cannot be charged with omitting to mention the use of the trocar. He directs the trachea to be exposed by an incision through the skin, and a small part of the thyroid gland, and that the blood should be staunched with a sponge soaked in spirits of wine. The further proceedings for making an opening between two cartilages offer no peculiarity. "Some," says he, "use an instrument armed with a canula, like that with which the belly is tapped in dropsy. This method, however, though more speedy, is not so sure as the other."[1] Such is Platner's bare assertion, which must not be allowed to weigh against the solid reasons for employing the trocar adduced by skilful masters. Nothing is more urgent than the necessity for re-establishing the freedom of respiration; how, then, can any operation be more *sure* than one by means of which a canula for the passage of the air in and out is very speedily placed in the trachea?

This author does not give his opinion on the employment of the operation for the relief of those who have been submerged, but waits for the results of experience and observation on the subject, and refers to the Dissertation of Kesselring, printed in 1735 at Koningsberg, as showing that the operation cannot be of use in all cases of drowning.[2]

Although the article on bronchotomy by Platner is very short, we see that the author had drawn his information from the best sources. He refers particularly to an observation in the 'Philosophical Transactions.' We find, in the 416th No. of that publication for the year 1730, a description of the manner in which the operation was performed at St. Andrews in Scotland, as detailed in a letter by Dr. George Martin to Dr. W. Graham, F.R.S. Van Swieten has mentioned this case too in his treatise on Quinsy.[3]

A longitudinal incision was made through the integuments,

[1] "Hæc curatio promptior minùs verò tuta est."—Platneri, Institut. Chirurg. § 616.

[2] Ibid. § 618, third edit.

[3] Comment. in Aphor. Boerhaav. § 813.

and the muscles separated before the trachea was opened. The patient was relieved by the hemorrhage, which served to unload the vessels. After penetrating into the trachea, the leaden canula was found to be too short, as it would have required to be an inch long in this patient. The surgeon was therefore obliged to employ the canula of a common trocar a little flattened at the extremity; but as this was too long, it was passed through the centre of a thick compress, which prevented its slipping in too far. The frothy mucus which passed through the canula sometimes adhered to its walls, and so obstructed the tube, as to impede respiration, which rendered it necessary to withdraw it from time to time to clean it; this inconvenience could scarcely have been foreseen, having occurred in no former case.

According to Lazan Meyssonier, a practitioner at Lyons, the canula is unnecessary in operating according to the ancient method; for, at p. 166 of the sixth edition of his 'Course of Medicine,' printed in French, at Lyons, in 1673, when describing bronchotomy after Paulus Ægineta, he says, "I saved the lives of three persons by performing the operation of Antyllus; but I put no leaden canula into the wound, only a little dry lint over it, and a plaster of *diapalma* dissolved in rose oil, and did not sew the wound, but let it close naturally, and not one of the three died, but by the special grace of God they are all living."[1]

Dr. Martin, after observing that the canula should be more than twelve lines instead of six, as fixed by Garengeot, whom he considers to have published a complete account of French Surgery, goes on to speak of a very ingenious idea which had been thrown out, to employ a double canula, one inside of the other, so that the inner might be withdrawn and cleared without interfering with the respiration. Before the fourth day, and as soon as the respiration can be carried on by the natural

[1] Nothing is so valuable in forwarding our art as well-authenticated facts; we cannot deny those so positively adduced by Meyssonier, seeing that they are probable. He, however, dealt largely in romance, and I have strong doubts of the truth of his statement. He confides to the public his discovery of how to make a man a perfect master of medicine in a year, so that he shall surpass in knowledge those who have studied for many years under other professors. He speaks of having had the happiness to receive for several years past occasional, if not continued inspiration from the archangel Raphael to the honour and glory of God, &c.

passage, which is easily ascertained by occasionally stopping the canula, Dr. Martin withdraws the tube, and applies a proper dressing for closing the wound. Emphysema, which occurs sometimes in wounds of the neck, does not occur here, because the cellular tissue which has been condensed by inflammation, and the slight pressure of the bandage prevent the escape of the air into the cells of the adipose membrane. Van Swieten does not know any author who, in treating of bronchotomy, mentions emphysema as occurring after that operation. The reason is simply because it never occurs, and thus all the precautions pointed out for obviating this inconvenience become superfluous.

The authority of Van Swieten, our illustrious colleague, is of such weight, that we cannot pass by his reasons against using the trocar in this operation without remark. "This instrument," says he, "cannot be made to penetrate the trachea without great difficulty, on account of the great mobility of this part. I have sometimes tried it on dead bodies and on living animals, and the operation has appeared to me difficult, and the instrument likely to deviate; hence, the first method, though more complicated, appears to me preferable."[1]

The difficulty of piercing the trachea with a trocar in dead bodies can scarcely arise from the mobility of the canal, as this is very easily prevented with the fingers placed on each side of it, but is caused by the contraction of the cartilaginous semicircles, in consequence of the air ceasing to pass through the windpipe. During life, the diameter of the trachea is much greater than after death, and especially in circumstances where the operation is required. The mobility of the part is a slight obstacle which is easily obviated with the hand. More perfect instruments than the trocar have, however, been invented for effecting the operation speedily and successfully by M. Bauchot, formerly Surgeon-in-chief of Marine, and to the Royal Hospital at Port Louis, and one of the corresponding members of the Academy. In 1746 he had the care of a woman, at Port Louis, who, in a fit of insanity, made a large wound in her windpipe. His success in this case naturally made more impression on the mind of M. Bauchot than the

[1] Comment. in Aphor. 813.

perusal of similar cases related by authors. About the same time he was called to see several persons attacked with quinsy, who died with symptoms of suffocation. Having got rid of all erroneous ideas of the danger of opening the trachea, he addressed his mind to discovering the most simple mode of performing the operation, being ignorant of Dekkers' proposal to use a trocar. The puncture with a lancet, as described by Garengeot after M. Petit, seemed capable of being improved on, and the following was the result to which M. Bauchot's reflections led him. The blade of a lancet confined by a bandage did not appear to him to be a very convenient instrument, and he thought, with justice, that the operation would be more readily performed with a cutting blade set firmly in a handle. To this blade he had a flat canula fitted, the extremity of which was furnished with a rim, to which were appended two rings. With this instrument, covered with the canula, the trachea was more easily pierced than with a trocar. In his trials on the dead body the author perceived the difficulty arising from the mobility of the trachea, and to meet it, contrived a crescent-shaped instrument to prevent the vacillation of the trachea, and at the same time to serve as a conductor to the bronchotome.

M. Bauchot was led to employ it in two cases of quinsy, in which the patients were threatened with suffocation. One was a young man of 23, and the other, a woman of 72. He found his instruments well adapted for performing the operation with facility, and he was perfectly successful.[1]

M. Bauchot's instrument might be found somewhat too short in the blade in a very fat subject, or where the neck was much swollen from the effects of the disease, which, however, seldom occurs, as the author remarks, in those internal quinsies which attack the larynx, and call for the operation to prevent suffocation. He, however, proposes that, should such an unforeseen case occur, a small incision should be made through the integuments, in order to get sufficiently near the trachea to permit the use of his instrument. The crescent-shaped

[1] It would probably be better to make the puncture longitudinally between the muscles, as the division of two or three cartilaginous rings would be less objectionable than the transverse division of the muscular fibres. Experience has shown that the cartilages readily reunite.

instrument, by confining the trachea, would serve as a guide and as a support in penetrating the tube. The canula entering with the bronchotome cannot easily be displaced, being grasped by the surrounding part, whereas a canula introduced subsequently, is never exactly proportioned to the wound. There is another important advantage in this mode of operating, which is, that there is no escape of blood into the trachea. For greater security, the canula is furnished with rings, through which are passed strings for tying it round the neck. The fenestrated dressings employed in these cases, are described in all elementary works.

M. Bauchot's operations were noticed in the seventh volume of the 'Memoirs of the Academy,' at the 18th page of the first part, or history. It is there stated, that "the operation of bronchotomy is not frequently required. The active treatment employed generally soon relieves the patient, and should he fall a victim, notwithstanding the care of the surgeon, it is rather in consequence of gangrene coming on, than of suffocation properly speaking; of what use then could it be to perform bronchotomy in a case of gangrene unaccompanied with suffocation? It is true, therefore, that cases rarely occur requiring it, but, however rarely this may happen, the operation is one so dreaded by surgeons, that we cannot be too careful to collect facts, which may serve to show its feasibility.

By the active treatment here spoken of as employed in quinsy, we must understand copious bleedings, but no relief can be more prompt than bronchotomy, in a case which requires it. In the case of the woman mentioned by Fonseca, there was no want of venesection. She was bled largely every two hours, and died at the end of ten hours. The inflammations of the throat, said to be cured by copious bleeding, are of a different kind. The ancient masters of our art have cited facts to show that bleeding is an ineffectual remedy in the urgent case spoken of. Brassavole, in his Commentaries on the fourth book of Hippocrates, respecting the treatment of acute diseases, relates the case of a favorite mistress of Alphonso, Duke of Ferrara, who having retired to rest in good health, awoke about ten o'clock with pain in the throat, and difficulty of breathing and swallowing. Brassavole bled her from the arm to ten or twelve ounces. Another able practitioner having been called in, and finding

the symptoms urgent, again bled her, without waiting for his colleague. A third physician being summoned by the friends, had recourse to a third bleeding. The three physicians having met, bled her from the sublingual veins; in addition to which, cupping was employed, but the patient nevertheless died in eight hours. Fernelius speaks of its being no uncommon thing for patients to die in eighteen hours.[1] Louis Duret, in his Scholia on Houillier's book on Internal Diseases, which we have quoted above, states that he saw a man die in three hours after being bled for an inflammation of the muscles of the right side of the larynx, which was not visible internally, but was attended with pain on touching the throat externally; here then, suffocation, and not gangrene, put an end to the patient.

Good modern authors, who have spoken from experience, have readily distinguished those kinds of quinsy in which suffocation had occurred without the presence of gangrene; some of these are not, from their nature, liable to gangrene, and yet manifestly require bronchotomy, such for instance is the spasmodic quinsy. Dr. Mead[2] saw one such case, in which during six hours copious bleedings had been employed; the patient, however, died, says the author, notwithstanding these large depletions: "*Nihil profuit tanta exinanitio.*" What proves that bloodletting does not afford sufficient and prompt relief in these urgent cases, is, that in examining the parts after death, neither tumefaction nor any other sign of inflammation was found, but the veins and arteries were congested with thick blood. The same author witnessed an epidemic of catarrhal quinsy on the sea coast in Wales, in which the patients died in three or four days from lymphatic congestion; this constitutes the angina aquosa of Boerhaave.[3] Gangrene did not here form the termination of the disease; death was caused by suffocation, and bleeding would not have prevented it. Although it did not occur to Mead to employ bronchotomy for the relief of his patients, there is no doubt the operation would have fulfilled the most urgent indication. What educated surgeon

[1] "Hoc sæpe vidimus sublatum ægrotis horis octodecim constante mente integrisque sensibus."—Fernelius, Pathol. lib. v, cap. ix.

[2] Monita et Præcepta Medica, cap. iv.

[3] Van Swieten, Comment. in Aphorism. ubi de Anginâ, tom. ii.

would look on a wound which should implicate only the integuments and the trachea as anything but a very simple affair? Since the time of Gulielmus de Salicete, five hundred years ago, it has been known that extensive wounds of the trachea will heal without difficulty; and are we to hesitate from timidity to make a slight incision in that part, where our doing so will save a fellow-creature's life, will snatch him from the jaws of a certainly impending death? Surely not. The authority of practitioners of reputation, nevertheless, prevented me from operating in a case in which I thought I had proved to them the necessity of the operation. This case will form the subject of a very important discussion in the next paper.

MEMOIR THE SECOND ON BRONCHOTOMY,

WHICH TREATS OF THE

EXISTENCE OF FOREIGN BODIES IN THE TRACHEA.

By M. LOUIS.

The majority of the cases handed down to us by former practitioners of foreign bodies which have passed into the respiratory tube, contain little more than a recital of the melancholy ending which the accident had given rise to. It would even seem, from the manner in which they are related, that it was thought impossible to establish principles in this branch of surgery on which should be founded a theory capable of serving as our guide in practice. The subject is, however, one of the most important which can be treated of. Humanity calls on us to bestow our care in circumstances which may terminate fatally, and to which we are all daily liable. In the whole domain of our art there is no situation in which our kindness and skill can display themselves with such brilliant results. The observation made by me about a month since,[1] will serve to throw considerable light on the subject, unless I am greatly deceived. I know that one man's experience is too limited; but the observations of our predecessors cannot serve instead of rules for our guidance, seeing that they have neglected to detail with precision the different circumstances they witnessed. It is scarcely conceivable how so much negligence could have been displayed in a matter so well deserving the utmost attention. Our resource then must be in the number of the facts, which may enable us to supply the deficiencies of one narrative from the details of others; and we shall thus endeavour to derive full and faithful information from the examination and discussion of several cases, although they may be deficient in the qualities which should characterize good observations.

[1] This Memoir was read at the public sitting of the Academy, April 26. 1759.

Obs. 1. On Monday, March 19, 1759, at five in the evening, a child, 7 years of age, the grand-daughter of a wine-merchant residing in the rue du Four, opposite the rue des Canettes, while playing with some dried haricot beans, threw one into her mouth, and thought she had swallowed it. She was immediately attacked with difficulty of breathing and a convulsive cough, which greatly exhausted her. The child declared she had swallowed a bean, and such remedies were employed as were thought appropriate; but as no relief ensued, several surgeons were successively called in, who, with as little success, employed the different means recommended for facilitating the return of foreign bodies from the œsophagus, or for pushing them on into the stomach. A fine sponge carefully fastened to the end of a flexible whalebone rod, was several times passed down the whole length of the œsophagus. The child, who pointed to the middle of the neck as the place where the bean was lodged, seemed to feel some relief when the sponge was passed below the spot indicated. From time to time she had violent fits of coughing, which excited convulsive movements in all the limbs; her deglutition was free, and she swallowed without much difficulty warm water and oil of sweet almonds. Two days had been passed in this distressing state, when I was called by the relatives to afford succour to this little child, who, full of intelligence and courage, had been several times held in their arms at the point of death from suffocation. Having learned accurately what had passed, I went in to see my patient. She was seated up in bed, resting on her hands, and exhibiting every symptom of laborious respiration. On asking her where her pain was, she replied by a sign, which left no doubt as to the nature of the accident; she placed her finger on the trachea, between the larynx and sternum. The fruitlessness of the attempts made to dislodge the foreign body from the œsophagus; the nature and size of the body which could not have been arrested in the alimentary tube; and the facility she showed in swallowing; were signs which negatived any question as to the presence of the bean in the gullet. Respiration was the only function impeded; it was difficult, and attended by a rattle. The child expectorated a frothy humour, and she indicated so exactly the painful point at which the obstacle was

fixed, which caused the difficulty, that I did not hesitate to declare to the parents at once, that the bean was in the trachea, and that there was but one method of saving the child's life, which was to make an incision, and to withdraw the foreign body. I informed them that the operation was neither difficult nor dangerous; that it had succeeded whenever it had been attempted; and that the danger was so imminent, as only to leave time for immediately summoning some able surgeons, who would confirm my opinion as to the indispensable and urgent necessity for the operation. I judged this precaution necessary, in order to ensure the confidence of the parents, and to protect myself against blame, should the event not answer my expectation. I returned home to prepare everything that was necessary for the operation. At the end of two hours I was sent for to meet the other surgeons in consultation. After I left her the child had become calm, she had lain down on her side and slept. My opinion, ill explained by the parents, had been discussed before my arrival. Those who had previously attended her under the idea that the foreign body was in the œsophagus, expressed their surprise at the proposal to extract by an operation a foreign body which was nowhere visible in the canal. I explained my opinion respecting the necessity of bronchotomy, not expecting to hear doubts expressed respecting a positive fact. The desire to arrive at the truth will justify objections, to which those who make them only attach as much importance as they deserve; but here the possibility of the case was contested. It was denied that a body of the size of a bean could enter the trachea. I however succeeded in convincing every one of the possibility of this, by relating shortly several cases of the same kind of which I was informed. The child was then examined; she was a little better than when I before saw her, but well-marked emphysema was found on each side of the neck above the clavicles, which was not present two hours before. This swelling only made me think the necessity for the operation greater and more urgent. The parents, whose confidence had been shaken by finding the difficulty I had had in producing unanimity of opinion as to the nature of the disease, were greatly perplexed when, in answer to their inquiry, they were informed that the child might die under the

operation, which I had described as a simple wound, unattended with danger. They repeatedly asked if I would be responsible for the life of their child under the operation. In reply, the urgent nature of the case, which might at any moment end fatally if left to itself, could not be concealed, but in contrast to her present dangerous position, were set the advantages held out by the operation. The consideration of the certain death of their child if no operation was performed, could not, however, determine the parents to subject her to a danger which, though they were assured it was indispensable, might, in their opinion, hasten her death. It was in vain that I impressed on them that any danger which might arise during the operation, would be from the accident, and not from the remedy. They could not appreciate this distinction, and I at length withdrew, after declining to sanction the administration of two grains of emetic, the action of which would, in my opinion, be perfectly useless, and might be dangerous. The medicine was given during the night; the child was wearied by the vomiting, and derived no advantage from it. I found her quiet on Thursday morning; those who had seen her before me considered her wonderfully better, but, notwithstanding the apparent improvement, the respiration was still attended by the rattle I had observed on the previous evening, when it was more laborious. Several times in the course of the day it became suffocative, and on the same evening the child died, three days having elapsed from the accident.

M. Bordenave, who had seen the patient, came on Friday morning to inform me of her death, having anticipated me in obtaining the parents' consent that the body should be examined. He made the examination at six in the evening, before a numerous assembly whom the report of the case had drawn together. After having effected a longitudinal incision through the skin and fat, between the sterno- and thyro-hyoid muscles, he slit up the trachea, dividing three of its rings. The bean became instantly visible to all, and I removed it with a small pair of pincers. The facility with which the foreign body was extracted, convinced all that the operation would have had the most prompt and salutary effect during life, and the parents could only regret, that they should have sacrificed the life of their beloved child from a timidity and

irresolution which the most persuasive reasons could not overcome.

A slight acquaintance with the works of authors will inform us, that many have fallen victims under similar circumstances to conflicting opinions, or to the neglect of the best-established precepts of art. To prevent similar disasters, nothing is so interesting as to reconsider the majority of these cases, and pay especial attention to the circumstances which have misled the lookers-on, and to those by which their judgment has been determined. That which has most frequently excited doubts as to the existence of a foreign body in the trachea has been the deceptive intervals of apparent tranquillity, often of some duration, experienced by the patient. We know that a crumb of bread or a drop of water touching the orifice of the trachea, when the movements of deglutition have not been accurately performed, irritate the part and excite a violent cough, which ceases only when the body has been dislodged. Hence the conclusion is naturally drawn, that a body of larger dimensions having passed the orifice of the glottis, will produce still more violent symptoms. The cause being permanent, the effects ought to continue without any interruption. However specious this reasoning, it has no weight; it presupposes that the interior of the trachea has the same degree of sensibility and irritability as the glottis, which is manifestly contrary to established physiological facts. A smooth and polished foreign body, like a bean, remaining in the trachea, only interferes with respiration at first from its volume impeding the free passage of air. The sensation is at first rather troublesome than painful, but, accompanied by the consecutive changes of which we shall examine the causes and effects by and by, it is sufficient to excite a cough, which necessarily becomes suffocative and convulsive when the foreign body is driven towards the glottis, and irritates, internally, the lips of that opening. This frightful access passed, a deceitful calm follows. It was these alternations which led some to think in the case I have just detailed, that the child was suffering from humoral and convulsive asthma, and that we ought not to lay much stress on her report that she had swallowed a bean, which, had it got into the windpipe, would have much more speedily caused suffocation.

If facts, unhappily too numerous, show the possibility of a slower progress in the events which terminate in death, we ought henceforward to employ the time thus granted us in an endeavour to save our patients who are supplicating assistance.

Obs. 2. Marcellus Donatus, in his admirable 'History of Medicine,'[1] speaks of the son of a Jew named Beséel, into whose trachea a portion of a chesnut passed which he was eating. Apparently, the first symptom which occurred in this case was an obstruction of the glottis. A woman, at the instant, struck the child on the back, and the breathing became less laborious, though it still remained difficult up to the beginning of the fifth day, when he died in an apothecary's shop, whither his father had taken him for advice. The symptom which immediately preceded the death of the child was a slight cough, in the course of which he became livid, as if choked with a cord. The author does not appear to entertain the least doubt as to the nature of the accident, which the patient survived four whole days, without any other symptom but a difficulty of breathing, which returned from time to time: "*Suffocatione levi interim irritante.*"

Theophilus Bonet, in his 'Sepulcretum Anatomicum,' has recorded the best case we have of the kind, the details of which are full of interest.[2]

Obs. 3. In 1650, the son of a goldsmith at Geneva, named Gainier, 6 years of age, was eating some soup with rice in it, when a little bone, which had been in the soup, slipped into his windpipe. The child pointed with his finger to the middle of the neck as the place where the foreign body was lodged. The respiration was difficult, and attended with cough. Inspiration especially was laborious, and attended by a pricking pain. Bonet advised the operation of bronchotomy, which another physician thought useless. "*Bronchotomiam suasi,*" says Bonet, "*alteri medico ineptam visam.*" The child died at the end of five days. The trachea was opened, and a little triangular bone was withdrawn. It is certain that the death of that infant was to be imputed to the opposition offered by the physician who was in consultation with Bonet, and nothing can justify his error. All the circumstances of this case are very analogous

[1] Lib. iii, cap. vii.

[2] Lib. ii, De Affect. Pectoris. sect. 1, Obs. 1.

to those of the case I have related. The children were of the same age; the symptoms accompanying the accident were the same; each of them pointed to the spot where the foreign body was detained; bronchotomy was proposed in the two cases, and the omission of this means of relief equally caused death in each case. It was less speedy in the case of Bonet perhaps, because the foreign body not having changed its place, on account of the irregularity of its shape and the points at its angles, it was not thrown up by the action of the air against the glottis, and did not therefore excite the frequent attacks of convulsive cough, which greatly exhausted the child I saw, and hastened its death. The title affixed to his observation by Bonet is worth a moment's notice: "*Dyspnœa ab infixo asperæ Arteriæ ossiculo.*" Now the term dyspnœa, as all know, is generally employed to denote a simple difficulty of breathing, caused by slight obstructions in the trachea or bronchi, and those are termed dyspnoics who have these passages obstructed by thick viscid humours.

The late M. de la Romiguiere, a member of this Society, attended a patient into whose trachea a bean had passed, and who had been suffocated by it. He opened the body, and exhibited the trachea and lungs, with the foreign body, to the Academy, on the 8th of October, 1748. I have not a written account of the case, but I remember the child was several times in the street, playing with its companions, between the day of the accident and that of its death, which took place surprisingly late, not, I think, until the ninth day.

Obs. 5. Muys[1] has related a case which fully confirms the above. A child, six or seven years old, whilst playing with another, swallowed a bean, which caused a most violent cough, great difficulty of breathing, and inexpressible distress. Several useless attempts were made, under the notion that the bean was in the œsophagus, to get it up, or to push it down into the stomach; it fell lower in the trachea, and the symptoms ceased. The child no longer coughed, and breathed without difficulty; in short, says the author, he suffered no inconvenience. Two or three days after, he went to play with some children of his own age, and in stooping forward was attacked with the same symptoms as at the moment of the accident; by

[1] Pract. Chir. Ration. Dec. vii, Obs. ix.

rest they became quieted, but motion renewed them; at length, after several relapses, the child died in the third week. The author, who published this observation in 1690, in his 'Seventh Decade of Practical Surgery,' had five years before declared himself in favour of bronchotomy in desperate quinsies: he had not the least notion of performing the operation in the present case, and recommends us to excite sneezing as the most effectual means of removing a foreign body which had slipped into the trachea. He is not the only one who has put confidence in such a frivolous remedy. We need but reflect for a moment on the mode of introduction of foreign bodies into the trachea, to see how little we can count on sneezing or vomiting in such a case.

The glottis, or opening of the trachea, has muscles which dilate or narrow it to produce low or high notes. In the natural state it is always partially open, to permit the passage of air in the two alternate movements of respiration, and its muscles are not then in action. Should a foreign body, capable of passing through the opening when most dilated, be projected against the glottis, without the base of the tongue taking part in the movement, for then the elevation and backward motion of the part would press the epiglottis over the orifice of the larynx; if, I say, under these circumstances, a strong inspiration is made, the foreign body will be impelled through the glottis, and will be precipitated into the trachea by the pressure of the column of air above it acting with all its weight on the foreign body. Having once passed the glottis, the chances are greatly against its being again expelled by the action of the air within, in the movement of expiration. To effect this, the body must be presented at the opening precisely in such a direction as is most favorable to its escape, a thing not to be reasonably expected in the movements excited by sneezing and vomiting. Sneezing, indeed, depends on the action of the diaphragm, and is produced by a violent expiratory effort, but this may be accomplished without producing any effect on the foreign body; it is possible, even, that it may become fixed in the glottis, and may cause the sudden death of the patient by suffocation. There is no reason to expect from the effort of sneezing an effect which coughing would not produce. Coughing serves, if I may be allowed the expression, to sweep the bronchi and

trachea. By the action of coughing the air becomes the vehicle of matters expectorated. We have seen, however, that the fits of coughing placed the patient in imminent peril. There is less to fear from the effects of vomiting, and also less good to be expected from it. The operation is the only remedy which reason sanctions, and which experience has shown to be useful. It is easy to perceive the real value of the facts adduced in favour of sternutatories, emetics, and expectorants. According to Hagendorn and Riedlin, these remedies afforded proofs of their value by causing the expulsion of a plum-stone, a pea, and a little bone which had passed into the trachea. Such is the purport of three observations, in which the symptoms present are stated to have been great difficulty of breathing and violent cough. But these symptoms, thus vaguely announced, do not positively prove the passage of these bodies into the trachea. The lodgement of a foreign body in the gullet often gives rise to the same symptoms, as we may perceive by referring to a number of cases recorded by M. Hevin, in his Memoir on Foreign Bodies in the Œsophagus, in the first volume of the 'Memoirs of the Academy.' There is no denying that, in the three cases cited by Riedlin and Hagendorn, the expulsion of a foreign body was brought about by the use of mugwort and white hellebore blown into the nostrils, but was the foreign body really in the trachea? There lies the difficulty. Since it is by a general survey of the facts that great experience is acquired in extended and liberal arts, such as ours, it is desirable that we should examine some analogous cases, which may serve to establish a solid foundation for our judgment.

Obs. 6. Tulpius[1] relates that a citizen of Amsterdam was troubled for more than seven years by an obstinate cough and difficulty of breathing, which had reduced him to the last extremity. He at length coughed up a bit of the shell of a filbert, as large as one's nail, which had been lodged near the orifice of the trachea, as the author expresses in the words "*circa caput asperæ arteriæ.*" Are we to consider this, as has been done by succeeding writers, an example of a foreign body in the trachea? Such was certainly not the opinion of the writer. He points with sufficient accuracy to the spot which the

[1] Lib. ii, Obs. vii.

fragment had occupied to show that he did not consider it as in the canal. "It was," says he, "perhaps, in the part where Philip Hechstetter relates that a gold crown was lodged for more than two years." No one will suppose that this was in the trachea. But, to avoid all doubt respecting this important difficulty, I thought it well to consult the author himself, whom Tulpius quotes, and to see what induction could fairly be drawn from his recital. The following is Hechstetter's observation :[1]

Obs. 7. A citizen of Augsburg, under the notion of curing a pain in his teeth, put a Portugal ducat into his mouth. On waking he found the piece gone. As he swallowed easily, however, and moved his tongue freely, he thought he must have swallowed the money; but some time after, finding himself becoming hoarse and getting thin, he consulted several physicians and surgeons, who could not reach the foreign body with their fingers, nor with any instrument. At the end of two years and two months he brought up the ducat again.

What was the position of the foreign body if, as is incontestable, it could not remain for two years and more in the trachea? Anatomy resolves the difficulty; it teaches us that there is a depression on each side of the glottis between this opening and the wings of the thyroid cartilage; Galen was acquainted with them, Henri Estienne has described them, and Morgagni has mentioned them, with his accustomed erudition and sagacity, in the first of his 'Adversaria Anatomica.' These depressions have received the name of ventricles of the larynx; in them foreign bodies may lodge for a long time and cause various symptoms, according to the greater or less degree of sensibility of the parts in different people. The situation of the body, its figure, and volume, will be the cause of more or less inconvenience. Situated in the ventricles of the larynx, it is not astonishing that it should be rejected after a long time and when least expected, during the effort of sneezing, or under the use of some mild expectorant medicine.

Obs. 8. Bartholin[2] speaks of a gunshot wound, by which the upper jaw was fractured; the ball, which disappeared at

[1] Obs. Decad. vi, cap. x.

[2] Histor. Anatom. cent. vi, hist. xv.

the back of the mouth near the tonsils, was spit up six months after by the patient. He recalls on this occasion the cure of the citizen of Augsburg, in whom a golden crown-piece had remained lodged in the isthmus of the fauces. We read in the same author an observation which will remove all the doubt which those of Tulpius and Hechstetter may have left.

Obs. 9. A woman, of Padua, having swallowed a filbert whilst laughing, was seized with a violent cough, which continued to torment her for two months, and induced fever and wasting. The woman was thought by a physician to be phthisical. Jean Dominique de Sala, who inquired more narrowly into the case, finding that the fever was not continuous, that the expectoration was neither bloody nor purulent, and that respiration was free, declared that the patient was not consumptive; after a good deal of questioning, he was informed of the cause of the disease. He administered, without benefit, an emetic of honey of roses and common oil; afterwards he gave an emulsion of sweet almonds; at length she rejected the nut by expectoration, and from that moment began to recover her health. There could have been no mistake about this case, but for the title which Bartholin has affixed to it, *Nucleus ex pulmonibus;* from this we might suppose that the nut had remained for two months in the lung. The perfect freedom of the respiration, so clearly stated in the narrative, forbids us to suppose that the lung was the seat of this foreign body. We shall by and by see what would then have been the attendant symptoms and what the event. In this case the foreign body only excited a wearing cough; its presence in one of the ventricles of the larynx produced that effect: the nut was expectorated with a mucous excretion, in the way that the fluids which naturally collect there are expectorated.

I do not pretend, in discussing these facts, to deny the possibility of the spontaneous return of certain foreign bodies. This may especially take place when they are of such a nature as to dissolve in the trachea. These cases afford the only exceptions which can be adduced in favour of employing soothing remedies and expectorants in the place of the operation, and then only if no urgent symptoms of suffocation are present.

Obs. 10. Marcellus Donatus relates, that a lady of quality in

swallowing pills allowed one accidentally to pass into the trachea. During three hours she remained in an alarming state from impending suffocation. The pill at length dissolved, and was, little by little, coughed up with the expectoration.

The examples of calcareous concretions which form in the lungs of asthmatic persons and are coughed up, afford no ground of argument against our objection to the use of medicines, seeing that they bear no analogy to foreign bodies which have entered the trachea and remain there. These humoral congestions which form insensibly in the lung, the functions of which are therefore not suddenly interfered with, and these stony bodies, readily escape, enveloped in the viscid or purulent secretion of which the bronchi are unloaded by expectoration; all this is natural enough. Such I conceive is the explanation to be given of certain facts which appear so extraordinary as to have been generally considered unworthy of belief. I refer to cases in which tents, or pledgets of lint, which had been used in dressing wounds of the thorax, have been afterwards thrown off by expectoration. These histories cannot, however, be fairly considered as apocryphal, and when we thoroughly examine them and consider all the particulars, the marvellous disappears, and we perceive only examples of the admirable resources of nature.

Obs. 11. Fabricius Hildanus saw a man in 1630, who had expectorated two tents. He had been wounded with a sword between the second and third rib, near the right axilla. Oozing hemorrhage continued for a fortnight, the wound then healed, notwithstanding that burning fever, difficulty of breathing, cough, and sleeplessness were present. The patient at length expectorated purulent matter, and at the end of three months he one morning spit up two tents, which had been left in the chest, from the surgeon having neglected to attach a thread to them. From that time he continued pretty well for a year; an abscess then formed in the seat of the wound, an opening was made into it, and it was gradually healed by methodical treatment.

Obs. 12. Tulpius[1] furnishes us with a similar case. A Danish nobleman, who had been wounded in the German wars, brought

[1] Lib. ii, Obs. xv.

up by the mouth a tent which had been introduced into a wound in his chest. The author acknowledges that he does not know how it could take place: "*Sed quâ viâ difficile dictu.*" It is not much to be wondered at, however, that foreign bodies, kept in contact with the surface of the lung by the adhesion of this organ to the pleura for three months, as in the case mentioned by Fabricius Hildanus, or six months, as in that of Tulpius, should cause an abscess, a real vomica, the contents of which, rejected by expectoration, fortunately carried along with it the foreign body, which was the essential cause of the secondary disease.

Obs. 13. In the annals of French surgery we find a case recorded, anterior to the two we have just cited, and which will serve to dispel all doubt on the subject: it is by the celebrated Pigray, first surgeon to Henry IV. This worthy disciple of Ambrose Paré informs us that he saw a soldier, who, three or four months after his recovery from a gunshot wound in the chest, brought up from the trachea a fragment of one of his ribs, about three finger-breadths long, and of considerable thickness, and that no ill effects followed. Such are the author's own terms.

It is evident that such cases bear no similarity to those in which a foreign body has been suddenly impelled into the trachea, where it causes instantly an obstacle to the free passage of the air, and becomes a cause of speedy death unless bronchotomy is performed.

This operation would be no longer indicated if the foreign body had penetrated the structure of the lung. The case would then be classed with those above related. The intelligent surgeon has to distinguish between them. We find a curious case illustrative of this point in Stalpart Van-der-Wiel.

Obs. 14. A girl, whose age the author does not mention, in swallowing some broth, unfortunately let a small bit of the bone of a shoulder of veal slip into the trachea. She immediately felt a good deal of inconvenience from the occurrence. The portion of bone having penetrated the lung, gave rise to constant cough and fever, followed by spitting of blood, and ulceration of the lung. At last, after four months, she coughed up the little bit of bone with the expectoration, and

afterwards got well, although the ulcer in the lung had threatened to end in consumption.

The above is the only case we possess in which a foreign body entering the trachea has penetrated the lung. It was no doubt attended by characteristic symptoms, which would have served to distinguish it from those caused by the presence of a foreign body in the trachea. If the narrator had had the same object in view as ourselves, he would not have failed to inform us whether there was a fixed pain in the chest, and if the patient pointed it out; we are also left in ignorance to what extent the respiration was affected. It is principally by our physiological knowledge that we are to judge of the symptoms produced by the presence of a foreign body in the trachea. Bonet, in his 'Medicina Septentrionalis,'[1] has given us an extract from a correspondence between Sennert and Doring on the possibility of foreign bodies being expelled from the trachea by an effort of nature; and he relates an observation on the subject by Sennert.

Obs. 15. A man who had mounted on a ladder to eat cherries from the tree felt it giving way under him. In his alarm a cherry-stone slipped into his windpipe. To this he attributed the cough and difficulty of breathing which immediately attacked him. The surgeon who saw him, not being able to discover the stone, the difficulty of breathing having ceased, and nothing remaining but a cough, supposed that the attack had been caused by a catarrhal flux to which the man was subject, in consequence of his having exposed himself to the rain in the morning. The cough lasted three weeks, and greatly exhausted the patient at times; he had, moreover, a severe pain in the side. At length, one night, after coughing violently for an hour, he spit up the cherry-stone enveloped in mucus, and became immediately free from cough and from the pain in the side. This case is related in confirmation of that narrated by Hagendorn, respecting which we have suggested some doubts. Sennert explains well how the fits of suffocation are caused by the foreign body being thrown up against the orifice of the trachea; and he thinks they cease when the foreign body falls back into the body of the tube.

[1] Medic. Septentr. Collat. lib. ii, sect. ix, De Affect. Asperæ Arteriæ, cap. ii.

Whatever we may think of the possibility of a foreign body being thrown out of the trachea, have we any right to trust to the uncertain resources of Nature, with the knowledge we possess of results of these unhappy cases? The necessity of the operation of bronchotomy is demonstrated. We have seen the sad consequences of omitting to avail ourselves of it; and, on the other hand, we must make the important remark, that we have no instance in which it has been performed without success.

Heister, in his 'Institutions of Surgery,' has expressly directed that the operation of bronchotomy should be performed when there is a foreign body in the trachea, not simply to remove the danger of suffocation, but in order to extract the body. He has, moreover, made judicious remarks respecting the appropriate mode of operating in these cases.

The patient is to be seated on a chair with the head thrown back, and firmly supported by an assistant. The surgeon is then to make an incision three or four finger-breadths long through the skin and fat, between the muscles which cover the fore part of the trachea, beginning below the thyroid cartilage, and extending it to the sternum. The blood having been absorbed with a bit of fine sponge or lint, we are to divide three or four rings of the trachea, and then search for and remove the foreign body with a small hook or a pair of small forceps.

Obs. 16. In this way, says the author, I removed a portion of mushroom, which had passed into the trachea of a man, from his laughing whilst swallowing some soup, in which, amongst other things, were mushrooms. This foreign body placed him in danger of suffocation. Such is the only diagnostic mark mentioned by Heister. In a note he adds, that Rau told him he had removed a bean in the same way, which had slipped into the windpipe. In conclusion, Heister says that modern surgeons have proposed no remedy for these cases: "*Attamen recentiores Chirurgi nihil de hac re proponunt.*" If this statement be intended as a reproach, Heister does not appear to be qnite justified in making it; and if meant as a simple expression of the fact, it is incorrect. However interesting may be a testimony so authentic as his, to the success of his two operations for bronchotomy, he should have felt, that in the whole of his large collection on surgery, there was perhaps no point that so

well deserved a circumstantial detail as the cases in which he felt called on to perform the operation he has described. He ought to have described the symptoms and the occurrences which led him to conclude that there was a foreign body in the trachea; to have stated how long the respiration had been interfered with; to have noted the facilities or difficulties experienced in performing the operation; to have informed us whether the foreign body was found opposite to the incision, or, if it was expelled by a rush of air; what relief, or what inconvenience attended the opposite currents of air in the alternate movements of inspiration or expiration; whether cough was excited by the endeavours to reach the foreign body; whether its extraction was affected by an instrument, and of what kind; whether any precautions were necessary in consequence of the hemorrhage from the lips of the wound, &c. These various circumstances, set forth with clearness and precision, would have rendered his observation highly instructive and useful; instead of which, he has confined himself to a simple statement of the success of the operation, such as the relatives, friends, or neighbours might have given, without any knowledge of medicine. Secondly, M. Heister is in error in stating that modern surgeons have said nothing respecting such cases. In Verduc's 'Surgical Pathology,' of which M. Heister had in his library the fifth edition printed at Amsterdam, in 1717, we find it stated that quite recently the operation of bronchotomy had been performed by a surgeon, who had skilfully laid bare the trachea, made an opening in the membrane connecting the cartilages, and extracted a small bone. The wound was quickly healed.

This account, though proving what we have stated, exhibits the same deficiency of detail as to the most important circumstances as those of M. Heister. The mode of operating proposed is, without doubt, less complete than that of Heister. The transverse incision of the membrane between two cartilages, does not afford the same facilities for discovering and extracting a foreign body, as a longitudinal incision extending through three or four rings. But Verduc concludes with an observation which well deserves to be remembered: "Without this prompt and bold operation, there was," he says, "nothing to be looked for but death." Let us remember this in similar circumstances,

and not be so wanting in courage and enterprise, as to allow a patient to die without relief. This advice is dictated by the love of our fellow-creatures. Casserius, following Albucasis, is very much more severe on those who reject bronchotomy generally, or abstain from employing it in appropriate cases: "*Pro inhumanis, inexpertis, formidolosisque, imo tanquam pro homicidis habendi.*"[1]

What reasonable objections can be raised against this operation? It is easily performed, and cannot give rise to danger. All authors are full of successful attempts to reunite complicated wounds of the trachea. Why should we be afraid of a carefully executed incision, which leaves a wound of no importance? The facts in proof of this incontestable assertion are too numerous to require any more from us than a simple indication of them. The difficulty of reaching and removing the foreign body appears at first sight to afford some ground for the opposition offered to this operation. The objection is one requiring to be met; and the more, as Haller appears to have been struck by its importance.

Obs. 17. In the seventh observation in his 'Opuscula Pathologica,' he mentions his having dissected the body of an infant in his anatomical theatre, who had been suddenly suffocated by a filbert. He found it lower down than the glottis, below the lower ligaments, at the bottom of the thyroid cartilage, and at the entrance of the trachea. It would appear, says Haller, that the life of this child might have been saved by the operation of bronchotomy, had it been performed at the moment of the accident, and had the foreign body been removed with a curette; but, he adds, in a case so urgent we can rarely distinguish with accuracy the spot in which the foreign body is arrested: "*Verum solet in precipiti casu, sedes ubi causa suffocans hæret minus obscura esse.*"

This exact knowledge does not appear so difficult to acquire as might be supposed. We may satisfy ourselves of this by a slight survey of those cases which are the best authenticated. In the three operations which we know to have been performed, and all with complete success—the bean extracted by Rau, the bit of a mushroom by Heister, and the portion of bone by

[1] Casserius.

Verduc, were all close to the incision. Haller, who has so exactly defined the situation of the filbert, assures us it might have been removed by bronchotomy. In the case related by Bonet, and in that in which I considered the operation necessary, two cases possessing so much analogy in their various features, the foreign body was found favorably placed for an operation, of which the success would have been certain, had our advice been listened to. In the case of the child examined by M. de la Romiguiere, it must be admitted, that the pea was found at the bifurcation of the bronchi, but it must also be remembered, that the lungs and trachea had been removed from the body, for the purpose of making the examination. It is more than probable, that, during life, the pea, being of smaller diameter than the trachea, would have moved with the air, and might have been carried during expiration towards that point of the trachea at which the opening would have been made, to save the child's life. We may infer this from most of the cases we have related. There are some cases, however, of an exceptional kind, notwithstanding the favorable aspect under which they have been presented. Verduc, in the treatise on 'Surgical Operations,' says, "a little boy died suddenly from swallowing a leaden bullet; he was opened, and the ball was found stuck in the trachea." This case must not be allowed to pass without some observation; since, in seriously discussing facts in order to arrive at the truth, we must be on our guard against errors to which they may give rise. It does not seem possible that a leaden ball could remain in the trachea. Its weight would carry it downwards into the bronchi, if not too large to enter them. It may, however, in fact, have been found in the trachea, if the child was placed for examination horizontally on a table, as it probably would be. Verduc does not say that he witnessed the case, which leads me to think it somewhat open to suspicion. This author was in the habit of citing the extraordinary cases with which the works of Fabricius Hildanus are filled; now we find mentioned in these, the case of an infant at Cologne, in 1595, into whose trachea a leaden ball passed; "they came to call me," says Fabricius, "but the child died suffocated before I could arrive." Nothing is said about opening the body, and this Verduc may have inadvertently added. Be this as it may, death would not

have occurred so speedily, from the presence of a less weighty body, sustained in the trachea above its division. The filbert, which suddenly caused the death of the infant mentioned by Haller, seems to have stuck in the glottis, and only to have passed down into the trachea at the moment of death, caused by suffocation. The danger would not have been so imminent, had it immediately passed into the tube, the diameter of which is greater than that of the foreign body. But a ball, carried by its weight to the bifurcation of the trachea, might suddenly and entirely intercept the passage of air. Art could be of no avail, where there was no interval between perfect health and death.

It is quite certain that patients have lived several days with a foreign body in the trachea, where it only impeded the passage of air; the interval between it and the sides, being greater than the opening of the glottis. How, then, does a foreign body, such as a bean, produce death? We have seen that its presence caused neither inflammation nor suppuration; long intervals separated the fits of coughing, so that these could not have been the cause of suffocation, at least unless they impelled the foreign body against the glottis, and retained it there long enough to excite a spasm so prolonged as to abolish respiration. But is it probable that effects, which the fits of coughing, when most violent, did not produce, should be caused by them in the state of debility to which the patient is reduced after some days? A particular symptom exhibited itself in the case I witnessed, which deserves consideration, as no other surgeon has mentioned it; I allude to the emphysema which appeared at the end of the second day above the clavicles; apparently, it arose in the course of two hours, and then made no further progress.

It was the presence of this emphysema, which, more than all my arguments, led to the general conviction that the bean was in the trachea. I do not think that any of those who witnessed the case had a clear idea as to the mode in which this symptom arose. It might be supposed that the foreign body, by the obstacle it had offered to the free passage of air for eight and forty hours, had led to the laceration of the membrane uniting the rings of the trachea. The examination of the body, however, served to dispel this illusion. The tumour

had not originated in the neighbourhood of the trachea. This merely formed the boundary of the emphysema; the body of the lung and the mediastinum were emphysematous. The retention of air caused by the foreign body, in each movement of expiration, and especially in the fits of cough, produced a violent impulse of the elastic fluid towards the surface of the lung, and into the spongy tissue of the organ; it then passed into the cellular tissue uniting the lung to the pleura which covers it, and, passing from one cell to another, prodigiously distended the cellular tissue, separating the layers of the mediastinum, and finally exhibiting itself above the clavicles. This distension of the lung and of the neighbouring parts by the air, which had insinuated itself into the spongy and cellular tissues, was one very manifest cause of the suffocation; and this swelling seems so natural an effect of the presence of a foreign body in the trachea, that one can scarcely believe but that it is a necessary symptom, though not alluded to by any author.

This thorough investigation of the phenomenon, constitutes an addition to our pathological knowledge; nor is it less important in a therapeutical point of view, from the light it throws on the effect of certain remedial measures. The curative indication in emphysema, consists in affording an exit from the cellular tissue for the elastic fluid distending it; its absorption in the vessels is very slow, and as yet experience has furnished us with no other resource, than the orifice of the wound, when it has originated in a wound, or than scarifications, towards which the air is urged by gentle pressure, or friction, in a direction towards the openings.

Obs. 18. The observation by Ambrose Paré on the cure of an emphysema, is too memorable not to serve as a basis for a law on the point. After the healing of a wound in which the trachea had been partially divided, there supervened a prodigious emphysema, not only around the wound, but all over the body. The face was so swelled that the eyes could not be seen, nor was there any trace of the nose. In this deplorable state the skilful surgeon made several scarifications in the skin, deep enough to afford an exit to the air contained under it. Such complete success attended the operation, that the patient, in a few days, passed from the brink of death to a state of the most perfect health. However interesting this

fact, the tumefaction had here its chief source in the external parts of the body; whereas, in the case observed by me, the emphysema began in the body of the lung itself; a circumstance which might occur in the case of certain wounds of this organ, where the respiration was obstructed, as well as from a foreign body in the trachea. The scarifications in such a case would serve, in some sort, as artificial tracheæ, or exhalent orifices for the air, under the action of the organs of respiration on the lung. Hence we may conclude, that when circumstances will not allow of the extraction of a foreign body from the trachea, the operation of bronchotomy would nevertheless be of service, for the removal of the emphysematous swelling, which we have shown to be the proximate and immediate cause of death.

Obs. 19. A recent fact, communicated by M. Verdier, Master in Surgery at Clermont, in Beauvoisis, confirms what I have said in my Memoir, on the pernicious opposition offered in consultation by surgeons not sufficiently enlightened to judge of the case. On Sunday, the 25th of February, 1765, a little girl, six years old, playing with her companions, had a bean thrown into her mouth by one of her companions, which unfortunately passed down the trachea. The child immediately complained to her mother, who was present, that she had swallowed a bean. The sudden hoarseness of her voice, and the alarming difficulty of breathing which immediately came on, led the mother to call M. Verdier without loss of time. The little girl, in answer to inquiries as to the seat of her pain, pointed to the top of the trachea; this indication of the locality, the perseverance of the symptoms, and the statement of the child as to the nature of the foreign body, left no doubt that it was actually lodged in the trachea. M. Verdier communicated to the mother the dangerous state of the patient, and informed her that he knew of no mode of saving her life, but by an operation, and the extraction of the foreign body. Another surgeon thought fit to employ some of those measures which are proper where a foreign body is lodged in the œsophagus; the child suffered much from these attempts, ceased to speak, and was seized with convulsions. The mother alarmed consented to the operation. M. Verdier prepared for per-

forming it, and having summoned one of the surgeons of the place in whom he trusted, for the purpose of giving confidence in the measure about to be employed, found him opposed to the operation. A young physician, too, who had been called on to attend, was opposed to the operation. The child lived only three hours, during the last of which she was insensible and severely convulsed. Half an hour after her death, they allowed M. Verdier to perform the operation. He made an incision into the trachea, and very readily withdrew the bean, which he sent to the Academy. This child was the victim of the opposition offered by the consultants, whose ignorance was inexcusable on a point admitting of so little doubt.

Schurigius, a physician of Dresden, has collected in his 'Chylology,'[1] all the instances he could meet with of foreign bodies having passed into the trachea.[2] None of the authors whom he has quoted appear to have thought of bronchotomy; and certainly it would not answer in all cases. In some it would appear that the foreign body was carried at once into the body of the lung.

Obs. 20. The oldest of the monks in the Abbey of St. Martin, near Treves, walking one day in the garden, could not resist the temptation of a fine cherry; he bent down the branch and took the fruit in his mouth. Having separated the stone with his teeth, he tried to swallow the whole in a hurry, as he heard the bell ringing for church; the stone slipped into his trachea, and immediately excited a most violent cough and retching, which the monk thought would have killed him. After this violent agitation he fell asleep for some hours, and felt nothing whatever of the accident for a whole year. At the end of that time he was attacked with cough and fever. These symptoms became more and more threatening, until at length he spit up a stone as large as a nutmeg; this was formed exteriorly of calcareous matter surrounding a nucleus formed by the cherry-stone. A copious purulent expectoration followed the expulsion of the foreign body, and the patient

[1] Chylologia Historico-Medica, h. c. Chyli humani sive succi hominis nutritii consideratio physico medico forensis. Dresdæ, 1725.

[2] Cap. v, d, § 85 ad 98.

died some days after in a state of marasmus. This observation is taken from the Ephemerides of Natural Curiosities.[1]

Obs. 21. The following case will serve to prove the justice of our reflections respecting the cause of the alternations of calm and of agitation. On the 25th of September, 1723,[2] a child, at Dresden, playing with beans, which he threw into his mouth, and again blew them out, at length sent one back so far that he could not return it. The child's countenance became immediately livid, and he was attacked with a violent cough, threatening suffocation. A surgeon who was immediately called, not knowing the circumstances, thought there was a foreign body in the œsophagus, and introduced a wire guarded with a small sponge; this brought away a quantity of mucus. The respiration became free, and the child who had not before spoken a word, recovered his speech which did not appear affected. The following night he died instantly in a fit of coughing.

The parents attributed this sudden death to a suffocative catarrh, but the surgeon, who had heard the history of the beans, requested and obtained permission to open the body. He sought in vain in the trachea and bronchi for the foreign body, but at length found it under the glottis. The child had been suffocated by the application of the foreign body against the opening. The operation of bronchotomy might be executed with success in such a case, even at the last extremity, and perhaps, even when the patient actually appears to be dead; drowned persons are less favorably circumstanced, and yet they have been recovered from apparent death even after several hours. The omission of the most beneficial services of art must be considered as one of the greatest afflictions of humanity.

We trust our labours may in future prevent such misfortunes; and that surgeons and physicians, enlightened by the experience thus afforded them, will no longer argue against the use of a remedy of which the utility and necessity are alike incontestable.

[1] Decad. ii, an. x, Obs. lxvi, p. 123.

[2] Ephem. Acad. Nat. Curios. Dec. iii, ann. v and vi, Obs. ccliii.

CASE OF PERFORATION OF THE TRACHEA BY A FOREIGN BODY.

By M. DE LA MARTINIERE.

The perusal of the different cases, collected into a didactic form, in the 'Memoirs on Foreign Bodies in the Trachea,' has reminded me of a particular case, which may perhaps be advantageously noticed here.

The son of a card merchant, about the court at Fontainebleau, 9 or 10 years of age, while cracking a little whip for his amusement, was suddenly attacked with extreme difficulty of breathing, and shortly seemed in immediate danger of suffocation. He pointed to the trachea as the seat of his suffering. The surgeons, however, who were called to his assistance, ascertaining that he had not been out of sight of his parents, and that he had put nothing in his mouth, could not suppose there was any foreign body in the air-passages. A full bleeding seemed the readiest remedy for the relief of this state, which became momentarily more dangerous and threatening; it, however, afforded no relief. Not more than an hour had elapsed from the accident, when I was called to see the patient. He had had convulsions, and was breathing very laboriously, his face was swelled and purple, his eyes projecting, his extremities cold, he had become insensible, and he was expected every moment to die.

The gentleman who had seen the child before me, had not neglected to examine the fauces, the œsophagus had been explored in the usual manner, and had been found free. While I was examining and feeling the outside of the neck, I perceived a little red spot in front like a flea-bite, just below the cricoid cartilage, and deep under it one could feel a little circumscribed tumour, as big as a lentil, corresponding to the red spot, and harder than natural; the thickness of the integuments prevented it from being felt more distinctly. I

immediately determined to cut through the skin and cellular tissue upon this spot; on putting the end of the finger into the wound, I still felt the little tumour in the same spot, but close down on the trachea. I therefore deepened the incision, and with another stroke of the bistoury laid bare the cartilaginous rings of the trachea; with my nail I felt something projecting, more than a line beyond the circumference of the tube, which I tried in vain to seize with my dressing forceps; luckily I had with me a pair of tweezers, with which I was able to lay hold of it, when, to the great surprise of myself and the bystanders, I drew out a great brass pin, without any head, and more than fifteen lines in length, which had traversed the trachea, and pierced its posterior wall, from left to right.

I shall not endeavour to explain how this foreign body could have penetrated so deeply. The pin, as was afterwards discovered, was at the end of the lash of the whip with which the child was playing; the manner in which the pin escaped from the whip, lost its head, and buried itself so deep as to project only a line beyond the trachea, are all matters foreign to surgery; and I shall content myself with relating the case, with such points of interest as it presented, in relation to the severity of the symptoms, and the operation by which they were put an end to. The scarcely visible red point on the skin, marking the passage of the pin, was what first drew my attention, and the sensation conveyed of a deeply-seated swelling, determined me to cut down on it; the highly dangerous state of the child, whose death was evidently at hand, required the promptest relief; it was especially this consideration which decided me to act on indications, that appeared clear enough after the favorable event, even in the opinion of those who before had remained idle spectators. The success could not have been more complete, for the child was, as it were, called back from death to life, while the simple wound, with proper dressing, healed in a few days.

This case may appear useful as a supplement to the 'Memoirs on Bronchotomy,' published by the Academy. In the picture of the calamities which this too much neglected operation may readily relieve, we find only instances in which foreign bodies, by an *error loci*, have been carried into the trachea, instead of down the œsophagus, by the action of the muscles of

deglutition. Here we have a foreign body proceeding from without, and occasioning the severest and most dangerous symptoms. The difficulty was to distinguish the foreign body, and we have seen what served as my guide in this particular and embarrassing case, which may afford room for more general reflections. The incision I made would not have been useless, even had I not discovered a foreign body; in that event I should have made an opening between two rings of the trachea, to afford temporary relief to the child's breathing.

When a foreign body produces these formidable effects, and is so situated that it is impossible to follow its course and extract it, the urgent indication will be to afford relief from the danger under which the patient is perishing. The operation of Bronchotomy will remove the immediate effect, namely, impending suffocation; the life of the patient being thus preserved, we shall have time afforded us to direct the necessary researches for removing the cause by surgical means, or for waiting, without fear, the efforts of Nature, which may afford us assistance, by the formation of an abscess, of which we have seen examples in other similar cases.

SUMMARY OF CASES OF

SWELLING OF THE TONGUE,

AND OF THE MOST EFFECTUAL MEANS OF RELIEVING IT.

By M. DE LA MALLE.

Obs. 1. A vine-dresser of Champs-sur-Marne, near Chelles, named Troisvalets, during recovery from a malignant fever, was suddenly attacked, in the night of the 8th and 9th of March 1725, with a pain in his tongue, followed by great and rapidly supervening swelling. In less than five hours, this part became of three times its natural size, during which time, my father, who was called to see him, had bled him successively from the arm, the jugular vein, and the foot, without benefit. The patient experienced acute pain, his skin was burning hot, his countenance swelled and livid, his pulse hard and concentrated, his look wandering; he could scarcely breathe, his tongue filling the cavity of the mouth, and protruding beyond the lips. My father, under these very urgent circumstances, could devise no better expedient than to put a wedge between his teeth, so as to keep his mouth a little more open than it was already kept by the enormous swelling of the tongue, and to make three parallel incisions with a bistoury, from its base to its point, one along the centre of the tongue, and the other two on either side, half way between the middle and edges; these incisions penetrated through two thirds of the depth of the swelling. These cuts produced all the effect that could be expected from them; a large quantity of blood flowed, and in an hour's time, the tongue was so much unloaded that the patient could speak. The incisions, on the following day, only looked like superficial scarifications, when the tongue had recovered its former state, and they got well in a few days, under the use of a gargle composed of infusion of mint-tops and elder flowers, sharpened with a little vulnerary water. Nothing but a measure affording the most prompt relief, would

have saved the life of the patient, in the critical state to which he was brought by the rapid progress of the swelling of the tongue.

Obs. 2. About two years after, a villager of Gagny was similarly attacked. The surgeon of the place called my father into consultation; the indication was the same, and the same proceeding was adopted with the like success.

The two preceding observations were forwarded to the Academy of Surgery, in the month of May, 1732, and were mentioned in the report made by MM. Dargeat and Le Dran, on the 28th of June, in that year.

Although very young when these operations were performed, I had heard them spoken of at home so often, as readily to call them to mind on the following occasion. An officer of the camp-master-general's regiment, was treated for a malignant fever in the hospital at Weissembourgh, in the month of February, 1735, for which the physician had bled him eleven times from the arm and foot. On the eighteenth day, when considered convalescent, he perceived a numbness of the tongue, which was speedily followed by painful swelling. The surgeon on duty bled him, and two hours after I saw him. I found his tongue hard and swelled, and prescribed further loss of blood, which, however, produced no effect. The weakness of the patient did not permit of our carrying this remedy further; but as I thought the swelling might be of a critical nature, and that it would be better to give vent to the humours which caused the swelling, by scarifying the part itself, and as the case was urgent, I made two long and deep incisions along the tongue, at equal distances between the median line and the edges; blood flowed, rather pale in colour, as might have been expected from the patient's state; the swelling subsided rapidly; in three days the tongue had entirely regained its natural size, and on the fifth, the incisions had healed, and the patient was entirely cured of the disease for which they had been made.

From the well-known structure of the tongue, we readily understand that two incisions are sufficient, when the organ is swollen on both sides. In some cases, tumefaction is confined to one side.

Obs. 4. On the 11th of February, 1744, Margaret Vincent,

of the parish of Champs-sur-Marne, was attacked with a sore throat, which entirely prevented her swallowing. My father, who carefully examined the state of the parts, perceived no swelling of the fauces, but only great dryness. The patient, though without fever, was bled; she used emollient gargles, and poultices of the same nature were applied externally; under this treatment, she recovered the power of swallowing. Cooling drinks were ordered for her, and in fact, she appeared to have recovered, when, some days after, in the night of the 17th and 18th of the month, the left side of the tongue became swelled through its whole length. Although the swelling affected one side only, it was so considerable as to impede the breathing, and to entirely prevent her from swallowing. My father, who had derived such benefit from the incisions he had made some years before in the first case, which was indeed a more severe one, considered the present one sufficiently urgent to justify a similar proceeding, he therefore made a single deep incision along the swelled side, and with such success, that in three days the patient was quite cured.

I have since read in the German Ephemerides, that a similar swelling of the tongue was noticed by Joel Langelot, first physician to the Duke of Holstein, about a hundred years ago. This swelling, for three weeks, resisted all the remedies which were applied with the utmost diligence, amongst which were bleedings from the arm and the ranine veins. At length, leeches were applied, as had been before proposed by Langelot, but objected to by the other physicians. This local evacuation unloaded the tongue, which soon recovered its natural state.[1]

Swelling of the tongue may be caused by the action of poisonous substances on that part. The late M. Dupont, our fellow-academician, has related an interesting case in point, illustrating the good effects of incisions in such cases. A young herdsman, sixteen years of age, living in a hamlet, near Montié, a town in the province of Perche, made a bet with one of his companions, that he would bite a toad to pieces, beginning with the head. He laid hold of one, and gave it two or three bites, but on feeling a sensation of heat all over

[1] Ephemerid. Medico-Physic. ann. vi et vii, p. 20.

the palate, threw it down. His companion, seeing that the toad was not divided as agreed on, made off with the stakes; the former, not liking to lose his bet, again began to chew the toad, and continued until he had done enough to gain the wager. Two hours after, however, he had cause to regret his folly. The palate, tongue, inside of the cheeks and lips swelled greatly; at the end of four hours he became insensible, was attacked with hiccup, with nausea, and with sweats, which were not cold like those of the merchants spoken of by Ambrose Paré, in his twenty-first book on Poisons, in the twenty-third chapter, "*On the bite of a toad.*" These two men being at dinner at an inn near Toulouse, gathered some leaves of sage in a garden, and put them in their wine, without taking the precaution to wash them. Before they had finished their dinner, they were attacked with vertigo and loss of sight; they then became faint and convulsed, their lips and tongue became black, they babbled and squinted hideously, cold sweats and vomiting came on, their bodies swelled, and they died shortly after. On inquiring into the matter, it was found that the sage they had gathered was bedaubed with the slime of toads.

The young man we were speaking of, was not seen by M. Dupont, the surgeon, until the following day, twenty-four hours after the accident. All the symptoms above described continued. His face was blueish, his saliva flowed involuntarily from his mouth, though in small quantity; he could not swallow; the external jugular veins were swelled, the tongue, which was very brown, protruded two inches from his mouth, and was at least three finger-breadths in thickness, the breathing was so laboured, from the swollen state of the parts round the larynx, that M. Dupont determined to perform bronchotomy, should other means not afford speedy relief. The first indication was to procure a diminution of the excessive size of the tongue, and to obviate the gangrene with which it was threatened. M. Dupont, therefore, proceeded with one hand to press down the tongue with a myrtle leaf, while with the other he made a deep incision into the organ with a bistoury, beginning near to its base, and terminating at its point. Blood flowed freely from these two incisions. He then left his patient in the charge of a surgeon of the canton, who, by his

advice, bled him twice from the throat in four hours. The relaxation of the parts, thus obtained, enabled the patient to swallow an emetic at the end of six hours, which produced free evacuations upwards and downwards; the symptoms in great part subsided as suddenly as they had come on, and on the following day M. Dupont, before leaving, saw his patient for the second time in a favorable condition, and advised the use of a gargle, made with ammoniacal water and a little brandy, and that the bowels should be kept freely open. Honey and wine were used as a local application, to cleanse and consolidate the wounds in the tongue; and in a fortnight the patient was well.

These practical examples appeared likely to be useful, justifying as they do the employment of a very effectual surgical operation under urgent circumstances, and where the life of the patient was in imminent danger. I long thought, that to my father belonged the honour of first employing this beneficial proceeding; but although he did indeed originate it for himself, in circumstances where he had only his own sagacity to guide him, the interest of truth requires me to acknowledge that it had already been put in practice. We find in the observations of Job a Meekren, a celebrated Dutch surgeon, that the wife of a sailor who had suffered for three or four days from great dryness in the throat, was suddenly threatened with suffocation on the 15th of March, 1656, from an excess of humour which she endeavoured to expel; the tongue, tonsils, and palate all becoming swelled in a very short time. Gargles, cataplasms, and injections, were employed without any effect. It was not thought right to bleed the patient, because the swollen parts were white, and the tumefaction did not appear to be of an inflammatory kind. Various derivative means were used, such as purgative enemas, cupping the back of the neck and shoulders, and blisters behind the ears. These remedies appeared rather to irritate the disease, since, instead of diminishing, it increased greatly, and the livid colour of the tongue, lips, palate, and sublingual region, gave cause to fear mortification was coming on; added to all which, the difficulty of breathing was very great. Job a Meekren called into consultation Francis de Vicq, a very experienced surgeon, who acknowledged he had never met with a similar

case in the course of his practice. He advised bleeding from the arm, and from the ranine veins: this was effected, though with difficulty, on account of the swollen state of the tongue, and some dark and ill-conditioned blood was abstracted; the breathing became a little easier in consequence, but all the symptoms continued so threatening, as to render necessary the use of measures more effective than any that had been hitherto used; it was at length determined to make a long and deep incision in the tongue on either side; a quantity of dark corrupted blood flowed from it, with immediate relief to the breathing, the swelling subsided, the patient recovered her speech, and in short all the bad symptoms were dissipated in an unlooked-for manner. Syrup of roses and purslain were then used as a liniment for the tongue, and the wounds soon healed.[1]

We may infer from these observations that many patients who have died of suffocation from swelling of the tongue, might have been saved by incisions in that part. The poison of smallpox sometimes precipitates itself thither with a sort of fury; instances are mentioned of its causing mortification of the part, which might have been prevented by unloading the vessels and cellular tissue of the part. The cases are sufficiently numerous to confirm the value of the proceeding I have described; its success can be no longer open to question, and the subject may well furnish an additional chapter in our Treatises on Operative Surgery.

[1] Jobi a Meekren, Observ. Medico-Chirurg. cap. xxii. De tumore gravi linguæ partiumque vicinarum. p. 107.

LIST OF ADDITIONAL MEMOIRS

ON

DISEASES AND INJURIES OF THE HEAD AND NECK,

CONTAINED IN THE

MEMOIRS OF THE ACADEMY OF SURGERY.

ON THE HEAD.

ON THE NOSE.

ON THE EYE AND ITS APPENDAGES.

* The references in this list are to the duodecimo edition in fifteen vols.

ON THE FAUCES AND ŒSOPHAGUS.

ON HARE-LIP.

ON SALIVARY FISTULA.

GENERAL INDEX.

THE END.

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