




**LIVERPOOL
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THE
SEATS and CAUSES
OF
DISEASES

INVESTIGATED BY ANATOMY;
IN FIVE BOOKS,
CONTAINING
A Great Variety of DISSECTIONS, with REMARKS.

TO WHICH ARE ADDED
Very ACCURATE and COPIOUS INDEXES of the
PRINCIPAL THINGS and NAMES therein contained.

TRANSLATED from the LATIN of
JOHN BAPTIST MORGAGNI,
Chief Professor of Anatomy, and President of the University at PADUA,

By BENJAMIN ALEXANDER, M. D.

IN THREE VOLUMES.

VOL. III.

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MDCCLXIX.



T O
Dr. H U N T E R.

SIR,

THE particular nature of the work before us gives a propriety to this address. A performance which stands upon the basis of anatomical science cannot seek the sanction of a more respectable name than that of Dr. Hunter. Great as the author allowedly is, and great as I have frequently known you confess him, it cannot but give additional weight to his work, and still more to my translation, that it is patroniz'd by you.

To you belongs the honour, in this country at least, to have stripped anatomical science of its mystery and disguise. — You have divested it of that pompous jargon and farrago of learning, with which it had been dress'd up in the schools, and have render'd its lessons, easy, perspicuous, and familiar. The science has, by your means, become more universally diffus'd, and more clearly understood. And perhaps there is no city in the world, where the attentive practitioners of the several branches of medicine, act with greater certainty to themselves, and safety to their patients, than in this metropolis.

For myself, I must confess that it is to you, chiefly, I owe that little share of anatomical science, of which I am possess'd. — From thence arises every degree of certainty that I find in determining the seats, and in great measure the causes, of diseases. And though I do not affect to despise, but even greatly esteem, the science of chemistry, and other branches of natural knowledge, auxiliary to medicine, I cannot, however, but give the first place to anatomy, as being the very basis, the ground work, and in-

DEDICATION.

deed, if I may be allow'd to speak thus, the grand luminary, of Physic.

What is it we do not owe to you in anatomy? You have not only rendered that which was already known, clearly attainable by the industrious and attentive mind, but have made many happy discoveries, which lead on to the most pleasing and important consequences. And though the public has seen many instances of this improvement already, we do not doubt but we shall still be witnesses to others. That unwearied assiduity with which you pursue your inquiries, in spite of the most lucrative avocations, cannot but produce the most useful effects.

To this assiduity the community stands greatly indebted. And this the Community will in general allow, however the jealous few may retract. It is a circumstance frequently attendant on great characters, to be envy'd and detracted from while living: And nothing but death itself can pay the just reverence to such reputation.

You will however permit me to hope, Sir, that it will be long, very long, before full and ample justice be done to your character. And this you will the more readily believe, when I assure you that, in such a desire, I am far from being destitute of the most selfish regards. For I cannot but hope, from the many instances of favour and partiality I have met with from Dr. Hunter, that I shall, during the course of our residence here, be indulg'd with the honour of subscribing myself

his very respectful friend,

and greatly obliged humble servant,

April 7th, 1768.

BENJ. ALEXANDER.

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THE
SEATS and CAUSES
OF
DISEASES
INVESTIGATED BY ANATOMY.

BOOK the FOURTH,

Wherein the Disorders relative to Surgery, or those which
affect the whole Body, are treated of.

THE

RESEARCHER'S GUIDE

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LETTER the FORTY-NINTH

Treats of Fevers.

1. **A**LTHOUGH you not long ago receiv'd a very long letter from me, you may now, perhaps, expect a longer, as the subject of this is fevers; diseases which are of all the most frequent, the most various and manifold. And, indeed, you see that the first section of the fourth book, which is assign'd to them in the Sepulchretum, is one of the most prolix. Yet this letter, though it may not be the shortest, will, at least, not be one of the longest. For why should I here, in imitation of that section, repeat what I have already sufficiently said, or anticipate what I shall hereafter say, with greater propriety, when treating of a great number of disorders, each of which has its proper fever, if I may so speak, naturally join'd with it? And in that section there are a great number of observations which Bonetus himself confesses are propos'd in other places, whereto he refers; and out of those of which he makes no confession, I think I have found others besides, in regard to which he might have made the same confession.

And, indeed, I have more than once observ'd histories to be put down twice over in that same section; which, however, I do not particularly refer you to, because I imagine that you yourself, if you read it more accurately, and with more attention, than I, will remark a still greater number; and at the same time be surpriz'd at some in which you read of incredible things; as, for instance, that in a pestilential hemitritæos (*a*), a vast quantity of bugs or flies was found betwixt the meninges of the brain; that in certain pestilences (*b*), "vipers and lizards" had been generated in human bodies, in several parts, which, after the most excruciating pains, kill'd "a thousand men every day;" or (*c*) that "the livers both of men and horses were found to be full of toads."

It is my determination, however, to copy in this place some observations in particular, which still remain uncopied among the papers of Valfalva; in most of which you will rather be surpriz'd at this circumstance, that after violent fevers, or those that kill unexpectedly soon, scarcely any thing, and sometimes nothing at all, is found, which might bear any cor-

(*a*) Obs. 57. § 11.

(*b*) Obs. 62. § 8, & 9.

(*c*) Ibid. § 10.

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respohdence to, or competition with, their violence or impetus ; so far is the cause by which fevers become fatal not uncommonly latent.

2. A man, about thirty years of age, was seiz'd with a slow fever, which was attended with no symptom worthy of remark, except that his appetite was entirely lost. The pulse and strength of the patient fail'd every day ; and at length he died suddenly.

The body being dissected by Valsalva, all the viscera were found to be in a sound state, except the following. The gall-bladder contain'd a bile which was ting'd of a brown colour ; and in this bile was a calculus of the bigness of a *dens mclaris*, of a pallid colour, and easily friable. Internally it was hollow, and had many other calculi included in it, and those of a black colour. The lungs were distinguish'd with black spots. In the pericardium was little or no serum. The blood in this body was very grumous, and in the ventricles of the heart was coagulated.

3. Whether you suppose this to have been a slow or a malignant fever, certainly the preternatural appearances that were found by dissection, frequently occur in others also, who are not carried off by a disease of this kind, and particularly not by a death of this kind. It does not so frequently happen, that those appearances are seen in the heart itself, which Valsalva saw in a boy whom I suppose a hectic fever carried off ; although there are some things in regard to which you would wish to know whether they existed in the living body, or not, and perhaps even in the body after death.

4. A certain boy died emaciated. The heart was strongly connected with the pericardium ; which being separated therefrom together with the fat, through all the external surface of the muscles of the heart, certain whitish bodies were seen lying at a distance from each other. Most of these resembl'd small grains of millet-seed in their figure, magnitude, and colour ; but some were a little larger, and of an irregular figure. On the surface of the diaphragm the lymphæducts appear'd pretty evidently.

5. But now let us go on to some things that relate to another kind of fever, which the same person observ'd in three women.

6. A woman, about thirty years of age, of a bilious temperament, who already had labour'd under a double tertian fever for a long time, receiv'd a blow upon the abdomen with a stick. Being receiv'd into the hospital of St. Mary de Vita, she complain'd only of a pain in her abdomen. But on the third day after receiving the blow, she began to be delirious. Her pulse was small and quick. She threw up from her stomach, more than once, a humour like water wherein fresh meat has been wash'd. At length, the disease increasing every day, she died.

The muscles of the belly were found to be contus'd ; yet in such a manner, that no mark of contusion appear'd either externally, or within the abdomen. The liver was whitish, and inclin'd to hardness in some degree : the gall-bladder, which was of a remarkable magnitude, contain'd about three ounces of bile, of a black colour ; some portion of which fluid was also found in the stomach. The other parts of the belly were in a natural state. In the thorax, the lungs, on that surface which was turn'd to the vertebræ, were affected with a considerable phlogosis, but in other respects sound. The right ventricle of the heart contain'd a small polypous concretion.

7. Whosoever

7. Whosoever had consider'd only the blow upon the abdomen, and the complaints made by the woman of pain in this part, would have attributed the symptoms that follow'd to some viscus of the belly having been injur'd thereby. But the dissection show'd, that whatever disorder there was in the liver related, rather, to that long-continu'd fever; or, at least, in the opinion of Valsalva, who prefix'd this title to the observation, *De Tertiana Duplici*, whether he suppos'd the whole of this morbid appearance to have related to the causes of that disorder, or to the effects of it. What had been added thereto on occasion of the blow, in a woman of a bilious temperament, the inspection of the brain, perhaps, might, as the delirium seems to hint, have shown. For as to the considerable phlogosis of the lungs, who can, for a certainty, affirm that, as it occupied the posterior parts, it was not owing rather to the supine posture of the body; as I have admonish'd on a former occasion (*d*), and as we see frequently happen? And this I would have you suppose to be said in regard to the following history also.

8. A virgin, of two-and-twenty years of age, having labour'd many days under a double tertian, and being afterwards seiz'd with an ardent fever, and troubl'd with a pain of the head and the whole body, was carried off thereby.

In the belly, at the extremity of the intestinum ileum, in the part where it is connected to the mesentery, were prominent many little bodies, which in their magnitude, form, and colour, resembl'd the granules of gun-powder. In the uterus many round bodies, like glands, were protuberant; on the rupture of which a viscid humour was discharg'd. Except these things, all the parts of the belly were in a natural state. But in the thorax, the lungs, where they were turn'd towards the back, were slightly inflam'd; and in the right ventricle of the heart was a polypous concretion.

9. Whether these round bodies were protuberant on the external or the opposite surface of the uterus; and, in like manner, whether those black little bodies, or rather points, possess'd this or that surface of the intestine; it does not sufficiently appear from what cause the tertian in the first place, and after that the ardent fever, had its rise. It does not, I say, sufficiently appear: not that it escapes me in what manner very learned men have accounted for recurrent fevers, from a viscid humour being discharg'd out of more than one lurking place, within a certain time; or that those black points might be very small inflammations, already degenerating into a gangrene: but because I know that both of these diseases have been in many, who had not been afflicted with fevers of this kind, but with quite different disorders, which I look for in this history in vain, where the seat of those disorders is pointed out.

10. A woman, of five-and-twenty years of age, and of the same temperament as the former (*e*), had come into the same hospital at the time when she began to be affected with a difficulty of breathing. With this difficulty were join'd a pain in the left part of the thorax, a certain sound of matter within this cavity at the time of respiration, and a pulse which was soft indeed, but very frequent. On the fifth day the jaundice came on, which, after having continu'd quite to the eighth day, vanish'd. Then, by reason

(*d*) Epist. 4. n. 13.(*e*) N. 6.

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of the obstinacy of the fever, venæsection, which had been made use of on the first days, was again repeated. At length, death suddenly came on; for the fever was not of such a kind as to threaten death at that time.

The belly being open'd, every thing appear'd to be sound; except that half a pint of water was found in the whole of that cavity: which circumstance had frequently, however, been found in other bodies also. In the thorax, the right lobe of the lungs, which adher'd to the ribs on its superior part, was inflam'd on its inferior part; and from the substance of it, when cut into, a little serum was discharg'd. Yet the left lobe was not only free from the ribs on all sides, but was likewise found to be in a sound state. From the right ventricle of the heart, a polypous concretion, which had its basis in the fasciculated texture of that cavity, was produc'd into the vena cava, being every-where of a firm compages, and of a colour in one part pallid, and in another somewhat red.

11. If Valsalva himself had not entitl'd this observation *De Febre Ardente*, I should have class'd it rather with the peripneumonies: although, even on this supposition, we should not very well understand how it happen'd, that the patient died suddenly. Nor yet does it appear why, although the pain was on the left side, the inflammation was on the right; unless, perhaps, where the one or the other is mention'd, one side was put down for the other, by a slip of the pen, as frequently happens. This, however, is certain from the aphorism of Hippocrates (*f*), that, in respect to this disease, but an ill omen is to be drawn from a jaundice being added to the fever before the seventh day. But if you suspect that any thing malignant had lain hid in any of the fevers hitherto propos'd; you will still more suspect it in that, which Valsalva has left us the description of in the following manner.

12. A man, of forty years of age, lay ill in the same hospital, by reason of a wound in the tibia with a blunt instrument. And when his wound began to be in a very good state, and he himself was quite free from fever; he was suddenly seiz'd with an acute fever. And this growing more and more violent, he was taken off thereby. In the carcase was no morbid appearance, except that the blood kept nearly its natural fluidity.

13. What is more natural in this case, than to think as Riverius (*g*) did in a certain case of his? I mean in the case of a boy, who had been taken off by a very acute fever, attended with symptoms which brought on a great suspicion of inflammation in the viscera; whereas, by dissection, he found "all the viscera" (for so Riverius has written, and not, as, through the great carelessness of the printers, it is copied into the *Sepulchretum* (*b*), "all the symptoms") in a very good "state;" and, not meeting with any apparent cause of so many symptoms, accounted for the disease from some latent malignity.

And this you will perhaps do the more readily, because here, at least, the fluxile state of the blood was apparent. For some of the most eminent physicians have taught us, that a great number of malignant fevers are join'd with a dissolution of the blood. And these we have also follow'd, in ex-

(*f*) 6. ex Sect. 4.

(*g*) Cent. 2. Obs. 83.

(*b*) in Additam. ad hanc Sect. Obs. 10.

plaining other observations of Valsalva (*i*), yet with this restriction, that as malignant fevers do not all discover themselves in one and the same way, we do not think they ought to be deserted, who have affirm'd, on the other hand, that many of them are also join'd with a concretion of the blood. For the opinion is favour'd not only by others, but by this observation in particular that I am about to subjoin, which is the last I shall give you from the papers of Valsalva, and is inscrib'd with this title by himself, "Of a malignant fever and obstinate costiveness."

14. A nobleman, about forty years of age, who, even when in health, was subject to such a costive state of bowels, that he could never go to stool without the use of purging medicines, having remov'd his habitation from his native country, where he liv'd in a thin air, to one that was more thick; after a short time was seiz'd with a fever, which was attended with no other symptom but this, that the patient complain'd of continual anxiety of mind, and of watchings. But a pain of the head having come on in the course of the fourteenth day, and the pulse now and then appearing, and soon after being so contracted, that frequently it could not be perceiv'd by the physician; he made an exchange of life for death on the same day.

The fundus of the stomach was ting'd of a black colour. The intestines, and especially the large ones, were contracted. The other viscera of the belly were found. The blood was very much coagulated.

15. I will now join to these dissections, some instances either of observations or animadversions of my own, or my friends, that relate to the kinds of fever taken notice of already, and to others. And I said some instances; for as, in observance of the above order, we begin with slow and hectic fevers; you have already had others in the letters before sent to you, either when I took notice of an abscess of the thorax purposely, or even sometimes when I took notice of an abscess of the belly (*k*) in a transitory manner. I will add one example or two here, even without a manifest abscess.

16. A man who was greatly emaciated, and therefore thought by some to have a phthisis, though it seem'd otherwise to us, at length came into this hospital, where he made his exit from this life, after the beginning of March, in the year 1747.

The thorax, the belly, and the head, being dissected, the lungs were found to be found, and the other viscera without any taint, except that the dura mater was very thick, and the brain very lax. And I moreover observ'd, when I was going about to demonstrate some things in relation to the posterior part of the spinal marrow, to the students; that this membrane, the dura mater, could not be drawn off so easily as at other times; and I was even under a necessity of proceeding gradually, in order to separate it from the neighbouring tunica arachnoides, without laceration. However, the skin was very hard in this body, as it generally is in tabid bodies.

17. This hardness of the skin, whether you try it with a knife, or with needles, is very evident; and not only in phthisical persons on whom many have experienc'd it, but in others likewise who have been greatly emaciated, either because no fat remains in the subjected membrana adiposa, by the

(*i*) Epist. 4. n. 9. & Epist. 7. n. 2.

(*k*) ut Epist. 46. n. 27.

unctuousness of which that might be preserv'd soft, or because the flesh is collaps'd, not only for want of fat in the interstices of the muscles, but also for want of humours, which were, in great measure, deficient in their vessels in several places, so that the skin being no longer distended, is contracted into itself, and becomes thicker; by reason of which contraction, and of the rugæ that are produc'd thereby, and these not only very large but very small, the smoothness of it is lost; for thus I interpret Morton (*l*), who speaks of this subject. On the other hand, the skin, when distended by the fat beneath it, is not only shining and smooth, as every one sees, but is preserv'd very soft, as even the confectioners and makers of sausages know, by cutting the skin of hogs flesh into very small parts; since they use the less labour in proportion as the creature was fatter, and the greater in proportion to its being less so. But let us go on to the other dissection, in which, indeed, evident injuries of the viscera, both in the thorax and abdomen, appear'd, but without any abscess.

18. The body of an old man, who had been so emaciated as to be said to have been wasted away by a marasmus, which was the effect of old age, was brought into the college, that I might therewith, at least, make a beginning of anatomical demonstrations, before the end of January, in the year 1741.

In the belly the mesenteric glands were not so minute as they generally are at that age; and not only this, but about the iliac vessels, from the origin thereof quite to the thigh, were a great number of glands, and those very large; so that these vessels were cover'd over with a kind of continu'd chain of them, as it were, some of which were equal in length to two or three inches, being large even in respect to thickness; so as to make it not surprizing, that these arteries should seem to have their parietes somewhat inflected, and in a manner varicose, in consequence of being attended by such glands as these, and press'd upon by them: yet these glands, when cut into, did not seem to deviate from the sound constitution of lymphatic glands.

But the spleen, although rather small in other of its dimensions, was thicker than is natural, particularly in the middle; and besides that the membranous connections, by which it is join'd to the diaphragm, were themselves also become thicker than usual, it had its coat not only thick likewise, in the very middle of its convex surface, but hard also for a space as large as a circle, the diameter of which was scarcely shorter than two inches, would occupy; and indeed in some part of that space it was already bony; and to this coat was annex'd internally, a kind of trunk of a vessel as it were, which was itself hard also, and went into the substance of the spleen. This I also remark'd in regard to the spleen: the artery which went to it was somewhat narrower than is natural, from its origin at the cœliac to the extent of some inches, till, at the place where it began to wreath itself into many flexures, as it generally does, it became wider.

The bladder, which was so distended with urine as to raise itself up above the pubes, had its coats in a thicken'd state; and being compress'd by the

hand, did not easily discharge the urine; nor could all that fluid be press'd out: perhaps by reason of the prostate gland being enlarg'd, and every where protuberating in the cavity of the bladder, about the orifice of the urethra; for what appearances I found in this gland, I have already told you in the forty-fourth letter (*m*).

The thorax and the pericardium being open'd, we found the heart to be destitute of all fat, of an ash-colour in its surface, and not smooth. The great artery had very hard valves: and this tube itself, at a small distance above these valves, was rigid with scales, that lay under the internal coat, and were entirely bony: but the beginnings of these only, or white spots, appear'd in that part of the trunk which is in the belly, and in the iliac branches thereof.

Nor ought a kind of singular disorder of the carotid arteries to be conceal'd: for these had no sooner ascended to one half their length, but they there distorted themselves like a cochlea; and immediately return'd to their original straitness of direction; and so obstinate was this flexure, that, if you extended out the arteries in a strait line, they soon after restor'd themselves to the same state of contorsion, upon the removal of the hand.

19. Having seen these several peculiarities, I was greatly chagrin'd to find that it was impossible to learn any more circumstances in regard to this old man while living, (he having been an unknown pauper) than that he had evidently died in consequence of being consum'd by a great loss of flesh. And whether many of the appearances found in the body after death, were the effects or the cause, or rather both causes and effects, of this wasting, you yourself will judge. Certainly in turning over this section of the Sepulchretum (*n*) you will find, that, in a hectic body (*o*), other glands of the lymphatic kind were increas'd; and that in others (*p*), the heart was not without some disorder, as in that boy even of whom we spoke above (*q*) from Valsalva; not to say in another (*r*), from the section already referr'd to, who, having been brought into a marasmus, had the heart, like our old man, "stripp'd of all its fat," and unequal with rugæ.

I omit other circumstances from whence it might likewise be understood, that the blood, and the humours secreted from thence, could not, in this case, be impell'd in the manner that was requisite, so that a proper quantity of the one and of the others might be daily supplied, and thrust forwards into all the small vessels; for if in the greater part of these, the blood and humours are deficient, the whole body must of course be collaps'd into itself; and on this collaps'd state, if we except the bones and the cartilages, the whole affair of great leanness depends. For all the solid parts of muscles or membranes bear a far less proportion to the blood and humours, with which their vessels and cells are extended, than the common people imagine; so that it would be almost incredible to how little a substance the body is reduc'd, when the fluids are dissipated and fly off, if the most learned men had not demonstrated it by the collection of many experiments. Yet among

(*m*) n. 20.

(*n*) libri IV. Sect. 1.

(*o*) Obs. 16. § 2.

(*p*) Obs. 12.

(*q*) n. 4.

(*r*) Obs. 56. § 7.

these experiments I should think it was less natural to recount that which was made by Lancisi (*s*), with another view, I mean by a long continu'd maceration of the human heart. For with the water, when often renew'd, many shreds of membranes and fibrillæ, which the water has gradually disjoin'd, are thrown away.

However, there is no more general cause of the body being made destitute of blood and humours, and growing lean, than the transit of the chyle thro' the mesentery being made more difficult, whether this difficulty be in the ultimate glands of the mesentery, or in the first, or promiscuously in many of them, at the same time. An example of the former difficulty you will have from Cowper (*t*), who, in a young heifer that was very lean in her whole body, found two of those glands which compress'd the receptaculum chyli by their tumour. And an example of the second difficulty will be given by the celebrated Fantonus (*u*), who, in a man that had been confin'd for many months by a slow fever, found chyle only in the *vasa lactea primi generis*, being retarded, for instance, by the obstruction of the glands; to which those vessels were carried. And many observations of the third difficulty will occur, which you may add, together with those two, to the Sepulchretum.

For even not a few are to be found, merely in the volumes of the Cæsarean Academy, that have been publish'd since the last edition of the Sepulchretum; that is to say, "of the mesenteric glands being totally obstructed and swell'd (*x*); of all the glands of the mesentery being stuff'd up, together with the pancreas (*y*); of the mesentery being fill'd with tumid glands (*z*); of the mesentery being every where crowded with scirrhus glands (*a*); of the chylous vessels being here and there obstructed (*b*);" and these observations were made upon bodies that had been affected with "an atrophy; a hectic fever; on one that was wholly emaciated; on one reduc'd to extreme leanness, which follow'd a slow hectic fever." And indeed, when you twice read, that in an atrophy the mesentery was fill'd (*c*), and render'd unsightly (*d*), "with innumerable steatomatous tumours;" you will scarcely doubt, in both cases, but the glands had been chang'd into those tumours from the stagnating chyle; not to say any thing of the mesentery being found fill'd, after "a slow fever, with little abscesses and ulcers, and that universally (*e*)." But if you choose to think differently, even with my consent, and not suppose the seat of those tumours or abscesses to have been in these glands; yet in so great a number of both of them it could not but happen, that many of the glands, and a great number of the vessels that transport the chyle, must have been compress'd, and the transit of this fluid, in great measure, prohibited; as in the observation also of the celebrated Phil. Conr. Fabricius (*f*), a tumour "equal in magnitude to some

(*s*) De Mot. Cord. Propos. 53.

(*t*) Vid. Aët. Erud. Lips. A. 1699. M. Feb. ad Tab. Cowperi 34.

(*u*) Anat. corp. hum. Diff. 5.

(*x*) Dec. 3. A. 9. & 10. Obs. 218.

(*y*) Cent. 3. & 4. Obs. 119.

(*z*) Aët. Tom. 1. Obs. 59.

(*a*) Eorund. Tom. 4. Obs. 146.

(*b*) Eorund. Tom. 8. Obs. 125.

(*c*) Cent. 6. Obs. 16.

(*d*) Dec. 3. A. 9. & 10. Obs. 214.

(*e*) Dec. ead. A. 3. Obs. 139.

(*f*) Progr. quo Observ. in 3. cadaverib. vers. fin.

“ fist, and scirrhus,” could not exist “ in the center of the mesentery ” of an infant, who died of an atrophy, without pressing upon the *vasa chyli-fera ultimi generis*. And indeed that very experienc’d anatomist (g) has, in another place, the dissection of a woman, who died of a “ slow wasting of “ flesh,” all of whose viscera shew’d no unusual appearance, except that “ the glands of the mesentery had entirely disappear’d.” But he has immediately subjoin’d, that in bodies of this kind, “ unless they are carried off “ by a very advanc’d old age,” (from which this woman was far distant) “ these glands, if not altogether scirrhus, are nevertheless, for the most “ part, found to be remarkably tumid.” And when they are entirely lost, is not the passage of the chyle retarded by this means also; which passage, if they administer thereto by no other means, they are useful in promoting, by diluting with the addition of the lymph at least? And as, when these glands are diminish’d, this lymph is diminish’d also, may we not, in some measure, ascribe the emaciated state of most old men to this cause also, among others? However this may be, as it is certain that these glands do, for the most part, decrease in old men; if in the old man, whose history I have given you, they were not so small as they generally are; it is very probable that this had happen’d on account of their obstruction; and that for this reason, the passage of the chyle being become difficult, the body had sunk away in a marasmus.

20. There is on the other hand, to go on to another kind of fevers, when we wish the bodies of those who labour under fevers to be, in some measure, collaps’d; that is to say, by the quantity or turgescency of the vitiated humours being diminished. And this, I remember, was desir’d by the physicians who were my preceptors, in the case of a virgin at Bologna, in particular; as well as at other times; and that not rarely neither, by all who do not neglect the aphorisms of Hippocrates (h). For this virgin having fall’n into sweats during an acute fever, the acuteness of the fever, indeed, soon went off, but not the fever; of which she did not get entirely rid for more than a hundred days afterwards. However, as the fever did not go off in so long a time, so the face of the patient did not fall much, but continu’d full, and never pallid. Therefore, when the fever seem’d to be, at length, gone, and the virgin had got up from her bed, behold the fever again discover’d itself, as they had expected; and that not slight, nor of few days continuance; till it at last went off, together with that fullness of body, so as to return no more.

I would not, however, from the narration of this case; wherein that sweat may seem to have been of less advantage in taking off the acuteness of the fever, than injurious in producing the fever for so long a time; I would not, I say, have you believe that I am in the number of those who are even more averse to sweats, in increas’d fevers, than, a little before the time we are speaking of, those physicians were to stools, who had frequently observ’d patients of this kind to have been carried off in a miserable manner, from having taken purging medicines. Without doubt nothing is more natural for men, than to avoid one extreme error, and run immediately into another.

(g) Propemptic. ad Dissert. J. B. Hoffm.

(h) Vid. 38. Aph. Sect. 2.

Different regions, different seasons of the year, different ages, different degrees of strength, different conditions of bodies, diseases, and causes, require different treatments. But scarcely any bear violent medicines without danger; and much less if the matter is crude; or, if concocted, it is not drawn to that part "where nature most inclines," to use the words of Hippocrates (*i*), "through the passages that collect it together."

Yet nature does not incline to the same place always, nor in all cases; but to different places at different times; as, for instance, to the kidneys, to the intestines, to the skin. And that nature does verge to the skin, and cures the most violent disorders by sweats frequently; and among these fevers, although that most ancient master (*k*) had not expressly taught it, I nevertheless believ'd that no physicians could be ignorant. However, the flying from one extreme carries even some of the most learned men so far, as to assert, that they cannot find examples of critical sweats, even in Hippocrates himself, in whom Malpighi (*l*) had pointed out so many unsuccessful examples of stools. But these gentlemen have been sufficiently answered by the celebrated Haller (*m*).

And others, though they do not assert the same thing, nevertheless make such objections to those who endeavour to excite sweats, as may make the physician fearful, who studies opportunely and cautiously, that is mildly, to assist nature; which is a little sluggish indeed, but evidently inclining to the skin: as if, truly, almost the same objections might not, with justice, be made against purging, which they so much recommend. Others are, moreover, made averse to sweating remedies, by this consideration, that the first use of sudorifics began, as they themselves say, among the Arabians. So the most advantageous use of the Peruvian bark first began among the Americans: nor are all the inventions of the Arabian physicians to be discommended. And certainly they were not Arabian physicians, from whom Pliny, in so many places of his natural history, has taken the account of roots, seeds, herbs, or other things, which were useful in exciting sweats.

Nor was Andromachus an Arabian: yet from him Galen (*n*) has describ'd an antidote, which was even given to persons who had fevers, "and powerfully excited sweat:" nor did Oribasius (*o*), nor Aetius (*p*), nor Paulus (*q*), come from an Arabian, but from a Grecian school; yet not one of them has omitted to take notice of medicines, by the taking of which internally, sweats may be excited: and, indeed, the two last have written a chapter expressly upon sudorific remedies. Yet I do not say these things, because I think that they are not equally known to the same learned men as to me; but in order to show you, that, by reason of a too great forwardness to disapprove some certain remedies, it now and then happens, that we seem to be quite forgetful of those things whereof we are very well inform'd.

(*i*) Sect. 1. Aph. 21. (*k*) Sect. 4. Aph. 36.

(*l*) Resp. ad Lipar.

(*m*) in Boerh. Prælect. ad Instit. §. 425. not. p.

(*n*) De Compos. medicam. sec. loca 1. 8. c. 7.

(*o*) Medic. Collect. 1. 8. c. 17. & de Virt. Simpl. ubi de Calamintha.

(*p*) Medic. tetrabib. 1. 1. Serm. 1. ubi de ead. & Serm. 3. c. 48. & 157.

(*q*) De Re Med. 1. 1. c. 48.

21. It is, therefore, the business of a prudent physician, in epidemical constitutions of fevers, to adhere obstinately to no prejudg'd opinion; but to observe attentively, of himself, where nature inclines; and not to conclude from one observation, or accidental cure, what ought to be done in other cases. I have seen a woman labouring under a continual fever, who, after blood being taken from her arm, in which I remember there was but little serum, was immediately seiz'd with a much more violent fever, like an accession, or paroxysm; which had hitherto been unusual. And, indeed, this was the true accession of an intermittent, which was succeeded by another on the following day; and within four days the woman was freed from her fever. This accession, therefore, which had at first seem'd dangerous; and immediately succeeded, in so violent a manner, to the loss of blood, prov'd to be salubrious: for the fever, from a continual one, became an intermittent; which went away of itself easily and soon. But that change was fortuitous, and would even have come on without any loss of blood. There is no occasion to add other examples, that are frequently met with in the practice of physic, in order to shew you the intention of what I assert.

However, not only in the event of fevers, but also in the prognostic indications of the event, those which accidentally indicate, ought to be distinguish'd from those that do not accidentally indicate. Among the latter, the common people gladly place even pustules and little ulcers, which happen about the lips; and, perhaps, not without reason. For Albertini also (r) confess'd that these were the marks, or tokens, of *crises*, “which follow “after;” and I have, more than once, observ'd that the event answer'd our expectation: although, at the same time, I remember that, in a very bad continual fever, our hopes were disappointed; notwithstanding they appear'd of themselves, not “after a fright,” and on the fourteenth day of the disease, and “urine was at the same time discharg'd with some little heat:” and why I have made these remarks you will easily know, if you inspect some certain places of the *Commercium Litterarium* (s), which relate to these little ulcers or pustules of the lips. Yet in regard to this sign, I have not so many observations as I would wish.

But another sign, which I had begun to observe by chance, as frequently is the case, has very rarely happen'd to fail, in a very great number of observations: I mean a sign taken from the inspection of the urine. For I continu'd the more attentively, and frequently, to attend to it, from the time I lit on two passages of eminent physicians; which you will see transferr'd into this section of the *Sepulchretum* (t), although for some other reason; I mean of Joubertus and Gradius: Joubertus, I say, for the words which are copied there, as if from Schneider, are not the words of that author, but of Joubertus, who is expressly quoted by him in his treatise on the gout, in the first book and sixth chapter; in which manner Schneider ought to have been quoted; and not “in the chapter on the gout:” and in another place, at least, of the *Sepulchretum* (u), where I have observ'd that the greatest part

(r) in Opusc. de Cort. Peruv. Tom. 1.
Comment. de Bonon. Sc. Instit.

(s) A. 1745. Hebd. 31. & A. 1739. Hebd. 28.

(t) Obs. 40. & Schol.

(u) l. 3. Sect. 25. in Schol. ad Obs. 14.

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of a certain scholium is taken from Schenck (x), those words are attributed to Joubertus. This author, then, has asserted, “ that in many patients who “ have fevers, (and especially when the disorder has been brought to a crisis) “ small sandy particles are copiously discharg’d with the urine; without any “ nephritis being present, or having preceded.” And Gradius had formerly taught, that sand “ appears in the decline of fevers, and after long fevers;” but that they are easily distinguish’d from those which prove the existence of calculi; “ because if they are compress’d and rubb’d betwixt the fingers, “ they are readily dissolv’d.”

Moreover, I have not only in fevers, whether they were vernal or autumnal, in summer or in winter; whether intermittent or continual; whether benign or malignant, or join’d with petechiæ, or of a middle nature betwixt them; or sometimes very slight, long or short; whether in children or young men; whether in men or women, and these some of them pregnant; or, finally, whether in those that have their origin from more frequent, or more singular causes; as for instance, from a corrosive poison being accidentally, or purposely, taken; I have not only, I say, in fevers, but also in some other disorders disjoin’d from fevers, and particularly in severe pains of the head, and some apoplectic affections, sometimes even “ in those of old persons, observ’d, that as often as these sandy particles appear’d, the fever was in fact either at an end, or very near to an end: but not unfrequently when it had not as yet begun to decline, or if it had begun, when it did not go on so evidently to decline as not to leave the event still more doubtful than I would wish.

And as in the end of the disease, or in the decline, that is already certain, and becoming more considerable every day, they have confirm’d the victory of nature; so before the beginning of the decline, or in a decline, which is still doubtful, they have, for the most part, portended the same victory: for either the disease has happily gone off altogether, or if a relapse has follow’d, it has been so much the slighter and shorter. Once only, as I have already told you (y), to a dropsy, which had follow’d a fever, and gone off, other violent and not very short disorders, but those also of such a kind that the patient recover’d from them, succeeded. But once, in all, the death of a patient was the consequence of an autumnal malignant fever; which patient I never saw either before or after that one day; so that whether he was taken off by the fever, or by some error committed afterwards by himself, those who were about him, or by the physician, I do not certainly know; nor yet whether those sandy particles had been observ’d during the whole time of the disease, or had appear’d on that day for the first time.

Nor do I speak of those which appear always, but of those which begin to discover themselves only when the vigour of the disease is approaching near to a decline, or when the decline is already begun, and “ adhere to the “ surface of the urinal,” as Gradius says (z); not “ of the urine,” as you will read it falsely copied in the Sepulchretum (a); where not even the book

(x) Obs. Medic. 1. 3. ubi de Ren. Symp-
Obs. 5.

(y) Epist. 8. n. 10.

(z) Prax. in Non. Almanfor. tr. 3. c. 14.

(a) in Schol. cit.

in which he has said these things is pointed out. That is to say, looking at the urine in a very clear light, you will observe thin sandy particles adhering to the sides of the glass chamber-pot, and sometimes swimming on the surface at the same time, reddish for the most part, whitish very seldom; such as I remember to have seen in a certain young man, when a fever that was malignant, and attended with petechiæ, began to decline.

22. What I have mention'd of this young man, brings back to my mind, that the blood, which in his disorder was taken away at four different times, at one time by the lancet, and at another by cupping-glasses; besides that it was more fluid than it ought to be, or had its crassamentum very soft; had, at the three last times of being taken away, the coagulum surrounded with a serum, which was of a white colour, as if from chyle being mix'd with it. Which I should not have taken notice of, if I had seen it in a person who was well-nourish'd; as I have at other times, and at a certain hour after taking food.

But in the following month, the blood which was taken away from another young man also, on the third, and again on the fifth, day of the disease, show'd at both times a whitish serum, in small quantity indeed, and even in all only a few drops on the third day; while the crassamentum was hard, and cover'd over with a crust of a moderate thickness: whereas on the fifth day, the coagulum was softer than it ought to be, and cover'd over with a crust not less thick than itself; not being hard however, but so tenacious, and resisting division, that you could scarcely cut it with a knife. Yet this second young man labour'd under a fever, which rather inclin'd to malignity, than was really malignant; being not only much shorter than that former, but more slight, and without danger. However, in those malignant fevers wherein these sandy particles appear'd, I neither saw a whitish serum nor a very soft crassamentum; but even this last sometimes more hard than it naturally is; and I even saw it very hard in one person, in whom it us'd to be very soft at other times.

I remember besides, that when two physicians of this college, of whom I was one, were consulted by order of the supreme magistrate of Venice, upon pestilential fevers that rag'd in that part of the territories of Padua which is about Montaneana, (for so some call it now, though Peter Bembo (*b*) call'd it Montanianum) we were inform'd, that although in the beginning the blood of the patients was, for the most part, dissolv'd in too great a degree, and at that time appear'd to be too much coagulated; yet, in both times of that constitution, the petechiæ had discover'd themselves; and even at this time, if any persons happen'd to have the blood dissolv'd, these had the petechiæ produc'd in the same manner as the others: so that it was natural to conceive of this malignant power, (which the communication of the disorder by contagion show'd to consist in a very small quantity of subtle matter) since it operated in one and the same constitution of air at the same place and time, as being in fact one and the same; but that the blood being in a different disposition or state in different persons, appear'd to be differently vitiated in different persons.

(*b*) *Rerum Venetar. Histor.* l. 9. & l. 10.

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And as the evident vitiated state of the blood was different in different persons, or brought on some symptoms differently in different persons; so it plainly appear'd, that either different remedies, or a different use of the same remedies, were requir'd in different cases; yet that there were both some symptoms, and some remedies, which were common to all, although the former were much more known than the latter: for who would believe that he could, in any measure, conjecture the peculiar nature of that malignant power, or energy, by which every one was infected, except from those things that were observ'd to be commonly advantageous or hurtful to all? And even if these fevers were not altogether pestilential, could any one think here, with a celebrated writer in the medical science, that the strength of the patients was not overwhelm'd by the malignant influence, but by the quantity of blood, since such causes had preceded as tend to diminish rather than increase it; and experiments, which had been more than sufficiently repeated, show'd blood-letting to be pernicious.

23. It is, therefore, natural to suppose, that with the malignant power is join'd a solution or coagulation of the blood; but that the malignity does not consist in either of these qualities, especially as we see one or the other of them in so many disorders which are not malignant. However, where either the one or the other is very considerable, and has symptoms join'd to it by which the malignity is shown; as, in particular, a speedy and very great prostration of strength and vital power, which can neither be attributed to evident foregoing causes, nor to an excessive quantity of overwhelming blood; this quality also, as one that is very frequently join'd with malignity, and adds violent symptoms likewise thereto, will, in some measure, be a proof of this malignity; as you will find in many observations, and even in that which I shall subjoin from our Mediavia.

24. A woman, of fifty years of age, being very evidently seiz'd with a malignant fever, was brought into the hospital. Her pulse on the six first days was very small and obscure, though it seem'd afterwards to be a little more lively. But a very great streightness in respiration, and a palpitation of the heart, coming on, the woman was carried off thereby within the space of two days.

The thorax, therefore, only being open'd, the blood was found to be half-concreted in the left ventricle of the heart; and in the right, it was not only so collected together as to distend that cavity, but the whole of it was so crowded together into a polypous concretion, that although this seem'd to be fleshy, when you look'd at it, it nevertheless resisted the knife when you attempted to cut it, in the same manner as the most tenacious and viscid crust that gathers upon the blood of pleuritic patients.

25. If you happen to ask me whether acids, as the same persons imagine, bring on the cause of concretion, or, as is more commonly said, of coagulation, in the blood; or whether, although some acids bring it on, all of them are capable of bringing it on, as it seems to others they are not, or of continuing to produce it; I shall say that there may be other causes besides acids from whence the blood may coagulate, and shall, at the same time, add some of my observations, which were made with attention, and close inspection, upon the blood that had been taken from patients by venæsection.

And,

And, first, although I have lit, more than once, upon blood which exhal'd a kind of nauseous and acid odour, and; if I may so speak, a kind of vague acid, or *acidum sylvestre*; it never happen'd, though I have been oblig'd to let blood in many malignant disorders, that I found any thing of an acid odour in that blood. But I found it in a woman who was affected with a continual summer-fever, and in a man in like manner, and in a boy of six years old, who were troubled with vernal intermittent tertians, of a mild nature like the former, in different years, in all of whom, for some reason or other, it was necessary to open a vein.

In the boy, indeed, the crassamentum was hard, and had very little serum: it was moderately firm in that woman and in the man; and in the latter with rather a little serum, and that of a yellowish colour. In which man it happen'd, that, though I had observ'd this odour on the fourth hour after blood-letting, seven hours after that I could scarcely perceive it; which was a pretty clear proof, that the cause of this consisted in particles which were more easily dissipable than in the blood of the others, in which I perceiv'd it after ten or twelve hours in a strong and vigorous state. And not only in those of whom I have spoken: for even where there was no fever, as in a severe and recurrent pain of the head, and in a scabies in like manner, there was the same odour of the blood, which abounded with a great quantity of serum around the crassamentum, that was cover'd with a thin and tenacious crust. In him, however, who had the pain in his head, the crassamentum was not so thick and black as in the scabious man; although both of them were scabious. But lest you imagine that in all those who are troubl'd with a scabies the blood emits an acid odour, I can assure you that it did not in others, and particularly not in a nobleman of the first rank, in whom a scaly disorder, that had eroded the skin, was unadvisedly repell'd at that time, from which he suffer'd much, his blood having a very tender and diffuent crassamentum beneath a very tough and thick crust. And, indeed, in the case of that same scabious patient whom I mention'd in the second place, although he had blood taken away four times within five months, no acid odour proceeded therefrom more than once.

But let us now say no more of a disorder of the blood of this kind, which is, as you see, not very rare, in order to consider one much more rare, which was perceiv'd at Padua ten years ago, and not by the faculty of smelling, but of feeling.

26. Catherine B. the honest wife of her honest husband Joseph, being a woman of a middle stature, and of a sanguineous temperament, so that her menstrua had begun when she was in her thirteenth year, and not in a small quantity, and continu'd to flow in the same or in a larger quantity every month after, even when she gave suck, and generated a great quantity of milk after her first and second time of child-bearing; for she brought forth twice; and notwithstanding she labour'd under an inflammatory fever every year afterwards, both in spring and autumn, and that for twelve years together; although she often lost blood on account of this fever; and even though the first of these fevers was succeeded by so great a hæmorrhage from the uterus, that being carried on beyond the eleventh day, it brought on a great weakness of the pulse, that was also follow'd by a jaundice, which was

at length carried off after two months by a great discharge of urine: this woman, then; whose habit of body and general diseases I have mention'd thus far, and am about to mention those that follow'd, for the reasons which I shall hint at when I have finish'd the narration; being in her nine-and-twentieth year, receiv'd the sudden and unexpected news of a fatal accident having happen'd to her most dear brother; and though she 'was in other respects of a fierce and intrepid mind, she immediately swoon'd away.

On coming to herself again, she perceiv'd that her menstrua, which she happen'd to have at that time, had been check'd; but on the next day she saw them again, not having the same appearance as before however, but being like water in which fresh meat has been wash'd: and discharges of this kind return'd at stated times afterwards, through the course of some months. For this reason blood was taken away more than once, and soon after often, in a very violent fever that came on, and was at length carried off by a sweat. However, after these things the menstrua return'd to their former nature; nor was a double tertian continual fever, which return'd every year in the spring-time, and that for the space of ten years successively, any obstruction thereto, notwithstanding this fever was not carried off but by repeated blood-letting, and the exhibition of the Peruvian bark.

After these ten years, she was attack'd in the summer with fevers almost of the same kind; but with these she was afflicted more severely and more dangerously, because they had violent pains of the whole belly join'd to them, and a uterine hæmorrhage, which was, for the most part, more increas'd when the pains were grown a little milder. Every method was made use of to counteract these symptoms, and, among others, blood-letting was six times repeated; and the serum of the blood was of a saffron colour, the crassamentum hard, and cover'd over with a polypous crust. But although both the fever and those symptoms were sometimes diminish'd, and sometimes, to all appearance, remov'd; yet an end was not put to them all, but by the *hæmorrhagia uteri* itself, which return'd in a greater quantity than ever on the forty-fifth day after the fevers had begun. Nevertheless, the patient soon grew well, and grew well in such a manner, that, after the completion of five-and thirty days from the last hæmorrhage, the menses returning in a moderate and natural degree, and always continuing to flow at the proper time, she pass'd twenty months in extremely good health. But after that, in the summer of the year 1749, she had frequently, by reason of a great thirst, drunk a considerable quantity of water, without any uneasiness of the stomach, which she could by no means bear in former years, even when she had a fever; and in the autumn that follow'd, by reason of external causes which were very evident, and affected the body with fatigues, and the mind with anxiety, had been troubl'd with a nausea of the stomach, watchings, pain of the head, and lassitude; this symptom was added in the succeeding winter, that though her thorax and head were very hot, the belly and the lower limbs were cold, nor could be sufficiently defended from the cold by clothes, or any other preservative whatever; and, in like manner, that she was seiz'd with a horror, which crept over her back after dinner, and still more in the night-time, when she turn'd herself from one side to the other: and, indeed, if she got any sleep, she was awak'd by tremors and sudden terrors; although
some

some diurnal terrors were not wanting, which, certainly, were the consequences of a false imagination, through the effect of which she every-now-and-then fell into a swoon.

From hence all the symptoms last spoken of were increas'd every day, a sense of internal oppression was troublesome to her, and her head in particular became so heavy and subject to a vertigo, that the woman had need of a support in order to prevent her from falling. She was then in her three-and fortieth year, when she sent for her physician, who was our Mediavia, and had been now for four years; and to him, on the seventh of May, in the year 1750, related all these things; and this, moreover, which in a woman of that kind is worthy of peculiar remark: that her menstrua, which, as we learn from what has been said above, had always been in a great quantity, and which in the last summer had not been diminish'd, although they flow'd twice in each month, and us'd to be pretty hot, and even extremely hot, had now not only begun to be diminish'd in their quantity, from the time she had been thus affected, but had begun to be discharg'd in a cold state, and, last of all, had even come away quite cold.

Upon hearing this account, the intestines, which in this patient had always been subject to costiveness, being immediately open'd in a mild manner, blood-letting was order'd; but the blood running down the arm slowly, and not coming forth with an impetus, a circumstance which gave rise to this my prolix narration, was observ'd by the patient, and at the same time by the surgeon, who was a man of approv'd credit and veracity, Daniel Fasolati, to the great astonishment of them both; I mean, that the blood, the violent heat of which not only the patient herself at other times, but the surgeons, when holding in their hands the glass-vessel in which the blood was receiv'd, had been surpriz'd at, came forth now in such a state of coldness, that the patient complain'd of ice (for that was her expression) flowing down upon the bending of her elbow; and the hand of the surgeon was affected with the coldness. The serum of this blood was in small quantity, and of a yellow colour; the crassamentum black and viscid. And that which in the evening was taken from the foot, had the same kind of coldness, and almost the same nature.

As there was scarcely any advantage gain'd by this treatment, and by some medicines which are call'd cardiacs; the physician did not hesitate, and particularly in a woman of this kind, in order that the blood might be rous'd to a more brisk motion, to take some from the arm and from the foot at the same time, on the following day. And the success corresponded to his wishes. For not only the blood was discharg'd in a less cold state, but while it was discharg'd the woman said that the sense of oppression was taken away; and a little fever coming on in the evening, in the night the inferior parts, which had always been cold and stiff in the preceding months, grew a little warm; and in the morning the fever remitted, and soon after left the patient entirely. After this she continu'd well ten days: the lower limbs being warm, and the pulse, which had been before hard, small, and low, and gave no resistance to the compression of the finger, being now chang'd for the better, in consequence of the oppression being remov'd; and the urine itself,

which had been before discharg'd, not only in a large quantity, but in a crude and limpid state, returning now almost to its natural quantity and colour.

27. Now take the remainder of the narration; for I do not think it sufficient to have related what had preceded and accompanied an affection of the blood of that kind, except all things be taken notice of, or, at least, down to a certain time. At the end of the tenth day, then, that part of the metatarsus of the left foot which answers to the great toe, was attack'd with a pain that was of very short continuance indeed; so that, as it attack'd her once on the first day, and thirteen times on the following day, it recurr'd five times within half an hour, and went off in such a manner, that, a little after, on the very same day, the woman could go from home almost without any inconvenience; except that, as she was returning, she fell down suddenly, without any external cause, on the right side, and did not rise up without being assisted by the hands of other persons.

She, nevertheless, return'd home; and there the pain attack'd her, first, in a slight manner; but on the day following was so acute, together with a great fever, and so continual, as to trouble her the whole of that day, and not to go off without the administration of opium. On the next day she was free both from pain and fever, so as to rise up from her bed in a good state of health. But on the succeeding day, she was seiz'd with a violent convulsion of the chest and of the thorax. After that, she was afflicted with a fever and pain, to which a very violent convulsion was added; these symptoms growing milder sometimes, even to the space of three days; but, at other times, persevering, or growing stronger, in such a manner, that it was scarcely in her power to draw her breath, and, finally, that her head was oppress'd by a deep sleep.

From the time of that first convulsion the disease was contend'd with, for eleven days, at one time, by giving the fresh-drawn oil of sweet almonds; at other times by antispasmodic powders, of the same kind as those that have their name from the marquis; sometimes by cinnabar; sometimes by opium, which in the middle course of the disorder was left off, as it had been found to be of no effect when given to the quantity of two grains; and often by venæsection, that is to say, once in the arm, twice in the hand, three times in the foot; the last blood that was taken from thence having almost taken away both that sleep and convulsion, leaving the fever behind: and this fever discover'd itself every morning by a thirst, and was attended with a pain of the head and stomach, till it reach'd to its achme; these symptoms afterwards ceasing, and the fever itself remitting to such a degree, that in the evening scarcely any was left, and the patient slept well in the night. And after this fever had continu'd some days in the same manner, it was quite remov'd by the Peruvian bark, taken to the quantity of an ounce, divided into several doses. Three years were pass'd over from this time without any inconvenience that was worthy of remark. But afterwards, the pains, fevers, convulsions, and other symptoms of that kind, return'd, though always slighter than the former, and more easily giving way to large blood-lettings.

And to these things, which had now been committed to writing a long time before, I thought proper to add the following, which I receiv'd by strict enquiries

enquiries from the same woman, about the beginning of the year 1760, when these letters were copied : That, in the year 1758, which was the fifty-first of her age, she at length began to be without her menses, which to that time had continu'd to flow, not only very plentifully, but of a bright-red colour : nevertheless, that she had been very well, and was still so, except that she had an almost continual sensation of ice, as it were, in her belly ; and as this ascended from thence to the chest, it brought on such a difficulty of respiration, that she was immediately oblig'd to lose blood, and that to a considerable quantity. Nor is strength wanting to bear this, as the woman still preserves both a good habit of body, and a good colour of countenance.

28. You have here the whole history of an affection of the blood, which is not less to be wonder'd at than what you read in Lower (*c*), of this fluid being almost wholly effus'd by a very great hæmorrhage, and at the same time restor'd by taking plentifully of broths now and then, and at length being discharg'd in a state more similar to broth than to blood ; the man not only living, but perfectly recovering : you have, I say, the whole history, from the medical journal of our Mediavia, given in a prolix manner indeed by me, but, as I apprehend, not without some utility ; since in proportion as things of this kind are more difficult to be explain'd, we ought to endeavour so much the more that no part of the history be unsupplied to those who may undertake to explain it, contrary to what is generally the case in other observations of this kind that I have hitherto lit on.

For, to omit what our Spigelius (*d*) has said “ of thick and cold blood,” which he saw coming forth from a vein that was open'd in persons who had drunk cold water after being very hot, and not without difficulty, as he seems to suppose it to have been made more dense and thick, within the adjacent great artery, from the cold of the œsophagus, rather than to have been actually cold ; certainly the observation which was formerly propos'd in Riverius (*e*), of a woman very liable to anger, who died within the fifth day after blood-letting, we are so far from knowing what causes had preceded, or what symptoms accompanied that continual fever under which she then labour'd, that Thomas Bartholin (*f*) was oblig'd to conjecture by a kind of divination, if I may be allow'd so to speak, that a perpetual horror had accompanied this fever.

As to Peter Borelli (*g*), he thought it sufficient to say, that a commander of horse, “ when he had a vein open'd in a disease, had discharg'd his blood “ in a cold state :” so that we are not even told under what disease he labour'd, or who had been witness to the circumstance. And he likewise adds such an explication of the phenomenon, that makes it seem surprizing, not that the same circumstance had already happen'd sometimes, but, rather, that it does not happen always, or much more frequently at least. Finally, Gabriel Clauderus (*h*), producing another explication, according to which this circumstance ought to happen always or generally, in the most violent apoplexies, says that he had observ'd the same thing as Riverius ; that is, he had observ'd, in two matrons who were seiz'd with a violent apoplectic pa-

(*c*) Traët. de Corde, c. 2.

(*d*) De hum. corp. fabr. l. 6. c. 2.

(*e*) Obsc. communic. 46.

(*f*) Cent. 4. Epist. Med. 47.

(*g*) Cent. 2. Med. Phys. Obs. 51.

(*h*) Eph. N. C. Dec. 2. A. 4. Obs. 138.

roxyfm, the blood, which flow'd from a vein that was open'd, to be cold, he having felt it so in his hand immediately upon its being discharg'd; yet that he had restor'd both of them to health, by applying, externally and internally, medicines that were loaded with volatile particles.

But from the vein of our woman the blood did not leap forth, but flow'd down slowly; so that Clauderus might have accommodated his explication, such as it is, with somewhat more ease to this woman. The same author subjoins (*i*) observations of the blood dropping from the nostrils in a cold state, and of the urine being discharg'd in the same state of coldness. But if it had happen'd that he had written later, he might have added others, not only of the urine being discharg'd in a frigid state; as, for instance, by a soldier (*k*), and by a boy (*l*), both of whom were oppress'd with a malignant fever, the latter, moreover, being universally cold; and also of a foetus being discharg'd in a cold state, not only when already dead, and from a mother who was already cold, and who died soon after, that is, within an hour (*m*); but also of a living foetus (*n*), and from a mother who liv'd, having "the most intense coldness" in its whole little body, and "a rigidity which was quite unusual, and almost like that of wood;" so that from its birth to the end of three days, during which time it liv'd, if it had not breath'd in the slightest degree imaginable, it would have been consider'd by every one as a foetus quite dead.

Nor would Clauderus have omitted the example of that illustrious woman (*o*), in whom, "for some days before death, the expiration had always been extremely cold;" and after she was dead, though both lobes of the lungs had "scirrhi and vomicae in great plenty," the left was found to be "excessively cold to the touch, and like ice; yet such a coldness as this was not observ'd in the other lobe of the lungs, nor in any other part of the body." But we will set aside the consideration of those that were dead, or near to death, and will compare with our woman, who was herself preserv'd, those only that it was in the power of Clauderus to save, notwithstanding cold blood distill'd from the nostrils, or cold urine was discharg'd. And there is no doubt but in our patient the menses had been discharg'd in a cold state; although there is a considerable difference betwixt the blood which flows immediately from an open'd vein, and that which falls out by drops into the cavities of the nostrils, or uterus, and vagina; and at length betwixt the blood immediately flowing from a vein, and a fluid which, after being secreted from the blood, flows down through a very long passage: so that it is somewhat less difficult to understand how these discharges could come away in a cold state, than how the blood could be cold in a vein.

If the upper parts of the body had been cold in our patient, at that time, also, as well as the lower; it would, perhaps, have come into the mind of some person to reply, that, as the remaining part of the blood which flow'd through the internal parts of the viscera was, by this means, sufficiently warm and proper for the preservation of life, that only which was carried through the external veins, and lay immediately under the skin, could be cool'd by

(*i*) Ibid. Obs. 139, & 140.

(*k*) Earund. Dec. 3. A. 9. & 10. Obs. 206.

(*l*) Act. N. C. Tom. 1. Obs. 34.

(*m*) Eph. N. C. Dec. 3. A. 5, & 6. Obs. 80.

(*n*) Earund. Cent. 9. Obs. 30.

(*o*) Commenc. Litter. A. 1743. Heb. 21. n. 4.

the coldness of the skin. But there is no room here for this explication, whatever its consistency may be in other respects. For not only the upper parts were hot, but the woman would not have complain'd of the coldness of the blood which flow'd down, unless the skin had been less cold.

You then, as you are an ingenious enquirer, will consider by what means it can happen, not only that the blood may sometimes be such as it is in fishes, but colder in living men, and men who are likely to live. But I, for whom it is sufficient to have given you the history, with very great fidelity, and to have compar'd it with others, must go on to other things, which, although they are not of so surprizing a nature, this history has, nevertheless, brought back to my remembrance.

29. When I resided at Bologna, a certain honest man was every day seiz'd with a coldness, which, although no heat follow'd it, one out of two physicians consider'd as a fever; and the other, because the patient fell down when seiz'd with that coldness, chose rather to consider in the light of a vertiginous disorder. He was cur'd by the use of the *carduus benedictus*, and the *spiritus salis ammoniaci*.

I also remember that a woman, who was fifty years of age, and was taken into that hospital of St. Mary de Morte, was seiz'd every night at a certain hour, with a coldness and trembling, which continu'd till the morning, being attended with a pulse which was somewhat more obscure than usual, but not more frequent, nor with any other inconvenience, nor yet follow'd by a febrile heat. And indeed her feet were continually cold, and often at other, though uncertain, hours, she was likewise seiz'd with a short coldness, trembling, and obscurity of pulse. The disease having been in this state already for twenty days; by giving the Peruvian bark those erratic rigors first of all disappear'd, and the periodical remitted: at length the latter ceas'd to return also, and left the woman quite free from disease.

But these symptoms seem'd to me in fact to belong to a fever *sui generis*. Other tremors, however, which were very similar to febrile tremors, but not join'd with coldness, and still less succeeded by any heat, and which I know to have attack'd a nobleman, a fellow-citizen of mine, every other night, I have referr'd to another place, and saw them remov'd, by a considerable quantity of urine being discharg'd spontaneously, and by a considerable discharge from the intestines, by the help of a mild medicine, without the use of this bark: although that some periodical affections, if they are febrile, are often dissipated without this remedy, nobody is ignorant; and if they are not febrile, are sometimes overcome thereby, as has been remark'd by many.

30. But that by the use of this bark (if you except some constitutions wherein it has seem'd not to answer so well) periodical fevers are put to flight with much greater certainty, if it be taken in the quantity, and at the time, that is proper, whether they intermit, or are already, from intermittents, become continual, and whether they are mild, or malignant and pernicious, I suppose is now well known, almost among all persons; since even some of the physicians of this country, whom formerly fear, and I know not what kind of aversion to the bark, deterr'd from the use of it, might have been brought into a better opinion thereof, by the many happy and speedy cures which

which they have seen perform'd even by me, with the assistance thereof, many years ago; and those also upon persons of rank and figure.

But the notice of the proper time, in which this remedy ought to be exhibited, may sometimes escape the physicians, not so much from their carelessness in foreseeing the danger at hand, as by chance; in the same manner that it happen'd in his eminence the cardinal Giovanni Francesco Barbadici, whom the most pernicious febrile paroxysm almost carried off, before it could be known that he was attack'd with a periodical fever.

The case is, of itself, certainly worthy of observation, and not only because it happen'd in a man of eminence, whose last disorder I have already describ'd to you (*p*). For having shut himself into his chamber immediately after dinner, and not open'd the door at the usual hour; the servants at first suspecting nothing, except that he was detain'd, longer than usual, by his holy prayers and meditations, or by reading, were quite unalarm'd; but afterwards, when it began to grow late, they suspecting some disorder, at first knock'd at the door gently, and after that, as nobody answer'd, more strongly, but all to no purpose, though they call'd out to him at the same time; at length, getting in at the window, they found their master lying speechless, without sense, and without motion. A physician being immediately call'd, he found, besides these disorders, which however remitted more and more, convulsive startings of the tendons, and a fever. And this fever alone continu'd, all the others having gone off of themselves, within less than an hour.

The following day, in the morning, Vallisneri and I were call'd to the patient. We enquir'd of what nature, and from what cause, that very sudden, and very violent, disorder of yesterday had been; which a fever, as it seem'd, had carried off. The physician told us, that not many days ago, an erysipelas had appear'd in the patient's face. But that, probably, from the inclemencies of the air; for it was then the autumn of the year 1729, and the patient being more solicitous about his episcopal duties, than about his own health, would never confine himself to bed, nor keep himself within his chamber; it had been repell'd inwardly, and had suddenly disappear'd. That he had seen only the termination of yesterday's disorder: and as to the manner of its attack, this even the patient himself did not know, as he had neither been sensible what had then happen'd to him, in those many hours, nor remember'd any thing now, except that feeling himself cold, as if from the season, he had gone to bed. The same things were confirm'd by the patient, whom we found, as usual, in a chearful and attentive state of mind, his fever now growing slighter and slighter, and there not being the least trace of the symptoms he had undergone the day before. Although we doubted, for more reasons than one, to what disorder we should, with propriety, refer these symptoms; yet that something monstrous was cherish'd within, not only the aphorism of Hippocrates (*q*), but reason itself also, did not suffer us to doubt.

In compliance with the one and the other, therefore, until some more clear

(*p*) Epist. 13. n. 3.

(*q*) 25. Sect. 6.

light should be thrown on the case, we readily granted, and assented to, the first physician's opinion, who was a man of eminence, and beyond a doubt experienc'd; I mean, that the matter of the erysipelas ought to be again thrown outwards, in order to prevent its bringing on the same danger afresh, which it seem'd to have brought on before; and this the physician had already attempted, by giving such things as might propel the matter to the skin, without exciting any tumult in the constitution, and had made nature obedient to him so far, that a nocturnal sweat, and some moisture of the skin, at present, were the consequences. And, indeed, in the whole of that day, there was nothing new that we could observe. But on the succeeding night, behold a febrile paroxysm came on, which however, except some convulsive startings of the tendons, shew'd nothing violent till noon. At which time, at length, either the same, or rather another accession, produc'd such a number of dreadful symptoms, that we were all sent for immediately. We found the patient incapable of speaking, and totally insensible, having a stertor, and a very difficult respiration, and being altogether like an apoplectic person, except that he was continually agitated by a *subsultus tendinum*, and had a very obscure pulse, which gave no resistance to the finger, when press'd upon it.

Then, indeed, it was evident with what disease he had been seiz'd three days before, and that this was another accession of a most dangerous tertian fever, which, as it answer'd to that first paroxysm in the hour of its return, corresponded also therewith in its violence, and in the number of its symptoms, or, indeed, rather outstripp'd it. Nor was there any hope of retarding the threatening danger, by what we could then apply only to the external parts, as all the terrible symptoms which we just now mention'd, grew stronger and stronger, before our eyes, and under our hands; so that, of all those who saw the patient, and a great number of persons did see him, there was not one who did not look upon it as certain, and pronounce it through the whole city, which was struck with the unexpected disorder of their excellent pastor, that he would very soon die.

And although I was very much under the same apprehension; I, nevertheless, said that some little hope remain'd, if this accession, like the former, should remit, if not at the same hour, by reason of its greater violence, at least an hour or two later. I therefore enquir'd of my fellow-physicians, who departed about evening, as from a person that they totally despair'd of, whether, if the disorder should remit, they could suppose there was any objection to my giving the Peruvian bark; to which they answer'd that they should readily assent, provided no blood should, in the meanwhile, have begun to adhere obstinately, either in the brain, or the lungs.

Within the first hours of the night I perceiv'd that the pulse, by degrees, became not quite so bad; and that some sweat appear'd: after that I found the patient come to himself by very slow degrees; and within that night, on which I would not return home, all the dangerous symptoms totally vanish'd: so that, early in the morning, the power of swallowing being restor'd, and the fever being brought to a proper remission, there was now room for a remedy. And this I had previously order'd to be prepar'd, as I always do in very violent cases of that kind, agreeably to the practice of the

most eminent physicians, from the same bark; yet not such as the appearance of, only, recommended to the senses by a mark that is sometimes fallacious; but such as it was certain intermittent fevers had been put to flight by the use of; and I gave half an ounce of it in the first draught: the remainder, which was three times the quantity, I distributed into much less parts; to be taken at proper intervals. And by this means I obtain'd my purpose of preventing the return of the paroxysm; which would, without doubt, have carried off the patient; who was almost killed by the second.

But even the second would never have come on, if it had come into my mind to do the same thing in the remission of the first. This, however, did not come into my mind; as we consider'd only the erysipetulous matter being thrown inwards, as it certainly was; and not the fever: for who could have guess'd that this fever had not follow'd those very violent disorders, as generally happens; but had preceded, and brought them on, and was periodical? as no one had seen the beginning of it; nor any fever of this kind had been observ'd at Padua at that time; although in those days, as we afterwards learn'd, the same fever had been observ'd in a city not very distant, and had carried off an illustrious patient, in whom the use of the bark had been deferr'd for a fit or two. Wherefore you, for whose sake I have given this long narration, if a case of that kind happen to you at any time, the beginning of which is unknown, although the cause may seem to be manifest; will by no means suffer yourself to omit enquiries into the nature of the fevers which prevail at that time; for it will not always happen to you, as it did to us, that it will be in your power to cure the patient, in whom you have let slip the remission of so dangerous a paroxysm.

31. Nor would I have you suppose that the patient, if he be not an old man, will be free from a fever of this kind, because learned men have now thought proper to call it "the soporific intermittent fever of old men." For although it happens more frequently in that age, and the cardinal, of whom we have been just now speaking, was more than seventy years of age; as also the noble count M. Antonio Trento, whom I had cur'd by the same remedy, when in the same state of danger from a like fever five years before; and that without either of them, which is not so common, relapsing into the fever: yet Morton (*r*) has also describ'd the case of a boy of ten years of age; and Torti (*s*) of a girl of a tender age; not to mention another who was not perfectly grown up to womanhood, and who labour'd under fevers which he call'd "lethargic."

I likewise would not have you be without fear of a soporific disorder coming on in the future paroxysms, or future parts of the paroxysm, because patients have pass'd through the first paroxysms, or the first part of any paroxysm, without that profound sleep. For although it frequently comes on before, and indeed long before, yet it now and then comes on at length in the seventh paroxysm: and although it is in the first attack of the paroxysm

(*r*) Pyretolog. Exerc. 1: c. 9. Hist. 25.

(*s*) Therapeut. Special. ad febr. period. pern. l. 4. c. 3. Hist. 9. & 1.

that it generally comes on, as Sydenham also (*t*) shows; and that time, according to the dissections made by Harvey (*u*) of those who died in the beginning of the fit, is very convenient for the obstruction of the blood: there are not wanting, nevertheless, examples of a deep sleep coming on, not only at other times of the paroxysm, which is not uncommon; but what is very rare, when the fever is declining; one of which kind you will see taken notice of in the *Commercium Litterarium* (*x*).

Here you will, perhaps, wish for some marks, whereby to judge, while the fever does not seem to differ from the mild kind, that this dangerous symptom is about to come on. And the same thing has been wish'd by others, no less than to know, whether any one had observ'd fevers of this kind before the year 1731. And they might easily have both their wishes fully completed, by the reading even of one author whom I have quoted; I mean Torti. For as he had transferr'd what was written before the end of the sixteenth century by Ludovicus Mercatus; and again before the end of the seventeenth century by Richard Morton, upon dangerous intermittent fevers, into his celebrated *Therapeutice* (*y*), not without the addition of scholia; he has handled the subject in such a manner, as to inform every one who reads his works, that Hippocrates, and many of the ancients, were not ignorant of intermittent fevers being sometimes made malignant and destructive (*z*); and, at the same time, from what signs Mercatus has, in general, taught us to understand that these will be of a dangerous kind (*a*); but particularly to fear in those whereof we speak; lest, “in the third or fourth accession, a deep sleep, or some other of the soporific affections, become perfectly essential to the fever (*b*).”

Nor, indeed, ought those signs to be pass'd by which Torti has propos'd, both in general and particular, from his own observation (*c*); and has confirm'd by the production of histories, in their proper places, which relate not only to other kinds (*d*), but also to this we treat of now (*e*).

To these you will join the signs that are added by another illustrious physician in relation to this very kind (*f*). And you will see in Torti (*g*) this mark, among others, of a sleep being about to come on soon, that the patient sometimes stammers, and mutilates or clips his words, or speaks one for another, “just as if he was troubl'd with a slight apoplexy degenerating into a palsy of the tongue.” There is, also, in the same author, the history of an old woman (*h*), in whom, as it had happen'd, in an exacerbation of a fever, not only that she could not speak her words properly, but that an evident kind of distortion of the mouth had come on; in the following exacerbation a deep sleep, moreover, was added; and in the next to that an apoplexy, which pass'd over into a paralysis of the whole right side. And, that

(*t*) Epist. Respons. de Morb. Epidem.

(*u*) Exercit. 1. de Mot. cord. & sangu. c. 16.

(*x*) A. 1740. Hebd. 13. n. 2.

(*y*) L. 2.

(*z*) Ibid. c. 4. Schol. 1. & c. 8. Schol. 1. 52.

(*a*) Ibid. c. 2. ante Schol. 3.

(*b*) Ibid. c. 3. ante Schol. 3.

(*c*) L. 3. c. 1.

(*d*) L. 4. c. 1. & 2.

(*e*) Ibid. c. 3.

(*f*) Vid. *Commerc. Litter.* A. 1733. Hebd:

(*g*) L. 3. c. 1.

(*h*) L. 4. c. 4.

you may know these to have been from a fever, they were taken off by the use of the Peruvian bark.

You not only perceive what symptoms have sometimes foretold sleep, and after this an apoplexy; but you, at the same time, perceive, that this sleep is rather of the apoplectic, than of the lethargic kind, especially when join'd with that stertor which is wont to be join'd with the most violent apoplexy. And in consideration of these things, Sydenham (*i*), and others, have asserted an attack of this kind, to be "altogether like a true apoplexy;" and Torti himself (*k*), that it at length becomes fatal, "like a strong apoplexy," if not put a stop to by the bark; and Morton (*l*) says, that a boy, whom we have taken notice of above, was found twice by him "affected with a stertor" "and other symptoms of a true apoplexy:" and he has related, that an old man, an uncle of his (*m*), who had been already, for many years, dull and sleepy, was seiz'd with an "apoplexy" of the same kind; so that the attack remitting, he sav'd both of them by giving the bark in large doses.

But the calling to mind this dull, sleepy, and moreover, fat old man, join'd with other histories, and particularly with that which is describ'd in the *Commercium Litterarium* (*n*), by a diligent, certainly, and skilful observer; I mean, of an old woman, who, having been afflicted a long time before with a stupor, and debility of one arm, and soon after with a heaviness of her head, a frequent vertigo, and a great lassitude of her legs, was seiz'd with a very profound sleep, in the paroxysms of an intermittent fever; these examples, I say, ought to make you solicitous lest, in intermitting fevers, which trouble patients that are subject to these, or any other similar disorders of the head or nerves, they should happen to be seiz'd with that terrible sleep, or even with an apoplexy, without that sleep having preceded.

For as examples are at hand, from the observator whom I have commended (*o*), "of an incurable apoplexy," and "of an apoplexy suddenly fatal," which follow'd this sleep; so also we have others, wherein, "without any" "soporific affection having preceded," an apoplexy has snatch'd away those who were attack'd with intermittent fevers. Wherefore, when a patient shall be subject to those disorders of which we were speaking; take care that you give him, in particular, the bark, as you would another, and in time; and take care likewise, that it may be retain'd by him for a proper time; for he whom I have spoken of, as being suddenly kill'd by an apoplexy, could by no means retain it. And this I was the more anxious about in Count Trento, who was affected with a kind of apoplectic sleep, as has been said, and, at the same time, with a slippery state of the bowels, because I knew very well that his own brother had been carried off, in former years, by a sudden apoplexy. But in the remission of the paroxysm, I endeavour'd that the bark should be retain'd, by mixing with it such things as strengthen the stomach and bowels; for I was afraid to make use even of the least opium. And in this manner it pleas'd heaven to prosper my wishes.

32. I do not think you will be displeas'd, and I know for a certainty you

(*i*) Epist. Cit.

(*k*) 1. 3. c. 1.

(*n*) A. 1738. Hebd. 33.

(*l*) Hist. 25. cit.

(*o*) *Commerc. Litter.* A. 1731. Specim. 24.

(*m*) Hist. 26.

n. 3. & A. 1734. Hebd. 13. post n. 2.

will not be surpriz'd, that instead of anatomical observations on those who died of these fevers, I have produc'd observations made upon living bodies. For you know, not only that in the section which treats of fevers in the Sepulchretum, some histories of this other kind are produc'd (*p*), but that it is my custom particularly to avoid dangerous dissections. For which reason, I suppose, you will be in less expectation of dissections perform'd on those bodies which were carried off by malignant fevers attended with the small-pox, when you know that I have not, as yet, been seiz'd with the small-pox. For I have not so much courage as Theodore Zwinger, who, as you will even read in the Sepulchretum (*), had never labour'd under that disease, and yet dissected a boy who died of it.

But you will, perhaps, say, that the bodies even of those who die of the plague itself, when dissected, and especially when cold, have been denied to be hurtful even by very learned men. It is true, I have read these authors; yet I have also observ'd what Thomas Bartholin (*q*), and Isbrandus Diemerbroeck (*r*), who had read the same, have thought of it. For the first says, "I would not trust too much to their reasonings;" and the other, that a dead body, when it is, in fact, quite cold, is "much less contagious than a living and morbid body;" but that it was contagious he did not deny; nay, even shew'd by his own example what he thought of it, when, although there was a person who promis'd to show him (*s*) carbuncles in the stomach of a body of that kind, he said, "That he did not care to disturb a wasp's nest, and, by opening the cavity of the abdomen, expose himself to the danger of contagion; and that he had rather believe it than see it:" and again (*t*), when he had related that it was demonstrated by the surgeons in his presence, that the exanthemata were continu'd very deep through the muscles of the limbs, he says, "Whether the viscera are affected in the same manner, I have not ocular experience; for this reason, because, although I make but light of the contagion which arises from the dissection of the muscles, I, nevertheless, believe that the contagion which arises from the opening of the abdominal and thoracic cavities, may rush furiously upon the by-standers."

Do not be surpriz'd, then, that I chuse rather to be in the number of the many, than in the number of "the very few," as he says (*u*), "who give credit to those that assert the carcases of such as had been afflicted with pestilential disorders, not to be contagious." And if they had not been very few who gave credit to them, do you think that, after so many pestilences, there would have been so few observations from bodies that had died thereof, as are transferr'd into this section of the Sepulchretum? For they are very few indeed, if you take away those that are put down from hear-say, those which assert incredible things, and those that are repeated; as, for instance, that which, after being set down under the third article of the sixty-second observation, is also put down again under the seventh article. And

(*p*) Append. ad Obs. 10, & 29.

(*) In Additam. ad hanc Sect. Obs. 19. cum Schol.

(*q*) Consil. de Anat. Pract. n. 3.

(*r*) De Peste l. 2. c. 3. adnot. 12.

(*s*) Ibid. l. 4. Hist. 15.

(*t*) Hist. 32.

(*u*) Hist. cit. 15.

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lest you should suspect that anatomists have been deterr'd from these dissections by a vain fear, rather than by any just reasons; pray read the arguments which are at the same time contrasted with the contrary ones, in the same authors, Bartholin (*x*) and Diemerbroeck (*y*).

Yet, if after reading them you are still of opinion that there is no danger to fear; attend to what happen'd in this our theatre to those who dissected the bodies of persons who died of a malignant fever only, and not of a pestilential one. A *professor*, who was young, strong, and healthy, Stegagnoni by name, had so far dissected a man who died of a petechial fever, as it is call'd, as to prepare the muscles of the back, (trusting, perhaps, to Diemerbroeck, who made light of this) when he was seiz'd with the same fever, and taken from among the living. But this body might, perhaps, not be quite cold: that of an old woman, however, the belly of which was open'd by the celebrated Vulpus, in the year 1717, and in the month of January, was certainly cold both internally and externally; for I stood by him, in order to demonstrate the situation of each viscus to the auditors; and although no ill smell, more than usual, appear'd, nor any mark of disorder besides an entangl'd state of the intestines, yet I immediately felt a kind of unusual languor, just as if I were about to fall into a swoon: and soon after, when the demonstration was finish'd, we had scarcely return'd home, but we were both of us seiz'd, one in the same manner as the other, and at the same time, with a febrile horror and coldness, and after that with a febrile heat: and from that time, notwithstanding the force of the fever was broken, I began to have but indifferent health for some years, in the manner I have said in the dedication of the fourth of the *Adversaria*. Nor is this to be wonder'd at: for although that woman had been brought into the hospital as an apoplectic patient, and really was so; yet that apoplexy had come on lately, during the course of a malignant fever under which she labour'd at home, as was found upon enquiry afterwards.

You see, then, that in order to avoid the danger, it is not sufficient to be cautious of dissecting a body before it is cold: for they who have recommended this caution do not seem to have observ'd, that a body may be cold externally, but retain its heat internally; which, as you will perceive from my letters to you, happens very often; and sometimes, even at the thirtieth hour after death (*z*), heat remains in the internal parts of the belly. Must we wait longer then? A putrefying body, they say, becomes "much more contagious than a living morbid body." Nor would I have you object to me, that there have been, and still are those, who, without having regard to any of these cautions, have dissected such bodies with impunity. For the nature and force of all malignant fevers is not the same, nor the disposition of all dissecters the same; and as no one can, for a certainty, know the nature of either, who can deny but the advice of the more timid is safer than that of the more bold?

33. However, to return to myself, and to the small-pox: when I was a very young man, and this disorder happen'd to be very general, (and so mild as scarcely to have taken any off to that very day) being carried away

(*x*) N. 3. cit.

(*y*) Adnot. 12. cit.

(*z*) Epist. 3. n. 2.

with a desire of learning, I made no hesitation to attend an excellent physician in the hospital; and was not afraid even to feel the pulses of those who lay ill of the small-pox, much less to take notice of other circumstances, and enquire into still lighter matters; as, for instance, by what collyrium the skin upon the eye-lids, though in other parts almost universally rough and deform'd with pustules, was, nevertheless, kept smooth, clear, and beautiful; and I found that this collyrium was made of plantain water, in which a little of the *saccharum saturni*, as it is call'd, was dissolv'd. And while I was observing these things, it accidentally happen'd that one or two of these patients were carried off by death, though the physician very diligently did all in his power to prevent it.

Admonish'd by this instance, I determin'd never to attend patients of that kind afterwards, though sent for even to princes and men of the first rank. Nor do I think, though I have reach'd to this age, that I ought, by any means, knowingly to bring myself into danger; since I have known it happen, even to persons of eighty years of age, to be infected with the variolous contagion in the same manner as children, and to perish from thence much more easily than children, notwithstanding they had then believ'd themselves to be free from it; although in a very severe constitution of this kind at Forli, in the year 1749, an old woman, who was advanc'd beyond the age mention'd just now, and afflicted with that disease, escap'd with her life, which was certainly a rare instance of escape.

However, what it was not proper for me to do; I mean, to dissect the bodies of persons who died of that disease; has been done so many times, and by so many anatomists, that I cannot help being surpriz'd, men, in other respects very learned, should seem to be ignorant, that they would be wide of the truth, either who should contend that the variolous pustules never came in any other part but the skin, and particularly not in the intestines; or who should contend that they were always form'd in other parts.

You will naturally suppose, that the first class of these gentlemen had happen'd to light on such observations as that propos'd by Peyerus the son (*a*); and that the other lit on such as happen'd to agree with those which the celebrated Gunzius (*b*) takes notice of, as being made by himself; but that both, quite forgetful of all others, had concluded that every observation was similar to their own; whereas many which are even transferr'd into the *Sepulchretum* were extant, some of which very evidently agree with the former, and the others with the latter.

Besides, there are some, which you may collect from the dissertation of the celebrated Phil. Conr. Fabricius (*c*), to be added to both of them. And, moreover, as another dissertation (*d*), which was deliver'd under the auspices of Bufferius the president, will give you an observation made on a certain prince, which agrees with the first of the above; so the volumes of the Cæsarean Academy (*e*) will furnish you with many that agree with the latter.

(*a*) Obs. Anat. 2.

(*b*) In Hippocr. de Humorib. not. 21.

(*c*) Exhib. Obs. circa Constit. Epid. A. 1750.
not *b* ad § 19.

(*d*) Sist. Hist. morbi, & cadaver. variol.

c. 1.

(*e*) Eph. Dec. 3. A. 7, & 8. Obs. 97. u m
Schol. & Cent. 9. Obs. 52.

And, indeed, other histories are not wanting, which describe pustules in various parts besides the skin, and yet not in the intestines or other viscera. Of which kind are those that you read in the *Acta Hafniensia* (*f*), in the Ephemerides of the Cæsarean Academy (*g*), in the pathological works of the most excellent Haller (*b*); and this, also, which I subjoin nearly in the same words wherein I formerly heard it from Jacob Sandri, who was one of my preceptors at the time when I resided at Bologna, and a man of great learning.

34. A boy, of a noble family, who had but few pustules of the small-pox externally, and had no signs of others having beset the viscera, died like a suffocated person.

The body being open'd by Sandri himself, shew'd all the viscera in a very sound state. But upon one of the muscles of the larynx a variolous pustule had been form'd, and about it the black colour of a gangrene now appear'd.

35. Moreover, that an internal gangrene is frequently join'd with other malignant fevers also; and even, if they are mortal, that inflammations of the viscera then degenerate into gangrenes; will appear from observations that you will read in this section of the Sepulchretum. To which you may also join these: Our Sanctorius (*i*) says, "Some others have thought that a malignant fever arises from a gangrene in the liver, or any other viscus; which I have observ'd in bodies more than once." Dominic Gagliardi (*k*) affirm'd, that in the dissections of those who perish'd from a malignant fever, in whom the ulcers which had been open'd by corroding medicines call'd vesicatories, already began themselves to be affected with a gangrene, "internal gangrenes were frequently seen." And Joseph Lanzoni (*l*), in describing an epidemical disease that rag'd at Ferrara in the year 1729, took notice, among other things, of "some livid spots in the coats of the intestines," which appear'd upon opening the bodies of several persons who had been carried off by this disease. And you yourself may add other examples which will not be wanting.

36. Now, before I make an end of writing, I will venture to say I do not suppose you will be surpriz'd; particularly as you were inform'd in the beginning, that I am not willing to repeat any thing which I have already written to you; I say, I do not suppose you will be surpriz'd that I have made no mention of some certain fevers in this place.

For you know that I have treated of the greater part of them, in treating of other disorders. Some however, as, for instance, quintans, and those that have longer intervals, I confess I have never nam'd; nor, indeed, have I seen any of them, except one which recurr'd exactly every week, in a nobleman, when I formerly liv'd at Bologna: nor can I say any thing of them, except that, although they generally succeed quartans, they are not, nevertheless, as has been done sometimes, to be consider'd as quartans that have their intervals render'd longer, unless we would still consider quartans, in like

(*f*) Tom. 1. P. 1. Obs. 109.

(*g*) Dec. 3. A. 7, & 8. Obs. 47.

(*b*) Obs. 44. in fine.

(*i*) Comment. in I. Fen. I. 1. Avic. Qu. 86.

(*k*) Dell'Infermo instruito P. 2. Vegl. 30.

(*l*) Act. N. C. Tom. 2. Obs. 209.

manner, when they succeed tertians, as tertians, whose returns are become slower than before; contrary to the opinion of all physicians from the most early times.

And this has been very clearly observ'd by my ingenious friend Zeviani (*m*), where he describes the change of a quartan into a quintan, of a quintan into a tertian, and soon after, of a tertian into a quartan, and, finally, of a quartan into a sextan; and this constant in a young girl that he had seen: of which last species of fever examples are extremely rare, as I do not remember ever to have read more than two besides this; the one of Gentilis (*n*), and the other of Lanzonus (*o*). But what appearances have been found in those who died after fevers of this kind, I am quite uninform'd. Yet when they are of long continuance, or succeed fevers of long continuance, it is probable that they leave behind them almost the same appearances as these generally do. And these fevers frequently produce disorders of the mesentery, or the spleen, or some other neighbouring viscus, and particularly of the liver. And you have an example in the celebrated Fantonus (*p*) of all these appearances being found at the same time.

In regard to the spleen, I have already sufficiently shown this, in more places than one, but particularly in the thirty-sixth letter (*q*), which you will find to agree with the observations transferr'd into this section of the Sepulchretum, where the question is of quartans (*r*), and of long erratic fevers (*s*). You will also find examples relating to the liver in the same place. With which you will join what is said, in the *Commercium Litterarium* (*t*), of the substance of the liver "cherishing the fomes of quartans in preference to "other parts;" and that, for this reason, "in many of those who die of "quartans, it is at one time found to be injur'd, at another time dried up, and sometimes inflated.

37. And thus far I had to add to the histories of Valsalva upon most kinds of fevers, from my own observation, those that I have read, or such as have been communicated to me by others. And these I would have you receive, as usual, in good part. Farewel.

(*m*) Nuovo Fonte di Pronostici P. 1.

(*n*) Apud Schenck. Obs. Med. l. 6. ubi de
raris febr. typis Obs. 2.

(*o*) Eph. N. C. Cent. 8. Obs. 10.

(*p*) De Obs. Med. & Anat. Epist. 8. n. 10.

(*q*) N. 18.

(*r*) Sub Obs. 30. (*s*) Sub Obs. 32.

(*t*) A. 1739. Hebd. 50.

LETTER the FIFTIETH

Treats of Tumours.

1. **T**HOSE diseases which most authors would certainly have plac'd immediately after fevers, the gout, the lues venerea, and others of that kind, Bonetus chose to defer the consideration of; and betwixt these and fevers to place tumours, wounds, ulcers, and others that relate to surgery. And as you know very well, how much this profession was lov'd and cultivated by Valsalva, you perhaps expect a great number of observations; if not from me, whom you know not to be form'd, by nature, for the cutting of living bodies, as I am for that of dead bodies, yet at least from him. And you will find, from the next letter, which will be upon the subject of wounds, that your opinion has not fail'd you. Nor indeed had he a few observations upon tumours.

But some he did not commit to paper; and others, though he did write them down, either he has himself publish'd, or I have describ'd in former letters. All of which I will only refer to here, that you may read them over again if you please; as I will repeat nothing, whether it be his or mine. For although I shall here follow the order of the Sepulchretum also, such as it is, according to my general custom; yet I shall not follow the repetitions. Some of which are not only, like many others, not repetitions of those observations that are openly declar'd to have been given in other sections; but of those that are put down again in this same section; as when, among those that you read in the Additamenta, even the very first, with part of the subjoin'd scholium, had been already given above, in the sixth observation (*a*), by Bonetus, who did not himself conceal the place from whence he had taken it; or when it happen'd to the same author, which is almost incredible, that, in one and the same page (*b*), he produc'd one and the same history, from Garnerus, twice over.

2. In regard, therefore, to bloody tumours, either those which are commonly so call'd, or those, in particular, that communicate with some trunk of a vein, (which are the same, in my opinion, that were afterwards nam'd "spurious varices," by Boerhaave (*c*)) what Valsalva saw of them, and what he thought, you read in the thirteenth of my anatomical epistles (*d*); and still more in his treatise of the human ear (*e*); and in both places, in like

(*a*) §. 7.(*b*) Obs. 7. § 1. & 3.(*c*) Prælect. ad Instit. § 711.(*d*) n. 4.(*e*) c. 4. n. 8.

manner (*f*), those things that relate to *scotamata* of the eye-lids. And I could wish he had given his opinion in as express a manner, as to the nature of a certain tumour, of which he has left us the following description.

3. A woman, of fifty years of age, had labour'd, for three months, under a hard tumour, in the right part of the neck, being oblong in its figure, equal to the size of a turkey's egg, and having its basis in the carotid artery of the same side, from whence going upwards, quite to the division of that artery, it terminated there. At length, about twenty days before her death, it began to be very frequently troublesome, especially in that region of the larynx; so that she was oblig'd to breathe with a peculiar kind of stertor, accompanied with a sense of heat in the throat. The woman was therefore carried off.

I will not here, as I did in the case of another tumour, in the left part of the neck, which Valsalva describ'd as being hard likewise, and without making mention of any pulsation (*g*), give you my conjecture upon the nature of it: you yourself will judge of it as you please. And I will go on to give you more certain remarks.

4. A virgin, of a lively disposition, who, by reason of her age, being now advanc'd to about fifty, had been some years without her menstrual purgations, had a cancerous tumour in her right side, near to the axilla. This tumour, by degrees, increas'd greatly in breadth and length, though but little in thickness, and, at length, reach'd to the arm-pit. The neighbouring limb was universally affected with an œdematous tumour. To this was added a cough, a spitting of catarrhus matter, a difficulty of breathing, a great thirst, and finally death.

The tumour, as far as could be perceiv'd by the senses, had not hurt the parts, whereon it was seated, to any considerable depth. In cutting into the neighbouring limb, a great quantity of serum flow'd out, all of which had stagnated in the cells of the adipose membrane. And the whole cavity of the thorax, on the same side, was fill'd with serum of that kind, having many concretions of the same colour swimming in it, of a middle nature betwixt membranous and gelatinous substance, many of which likewise adher'd to the pleura. The lungs were so contracted, that at first sight they almost seem'd to be wanting as it were. The heart was very small.

However, in regard to the belly, the fundus of the stomach was very much extended; the spleen was very small; the liver inclin'd from its natural colour to that of a brown; the gall-bladder was small and empty. The ovaria were white; and although they preserv'd their natural figure and bulk, they had nevertheless grown very hard.

5. You will read an observation of Rondeletius (that is transferr'd into the Sepulchretum, not in this place, wherein it is not so much as mention'd, but in the second book (*b*)) which is similar to that in question. For in both of them were an external cancerous tumour, a difficulty of breathing, and a great quantity of serum in the thorax: yet that this serum was collected, in that observation, during the decrease of the tumour; and in this, during

(*f*) Ibid. & nostræ illius Epistolæ, n. 2. (*g*) Epist. 17. n. 19. & 20. (*b*) Sect. 1. Obs. 72.

the increase, is shown by the time in which the difficulty of breathing came on. And this difference will make you explain the circumstance somewhat differently in that observation, from what you would in this. And as what relates to the serous tumour of the arm is peculiar to this, so the cause of this tumour was peculiar also; I mean, the compression of the axillary vein, from the cancer raising itself up thither.

6. But now let us come to other tumours of the upper or lower limbs, of a different kind, that have been observ'd by Valsalva, beginning with those that have succeeded venæsection, when ill perform'd. But I omit that which he saw in a noble matron from the puncture of a nerve or tendon, in blood-letting, her hand being greatly swell'd with the very severe pain, and, when that pain was appeas'd, continually trembling: which tremor continu'd not only after the swelling of the hand was abated, but even quite to the day in which he wrote this, that is to say, for five years together, no remedy being of any service.

I, in like manner, omit that which happen'd to a young man, by an unskilful surgeon's having pierc'd through the vein, in the bending of the elbow, the blood being internally effus'd in consequence thereof; from whence afterwards arose an abscess of long and difficult cure.

I will rather describe to you, with the more accuracy, the history of a tumour cur'd by the hand of Valsalva, because it is a thing of greater moment, nor unworthy to be compar'd by you with the observations which relate what has been seen, done, or remark'd, in that part by others; as, for instance, by Rockius (*l*), by Petit the surgeon (*m*), by Teychmeyerus (*n*), and by those whom I read while I was revising this letter, that celebrated physician Trew (*o*), and that industrious surgeon Guattanus (*p*), but especially by the celebrated author of the dissertation to be quoted below (*q*).

This observation, therefore, of Valsalva, although it may seem lame and imperfect in some things, as describ'd in a loose manner by a man who wrote for himself only; has, nevertheless, some things that deserve peculiar attention, as one in particular does; I mean, that a cure of this kind was perform'd by Valsalva, before he had seen it perform'd by others; and that, as he was so skilful and industrious, he would have added other things at different times, if he had liv'd longer, and other opportunities of performing the same operation had occur'd to him.

7. A surgeon, about eighteen years of age, losing blood from the arm, on account of a disorder of the thorax, had his artery wounded. The person who bled him, supposing that he had open'd the vein, tied the wound up in the same manner as if nothing but a vein had been cut into. After some days, a tumour was observ'd in the elbow; which, within twenty days, or somewhat more, encreas'd to the bigness of an apple. This a certain surgeon, supposing it to contain pus, cut into: and from the wound the blood began to flow, but without any impetus, in consequence of the coagula of blood plugging it up, and entirely preventing the discharge.

(*l*) Comm. Litt. A. 1734. Hebd. 36 n. 2.

(*m*) Mem. de l'Acad. R. des Sc. A. 1735, & 1736.

(*n*) Dissert. de stupendo Aneurysm. & cæt.

(*o*) Act. N. C. Tom. 8. Obs. 126.

(*p*) Hist. 2. Aneurysm. Hist. 1. (*q*) n. 8.

But three days after, the blood, having made a way for itself, burst forth : and that not only on this day, but on the two following days also ; once only every day indeed, yet in such a quantity as could not be restrain'd by any astringent remedies ; and brought the patient into a kind of swooning state. In the mean while, both the hand, and the elbow, and the neighbouring shoulder, almost quite to the middle, became swell'd : and an inflammation had already arisen near to the incis'd tumour. In such an extremity physicians were call'd, and those such as were well skill'd in surgery also ; among whom was Valsalva ; who, after having weigh'd the case accurately, began the cure in the following manner :

In the first place, he bound the upper arm with the bandage which they now call the torcular, or tourniquet, in such a manner that it might be speedily and easily relax'd upon occasion. He then carried up the incision, which had been made by the surgeon, as I have said, upon the tumour, towards the superior parts, and in the usual course of the artery. Thus the whole cavity of the tumour being laid open, which would almost have contain'd a man's fist, he drew out the blood, both fluid and coagulated, where-with it was fill'd ; and wash'd the place very well with sponges moisten'd with warm wine. And this being done, he order'd the bandage to be relax'd a little ; until the blood, flowing out, should show the situation of the wounded artery. This was in the fundus of the cavity ; so that it was very inconvenient to tie up the artery, by reason of the depth. But having, at length, tied it immediately above the wound, the blood no more sprang forth, even when the bandage was relax'd.

However, all the part of that limb, which was below this ligature made upon the artery, instantly lost its power of feeling and motion ; and a few hours after became quite cold : nor was a pulse any longer perceiv'd. Yet this pulse began to be perceiv'd again about the third day, from the time of making the ligature, though in a very small degree : but about the fifth it had return'd almost to its natural impetus. In the latter part of this day blood was observ'd in the bed ; and, for that reason, the bandages about the wound were seen to be wet. But when these were cautiously remov'd, and the wound examin'd, no blood was discharg'd ; nor was there any sign from whence it had been discharg'd. From this last eruption of blood the pulse was again entirely lost ; just as if a new ligature had been thrown around the artery. But the limb, nevertheless, recover'd its natural heat, gradually, a few days after, and its motion also, though this last more slowly ; for a weakness remain'd eight or nine months, and a kind of wasting, a brown colour of the nails, and a great proneness to be hurt by cold. After this period of time however, which I have mention'd, all these symptoms went off ; and the pulse return'd, though in a languid state.

8. This history having been requested of me, by that celebrated man Peter Paul Molinelli, I immediately, and very readily, sent it him ; not only that I might oblige a man who excell'd in the medical and chirurgical art, and deserv'd very well of me, but also that the history, which I sent to him in an imperfect state, he might, as having known the surgeon when living, and dissected his body after death, make complete for me, as far as this was possible..

And

And this you will find to be extremely well done by him, if you read his dissertation, which is entitled, “ Of an aneurism from the artery of the arm “ being wounded in letting blood.” The chief things which he has added are the following : that Valsalva had applied not one ligature only round the artery, but many ; being compell’d thereto by the difficulty of stopping the blood : that the man had afterwards liv’d in pretty good health ; and did not die till about thirty years after this operation ; when he was taken off by a consumption and ascites : and that he had been wont to make use of that arm which had been injur’d, just as he did the other, since you could now perceive no difference by comparing the two arms together, not so much as in the pulse.

This is the more to be wonder’d at because, in the dissection of the body after death, although the brachial artery was entirely deficient, to the extent of two inches, in that part where the aneurism had been ; that is to say, in consequence of having been destroy’d formerly by disease, by the knife, and by abscess, or sloughs ; there could be found no artery but one which could keep up the communication instead of it, betwixt its superior trunk, and the radial and ulnar arteries ; and this was not only surprizingly tortuous, but so slender, that it was very difficult to conceive how the radial artery, as so little blood flow’d into it, and this blood was carried through so many flexures, could pulsate equally with the artery in the other arm ; and, again, how it was that both arms were equally well nourish’d, and robust ; or, at least, equally fit for every kind of action.

Indeed that part of the nerve which lay in the same tract, wherein I have said the brachial artery was wanting, was found to be enlarg’d into the form of a very considerable ganglion. But although you should imagine that the strength of the nerve might be encreas’d by this means ; you, nevertheless, could not conceive of the proper strength of the muscles, the nutrition of the parts, and, particularly, the pulsation of the arteries, without a proper quantity of blood flowing in, and that with a proper impetus. And certainly, when a principal trunk of an artery is shut up, the most learned men, and among these Haller (*r*), did not doubt, “ from physics, and hydraulics, “ but the lateral branches, although small, may afterwards be distended, if “ they are acted upon by a fluid alone :” and, indeed, the same Haller (*s*) affirm’d it “ to be commonly known, and to have been seen by him, that “ upon cutting the radial artery away, the ulnar had been so dilated, that all “ the branches which are supplied by the radial, receiv’d their blood from “ thence.”

Wherefore it is the more to be wish’d that the enquiry may be repeated, in the bodies of those in whom the brachial artery itself has been tied up while living, for the sake of curing an aneurism in the flexure of the elbow, by every anatomist who has opportunity to make it ; and particularly by the same very excellent Molinelli : so that, as he has describ’d with so much accuracy what he found in this first case, he might be able to inform us, even by the help of injection, whether the same, or different appearances, occur in bodies of this kind. For although the trunk of that artery is seldom

(*r*) Dissert. de Arteria Brachii not. ad §. 45. (*s*) in Boerh. Prælect. ad Instit. §. 692. not. *e*.

double, yet that the branches going from thence, both into the ulnar and the radial artery, which the celebrated Winslow (*t*) calls collateral branches, do not appear in the same manner in all bodies; but that there are many in most bodies, sufficiently appears, even from the descriptions of this author, and the illustrious Haller (*u*), when compar'd one with another. It is, therefore, probable it will at one time happen, that more than one of the collateral branches offer themselves to the eyes in a dilated state; and at another time, one only: although, even upon this hypothesis, it could not be sufficiently understood, how what Valsalva had observ'd, about the fifth day after tying up the artery, could happen; for if the dilatation of those branches must be brought on by degrees, how had the pulse so soon return'd to its natural impetus?

But in regard to the nerves; although the communications of the brachial one with another, and the frequent distribution of more than one branch therefrom into one muscle, may, perhaps, tend to make us not quite so solicitous about making the same enquiry in respect to them, as we did in respect to the arteries; without doubt that change which the celebrated enquirer has observ'd, that change, I say, of the nerve, which seems to have been tied up together with the artery into a very large ganglion, deserves to be confirm'd by many observations upon bodies of that kind; or even by experiments on brute animals, made with accuracy and attention: and it ought also to be enquir'd, whether this enlargement be owing to the very manifest dilatation of the arterial branch flowing into it, or rather, if this does not always occur, to the ligature made upon the nerve.

And I now see that this wish has been sufficiently completed since my writing this letter (*x*), as far as relates to brute animals, by experiments which, as I judge them to be worthy of more than common praise in themselves, so, if I am to consider them as repetitions of the experiments of Valsalva, I hope to have a more convenient place of considering and saying what I wish for even in them. For at present it will be much more useful to you to consider with diligence and attention, the observations and remarks which the celebrated Molinelli has made, in that clear and fruitful dissertation, on performing the cure of the aneurism in the flexure of the elbow; not only by tying up the nerve with the artery more expeditiously, but also by throwing ligatures more safely round the aneurismal sac; and join them with those cures which he may perform hereafter. However, although he has completed the above observation of Valsalva for us, I do not very well know whom I can now find to make the following complete.

9. A certain man had labour'd under an aneurism in the left ham about ten years, which gave him great pain, and was equal nearly to three inches and a half, of the measure of Bologna, in its diameter. This being cur'd by Valsalva, the patient was at last carried off by another aneurism in the

(*t*) *Expof. Anat. tr. des Arter. n. 140. & cat.*

(*u*) *Differt. cit. §. 17. 19. & feqq. & 28. 36. 45. Adde nunc Fascic. Icon. Anat. 6. & Guattani Hist. cit. Fig. 1.*

(*x*) *De Bonon. Sc. Infl. Tom. 3. in Opusc. & Quæst. Præfide Hazon Paris. propof. 5. Febr. 1750. n. 4.*

right ham. And when his body was open'd, a third aneurism was found to have been form'd at the curvature of the great artery.

10. As Laurence Heister, who is a very learned surgeon and physician, if any man is, in that dissertation which is entitl'd "Of the structure of the knees, and their diseases (*y*)," has admonish'd us, that "very few" aneurisms had been remark'd in the ham; and, indeed, besides those that he himself mentions, I scarcely remember to have read of more than two, the first of which was formerly pointed out in one word by Severinus (*z*): and as to the other, Matanus (*a*) has very lately told us how great a quantity of blood it contain'd; I, therefore, was not willing to omit this observation of Valsalva, although obscure (if you consider those things that I shall say presently) and imperfect; as, besides other things, it shows, at least, how liable some bodies are to aneurisms.

But although the very experienc'd Heister thinks the same method of cure which is made use of in the aneurism of the elbow, to be "not impracticable" in the ham also (*b*), on account of the same hope (which you will now see confirm'd by the very excellent Haller (*c*)) of the branches of the artery communicating laterally, and indeed professes that he would undertake the operation whenever the case may offer; yet, as I never found any thing more in respect thereto to have been added by Valsalva, than what I have written in the history, I did not take upon me to determine by what method he had made the cure.

There were, indeed, among the papers of Valsalva, two figures, skilfully and elegantly drawn; one of which represents the popliteal artery on the surface that is turn'd towards the external parts; the other represents it on the opposite side, dilating itself, from the external surface, into an oblong sac, which is narrower in proportion as it ascends the more, and not without three orifices of arterial branches communicating with the narrower part of the sac: so that unless this part was tied up with a ligature, according to the custom of the celebrated Molinelli, it would have requir'd a very long and tedious manual operation; and yet the sac is represented as entirely whole on the external side. For which reason, and the man's dying of an aneurism that had been form'd in the other ham, I almost conjectur'd that the latter, rather than the former, had been drawn in these figures, as Valsalva had taken it out from the dead body.

Nevertheless, it did not appear clear by what method he had cur'd that other, till, turning over the observations of the celebrated Benevoli, I happen'd to light on a passage, where (*d*), speaking in commendation of the method already taken notice of to you on a former occasion (*e*), in which Valsalva us'd to cure aneurisms by letting blood frequently, and afterwards using a very spare diet; he asserts that he had seen, in the study of Valsalva, an example of one thus cur'd "in the popliteal artery," from a man who had been carried off by some other disease after the completion of this cure.

(*y*) N. 83.

(*z*) De recond. Abscess. nat. l. 4. c. 7. prope finem ad n. 2.

(*a*) De Aneurysmatic. præcord. Morbis Animæ adv. not. a ad § 71.

(*b*) Dissert. indicata, n. 76, 77.

(*c*) Fascic. Icon. Anat. 5. ad Tab. 4.

(*d*) Osserv. 11.

(*e*) Epist. 17. n. 30.

For having read these words, and taken those figures into my hands, when I observ'd that the sac was certainly represented of a diameter far less than that which is propos'd above (*f*); I began to think, that the very great contraction of the sac was to be ascrib'd to this kind of cure: which, although Valsalva had made use of it against internal, and those incipient, aneurisms, he would, perhaps, have been willing to apply against this also, adding a compressing bandage, and other external assistances. But as I see some things which do not sufficiently agree with this conjecture, I therefore leave it entirely to your determination: I pronounce nothing myself, and return now to more certain things.

11. A man, of forty years of age, had a small but pulsating tumour which arose gradually about the right groin. Through the space of three years it encreas'd every day, and became large. About the third month before his death, it began to trouble him with pains, and to bring on a large and equal œdematous swelling through the whole of that lower limb. In the last month the pains became very violent, and not at the tumour only, but sometimes also below the internal ankle: in which one place, and only when the pains were troublesome, the foot had feeling, being at other times depriv'd of all power of feeling and motion. There was never any respite from excruciating pain through the whole of this month, and no sleep; till at length, the patient's strength being worn out, he lay half-asleep for some days, and in this manner died.

This aneurism had an immense cavity; for it reach'd from the anterior skin of the upper part of the thigh to the thickest of all the nerves, the *cruralis posticus*. And, indeed, the crural artery, from the dilatation of which the tumour had begun, was found to be moderately dilated; but being in some places torn asunder, or eroded, it had thrown out the blood through these apertures in such a quantity, and with such an impetus, that the muscles partly being corroded, and partly giving way, it had produc'd a very large cavity, as I have already said, and had eroded that very nerve which I mention'd just now, in such a manner, that only a few fibres of it remain'd, by which the upper part was join'd with the lower. All that cavity was full of coagulated blood and polypous concretions, as they seem'd to be.

12. The dissection very clearly shows the cause of all the symptoms that the man suffer'd. For after that the aneurism had degenerated from a true to a spurious one, in the manner that the word "spurious" is generally understood; that is, after the coats of the dilated artery, being ruptur'd or eroded, began to pour out the blood into the neighbouring parts; the remainder of this fluid could not now be sent, either with that force or in that quantity, into the parts below, which are requir'd to preserve its speedy return through the veins: hence the œdematous swelling of the limb. And the extravasated blood, while by tearing the muscles one from another, it at the same time lacerated the little nerves with the interpos'd membranes, or at least caus'd a distraction therein, created pains; but such as were more easily to be borne than when it, at length, reach'd to that very thick nerve, and being now made more acrid by stagnation, began to erode it.

(*f*) N. 9.

At length, when the nerve was so far eroded as to that part from whence almost all the branches proceed that bring the power of feeling and moving to the foot; both of these powers were lost therein, if you except that place which is near the internal ankle: for to this place belongs a branch that does not proceed from this posterior, but from the anterior crural nerve, and generally accompanies the *vena saphena*. There is no need to explain in what manner the other symptoms were the consequences of continual pains.

It is better to observe, from the succession of these, and even of death itself, that where aneurisms, even when external, are seated very near to the nerves, or to other parts of a quick and lively sensation, notwithstanding they do not immediately become destructive by being ruptur'd and pouring out their blood, they may, nevertheless, carry off the patients by very severe and excruciating pains. And this will be confirm'd to you, besides the history which I lately saw publish'd by Guattanus (*g*), and which may be compar'd with this of Valsalva, by some observations of Marcus Aurelius Severinus (*b*) on a Grecian man, and on a shoemaker.

But although you will very readily read the description of the aneurism in Anselmus Paganus, which Severinus has taken notice of with the others, as it is very similar to that just now propos'd from Valsalva in its situation, magnitude, and most other of its circumstances; yet when you consider the incredible, I had almost said, cure of the same, you will be very much surpriz'd that, among the problems explain'd by Severinus, this principal one was not very clearly and accurately discuss'd; I mean, how the crural artery, "when putrefied, dissolv'd, and broken down," near to the groin, could, by the force of fire applied thereto, again recover its parietes; so that the limb not only continu'd to live, but the man could even walk upright upon it, only with the small support of a low and slender cane.

13. In regard to other tumours which relate to this letter, Valsalva has left us nothing in writing besides what has been said above; unless we should chuse to refer to this class those very few words which he has cursorily thrown into his medical responses. In one of them, which is of the hæmorrhoids, he says that some condylomata, describ'd with these, may be blind piles, as those which, being often cover'd over with a coat of fat, do not seem to be vessels dilated, as they really are, but excrescences of another nature.

And in another response given upon an old tumour in the knee, which was taken for an exostosis, it is natural to suppose, says he, as the tumour began to appear immediately after the retropulsion of a scabies, in which there was some suspicion of a latent venereal virus, that the particles which, by previously vitiating the blood, had produc'd a scabies, being obstructed in that part, had given origin to the tumour, either by lacerating the fibres of the bony substance, just as when the fibres of oaks being pierc'd through by insects, galls, or oak-apples, rise upon them; or by stagnating with the humours flowing through the joints, which is a thing that very easily happens, by reason of the narrowness of the vessels in places of that kind; for being thus cemented with the ligaments and tendons, they have increas'd the thickness and

(*g*) Hist. 2. Aneurysm. Hist. 2.

(*b*) De recond. Abscess. nat. l. 4. c. 7.

the hardness of both: wherefore, if they are compress'd with the hand, they entirely bear the similitude of bone; although to those who enquire by dissection, which sometimes, says he, I have had opportunity to do, they resemble the internal substance of the root of the reed, if I may be allow'd to use a kind of gross comparison,

14. These things, then, have been left in writing by Valsalva. And some other things which were done and observ'd by him, he related to me; or observ'd and did even when I was present: and these I will now communicate to you. The first of which you may, in some measure, compare with that observation of our Fabricius, which I formerly referr'd to in the second of the *Adversaria* (*i*), or with another of that illustrious man Heister (*k*); or rather, if you chuse to refer both of these to the class of *ganglia*, you may compare it, in some measure, as I have said, with that which the very illustrious archiater Van Swieten (*l*) has taken notice of.

15. A virgin, as was related to me by Valsalva, had a very small protuberance of the ankle, which, for more than sixteen years after, created such violent pains, that if she had not been prevented by her domestics, she would have cut off her foot.

Making an incision, therefore, in that part, according to the longitudinal direction of the leg, under the common integuments a gland, of a small size, was found by him, of an oval figure, but depress'd, and, as to its colour and nature, seemingly in a middle state betwixt the conglobate and conglomerate kinds. This gland being taken away, the pain no more return'd.

16. A rustic woman, whom by looking at you would have suppos'd to be dying of old-age, weak, wrinkled, dry, and even brought down to the most emaciated state, lay ill in the hospital for Incurables, at Bologna. The cause of all her misfortunes was her right breast, which had grown out into a tumour, of a form and size that resembled the human brain. This tumour, being every-where and altogether ulcerated, shew'd in several places, amidst its red and bloody substance, many glands, as it were, equal in size to the largest grapes, but white in their colour, oblong, and smooth. As there was no room to attempt any other method of cure, on account of the woman's decay of strength in particular; it came into Valsalva's mind to constrict the basis of the tumour, which was large indeed, but less so than the other part, as far as the woman could bear it, by making a bandage thereon.

By this continual constriction being increas'd every day, it naturally follow'd that the edges of the tumour were depriv'd of their nourishment, and became dead all about; so that they could be cut away all round with the scissars without pain or effusion of blood; and the circumference of the basis was more and more diminish'd. This method being continu'd for a considerable time, that very large tumour was reduc'd to a very small bulk, and at length safely amputated. Wherefore a cicatrix being brought on, the woman, in the mean while, departed much recover'd in her health.

And lest you should doubt whether she was perfectly cur'd in that part, it not only happen'd to me to see the other circumstances which I have related

(i) Animad. 24.

(k) Dissert. de Tumorib. Cystic. singularib. n. 36.

(l) Comment. in Boerh. Aph. § 1084.

to you, but a year or two after I even saw what I am going to relate to you now. For one day, when I happen'd to be in the hospital together with Valsalva, behold a certain woman came to us, who saluted him and me also, as very well known to her, being of a very good habit of body, of a good colour, and, to appearance, of such an age, that she might seem to be the daughter, or rather the grand-daughter, of the other, whom I describ'd to you just now. Yet she was the very same I have spoken of, and she wonder'd she was not known by us; You will know very well, says she, who I am, when I shall have told you the reason of my coming here: and no sooner had she said this, but she open'd her bosom, which was without any breast on one side; but found both on the right and the left side also: except that a small swelling began to be perceiv'd under the skin of the breast.

In this manner, said she, the former tumour began: I therefore came hither that this new tumour may be cut out, before it encreases to any considerable size. And this was done a few days after by Valsalva; who was afraid, nevertheless, that fresh and fresh tumours would still arise; and that even when this breast was taken away at length, the same would be form'd in some other place, and particularly in the uterus. And that he was not afraid of this without reason, is shown by too frequent observation: and indeed the very learned dissertation of that illustrious man Triller (*m*), will show you that he had reason to fear even worse consequences: after reading of which, and considering what more severe diseases follow the extirpation of a cancer, for the most part, you may judge whether so great a severity of evils is compensated by the truce that may have been gain'd for a year or two: although the patient, so that she be but deliver'd from the present pains, which would soon prove fatal, either does not suppose that others more violent will come on soon after, and kill her in a more cruel manner; or if she does believe it, does not, however, pay so much regard to them, as what is to happen after some time.

17. I also saw a tumour of a far different kind cut out by Valsalva. Which, however, as I myself dissected it after being cut out, with his consent, I shall describe below in its proper place. For now I must go on to my own dissections. And first, not to repeat here what I have written elsewhere, you have in the same treatise, and the same epistle, which are taken notice of above (*n*), what I myself have observ'd of those spurious varices, and of the steatomata of the eye-lids, when I pointed out what Valsalva has said of both these kinds of tumours. And in regard to steatomata, and other encysted tumours, many things that deserve to be read are extant in that epistle of Boerhaave, which is entitled, "Of the structure of glands;" and, in like manner, in the prælections upon his institutions (*o*).

And although the same author, as it seems, gives an instance of a tumour containing an aqueous humour, not in just the same manner in both places; being, as I suppose, a little forgetful; yet it sufficiently appears, which is the principal thing, that he had seen a tumour of this kind: and this obser-

(*m*) De nociva Canceri inveter. Extirpatione. Hist. præsertim 3. & Observ. addit. §. 17. & seqq. (*n*) n. 2. (*o*) ad §. 711.

vation may be confirm'd by many examples added from the celebrated Heister (*p*). And to the same class belongs, in part, the description of certain tumours in the head of an infant; which is transferr'd from Blasius into this section of the Sepulchretum (*q*); although the water was divided into many hydatids. That which I observ'd in the following manner was more free, though it seem'd at first to be otherwise.

18. One of the bodies, the head and neck of which I made use of in my public anatomical demonstrations of the year 1750, had a small tumour at the left side of the os hyoides.

The tumour being laid quite bare by dissection, and being set at liberty from the left horn of the os hyoides, to which it was externally connected, represented a congeries of hydatids, not larger than the last joint of the little finger. But having slightly prick'd the edge of it, the somewhat turbid water, which it contain'd, all immediately flow'd down, with even the slightest pressure.

19. This, probably, might have been the beginning of a large tumour, if the man had liv'd much longer: although I think that tumours like these are to be plac'd in the number of those which, while they are as yet incipient, are dissolv'd without great difficulty: and I believe that one, which I saw form'd on the external part of the wrist in my wife, to have been probably of this kind; being of the shape, hardness, and magnitude of a filbert. For though she had been troubled with it for many weeks, behold one morning when she rose out of bed, she found it to have been suddenly and entirely vanish'd during the night. The truth of which I was immediately witness to. But not many days after, the same tumour return'd; and after a much shorter time than before, again vanish'd away suddenly, never to return more; and what had not happen'd before, left the skin in that part distinguish'd by some red pustules as it were; which went away of themselves likewise soon after.

It was the summer-time, and she had made use of resolvent cerates and pressure; having happen'd to hear from me that Valsalva ascribed so great effects to this latter, as to order an encysted tumour, which he himself had on one of his scapulas, to be compress'd even with the feet, in order to retard its encrease. But she had us'd moderate pressure only, as I persuaded her, and that merely on the first days; and the cerates not for a long time, or at least not constantly; as they seem'd to be of no advantage. Nor indeed, if you should rather choose to consider it as a ganglion, shall I greatly object to your opinion; for it was recent; so that there was no necessity to suppose it contain'd in very thick involucra; or to suppose that it included a humour, which a long-continu'd absorption of the thinner particles had left more glutinous and less dissipable.

You perceive I do not think in any different manner, of the matter of ganglions, from what their frequent dissections have shown. Some of which you will read in the celebrated Heister (*r*); and others you will add from the

(*p*) Dissert. supra ad n. 14. cit.

(*q*) Obs. 1. §. 5.

(*r*) Instit. Chir. P. 2. S. 6. c. 171. n. 2.

observation of those excellent men Weiffius (*s*) and 'Ellerus (*t*). However, our country surgeons, as you very well know, call encysted tumours *natte*; comprising in this one word, not only those three common kinds, but others; almost all of them, if you except the more learned, being entirely ignorant how different a matter from those they sometimes contain; and not so much as suspecting, that where there is a hardness, there water may be; both of which have been observ'd by Boerhaave (*u*), and by Heister (*uu*), in theirs.

But there are, also, other peculiar kinds of tumours; as, for example's sake, that which Jo. Paulus Kellius (*x*) exhibited, when Salzmannus was president, consisting nearly of membranes alone; which lying one upon another, in the manner of lamellæ, had produc'd a tumour in the neck, that was equal to the weight of five pounds; an instance that had scarcely ever occur'd to any one before; or that which after others, and particularly after Severinus (*y*), is describ'd by the very experienc'd Benevoli (*z*), containing a substance similar to something polypous. In reading of whose observation, I call'd to mind another, which our Mediavia communicated to me on the very day he made it, that is, in the month of June, in the year 1735.

20. A monk had a tumour form'd upon the region of one rotula, or knee-pan, which was equal to a man's fist in its size, hard, moveable, and free from pain; they call'd it *natta*.

The common integuments being cut into, and easily drawn asunder; for there were no very close connections that prevented it, and the blood-vessels, though very thick indeed, were very small; the tumour was separated from the tendons that cover the knee-pan, with as much ease as one muscle is generally separated from another. Wherefore, the coat being uninjur'd, the tumour was taken away; and when cut into, shew'd this coat to be pretty thick; so that it might be divided into three laminæ, the middle of which was the thickest.

And whatever solid matter there was contain'd within the coat, was, to appearance, of a polypous substance; and that form'd into a kind of cancelli, so as to resemble, in some measure, the spongy structure which we see within the heads of the bones. All these cancelli were full of a dilute blood.

21. Tumours of this kind might, perhaps, have been plac'd among those which Celsus (*a*) says, contain "somewhat like a heavy and bloody flesh," if he had not class'd them among the soft and yielding tumours. Boerhaave (*b*), who does not easily suppose that sarcomata are propagated from, and made up of, true fleshy fibres, but of the adipose membrane; the fat of which, by reason of the small vessels being distended with blood, resembles red flesh; also asserts that tumours thus form'd are included in a thin pellicle; and can, for that reason, be taken away in an entire state.

(*s*) Vid. *Commerc. Litter. A.* 1745. Hebd. 24. n. 1.

(*t*) Vid. *Act. Erud. Lips. A.* 1750. M. Octobr.

(*u*) (*uu*) Vid. *supra* ad n. 17.

(*x*) *Disput. de Tumore tunicato membranac.* §. 1. & 7.

(*y*) l. 4. *supra* ad n. 10. cit. c. 2. & 3.

(*z*) *Osservaz.* 16.

(*a*) *De Medic.* l. 7. c. 6.

(*b*) *Prælect.* §. *supra* ad n. 17. cit.

And, indeed, I formerly said in the *Adversaria* (c), that I had seen fat sometimes in the facculi of this membrane, so ting'd with blood, that these facculi themselves resembl'd flesh. But whether the case was thus or not, or rather whether the redness was in the very thick and distended vessels, which creep through the very frequent and very thin little membranes, that are interpos'd to the fat, and seen through it; it certainly did not happen to me, at that time, to see those parts of the adipose membrane conglobated into a tumour, and surrounded with a peculiar coat. And though I would not deny but this might have happen'd to others; yet I believe that, on the other hand, all will not deny but these fleshy excrescences may easily arise from the fleshy fibres themselves, where any part of them is lacerated or eroded.

But these excrescences do not relate to encysted tumours, nor yet the excrescences of the adipose membrane. Yet as some very learned men may seem to have confounded these latter with steatomata, and others may seem to have distinguish'd them from these indeed, and nevertheless to have plac'd them among encysted tumours; I will here fully explain to you what I understand by the term of excrescence of the adipose membrane, and what structure thereof I have observ'd.

22. John Philip Jagraffias, where he treats of the *natta* (d), which, he says, he had seen only in the scapulæ, having found fat contain'd therein, though sometimes flesh also, does not doubt but it is to be reduc'd to the class of steatomata. And our Fabricius ab Aquapendente (e) asserts, that the steatoma, when it is not in the head, but in other parts, "seems to contain a matter rather similar to other fat than to suct." Which remark clearly shows, that our ancestors, although a sebaceous matter was not found by them in tumours, but fat, did not, for this reason, suppose that a new class of tumours was to be constituted, as in our memory Litre (f), who thought proper that a tumour of this kind should be separated from a steatoma, and call'd a lipoma, such as he saw on the scapula of a man, full of soft fat, not sebaceous matter. Yet Ruysch (g), when he afterwards describ'd a tumour of that kind in a few words, continu'd to call it a steatoma.

But Palsin (h), taking notice of two tumours of the same kind, which had grown out to a prodigious size in the back of two women, makes use of neither term; and what all those whom I have nam'd have either expressly done, or at least in such a manner, that, upon well-weighting all things, we may conjecture the same thing, omits himself to tell us, whether these tumours of those women were comprehended in a peculiar cyst likewise.

Nor, indeed, does he, or the others, declare with sufficient plainness, what fat was found in those tumours, whether it was comprehended in many cells, as in the adipose membrane, or whether it fill'd up the whole cavity, without any small membranes being interpos'd; so that those who read the account may be suspicious that it was, if not "liquefied oil," with which

(c) II. Animad. 6.

(d) in fine Tract. de Tumor. p. n.

(e) in fine Append. l. 1. Chirurg.

(f) Hist. de l'Acad. R. des Sc. A. 1709. Obs. Anat. 3.

(g) Epist. ad Boerh.

(h) Anat. du corps. hum. tr. 2. ch. 2.

Boerhaave (*i*) asserts, that he, in conjunction with Ruysch, had seen a tumour (of eight pounds in weight, taken from the back of a porter) fill'd; yet, at least, that it was a "substance" which "was nothing but oil," as he had said a little above, when taking notice of another tumour, or else the same, as it weigh'd just the same number of pounds, and was seen by Ruysch.

It is not certain therefore, notwithstanding some of them might be, that all the tumours I have spoken of were excrescences of the adipose membrane itself, as that in fact was, which is describ'd about the scapula of a woman, by Blesius (*k*), and call'd *excrescentia adiposa* by him: which I omitted among those taken notice of above, not because it was dissimilar in the substance which it contain'd; for this resembl'd nothing but a yellowish fat; but because the same substance was not soft, but endow'd, in some measure, with a cartilaginous hardness.

I, however, formerly sent an observation to Schrockius, of a large adipose tumour, which itself also possess'd the region of the scapula; and that was in a woman too, as most of the others that I have spoken of likewise were. If you read this, for it is publish'd by Schrockius (*l*), and for that reason will not be repeated here, and join with it another, which I shall immediately subjoin, you will easily perceive how far my observations and opinions differ from those of others.

23. A man, without any previous cause that he knew of, had a small tumour appear in the common integuments of one buttock. This tumour encreasing by degrees, at length reach'd to such a size, as to equal the magnitude of a child's head, if not to exceed it. It was of a globular form, and being connected to the buttock by a short peduncle, not thicker than two thumbs, hung downwards. There was the same colour both in the peduncle and the tumour, as in the other parts of the skin. There was no pain if you handled them, no hardness, no fluctuation, no pulsation. But the bulk was inconvenient to him when sitting, and the weight (although it was sustain'd with a broad and proper bandage, lest the tumour should increase by distraction, as it was very possible for it to do) was uneasy to him when standing or walking; and, at length, a fever, and a sense of violent heat, which two symptoms sometimes follow'd a very long or very quick walking, laid the man under a necessity of consulting Valsalva.

Valsalva having consider'd the whole of the case, and not doubting but the tumour should be taken off, perform'd the operation a few days after, in my presence, and in the following manner. After having tied up the peduncle by a ligature, near to the globe of the tumour, and not having, even by this means, perceiv'd any pulsation above the ligature, which show'd the existence of any pretty considerable artery in that part, he cut the peduncle across, above the ligature. Nor did any more blood come forth upon the incision, than he had expected; but one small artery showing itself, and that so very small as to be stopp'd by compression alone, and but one vein of any importance, which however was but small, running at the side of

(*i*) Prælect. ad § cit. supra ad n. 17.

(*k*) Part. 1. Obs. Med. rar. 3.

(*l*) Eph. N. C. Cent. 5. Obs. 17.

the peduncle under the skin, and being manifest before dissection. And the wound being in a man of a good habit of body, and at a good season of the year; for it was the spring of the year 1704; which much forwarded the advantage of remedies, was very soon heal'd up.

As the tumour had been taken out by Valsalva while I was looking on, so it was cut into and examin'd by me on the same day, while he look'd on. In the very place of excision, before I began to dissect it, there appear'd four or five cylindrical bodies, as it were, of the thickness of a little finger, of which the peduncle consisted. Pursuing the course of these bodies then, I saw that the tumour was nothing else but the production thereof. For being become very thick, unequal, and tortuous, and being divided, each into many, they made up the whole of that bulk. Nor was there any need of the knife to disjoin them; for they were better disjoin'd by the fingers, and more easily, that is, by pushing them on gradually.

The structure and nature of these bodies was the same in the peduncle, and every where else; that is to say, their nature and structure was the same with that of the adipose membrane; so as to differ from it in no point, whether you consider'd the surrounding and interpos'd little membranes, or the fat they contain'd, which was soft and greasy to the fingers, and inclining from a white colour to a yellow, of which kind the fat in the most healthy bodies is. No sanguiferous vessels appear'd to the eye, except at the upper part; and these were small, as I had before perceiv'd to be the case, from what I remark'd during the excision. However, the whole tumour was surrounded with a pretty thick skin, so that you might divide it into two laminæ with the scalpel.

24. I do not doubt but from this observation, and the observation I sent to Schrockius, which agrees with this in every circumstance, you will clearly perceive, that these two tumours, dissected by me, were nothing but excrescences of the adipose membrane itself, that lies under the skin; as they were not made up of fat more or less liquid, and every where comprehended in a peculiar cyst, but made up of fat which was included in the membranous cells, not only endow'd with the same structure and nature wherewith they evidently are endow'd in that membrane, but, as the transverse section both of the peduncle and basis shew'd, evidently continu'd into that membrane.

Nor is the internal of those two laminæ, into which I have said that the skin might be divided, to be consider'd as a peculiar cyst; not only because I know that it was not allowable to do so in that other observation, but also in particular, because in either one or the other, if there had been a cyst which every where embrac'd the tumour, certainly that portion of the cyst which comprehended the upper part, would have been left within in its proper situation, as it was not cut out together with the tumour: and that it was not left within is to be argu'd from hence, that the wounds of both patients were easily heal'd, and without the assistance of such things as destroy a portion of the follicle left behind, by corroding or putrefying it; whereas if this be not consum'd, the wound is not brought to a firm cicatrix, and the tumour returns afterwards: neither of which circumstances happen'd to these patients.

To this very kind of tumour, I should suppose, belong'd that which I have already (*m*) mention'd to you, as being taken for an omphalo-epiplocele, by physicians of eminence; whereas in the body, after death, no hernia was found there, but only a prominence from a quantity of fat which the cells, indeed, of the subjected membrana adiposa contain'd, but no peculiar cyst. And that to this class belong that globe of sound fat, which I formerly spoke of to you in another letter (*n*), as lying under the skin of the abdomen in like manner, but somewhat higher than the other; that is to say, about the ensiform cartilage of an old woman; I, for a certainty, know, inasmuch as I dissected it myself, and clearly saw that it appear'd in the manner I here require; as I do also of that which I shall describe hereafter (*o*), as having been accurately examin'd by me in the thigh of another woman.

And that of the two propos'd by Littre, the one which he himself also found in the thigh of a decrepit woman (*p*) was similar to these, I should more readily believe, than of that, taken notice of above (*q*), upon the scapula of a man; as in this he not only has made no mention of cells, but has even expressly suppos'd a cyst wherewith it was surrounded; whereas in that tumour of the woman he makes mention of cells indeed, but by no means of a cyst; and even when there is a necessity of coming to the amputation of a tumour which does not yield to those things that he recommends to be applied externally, in the beginning, he would have nothing of the tumour left behind, lest, as he says, it should happen to spring forth again from some cell that was already relax'd, and not from the remains of the cyst, which, if he had then seen it to exist in any part, he would not there have omitted.

A tumour made up of fat Littre suppos'd to be very rare, and perhaps not seen before. Yet Elsholzius (*r*) had, thirty-eight years before, publish'd the dissection of a tumour, under the name of a steatoma, which having been form'd in a soldier, almost betwixt his thighs, contain'd fat, "in very thin little membranes, dispers'd through the whole mass of the tumour, and distinguish'd into cells as it were." And this tumour I could scarcely suppose to differ from those that I dissected, even considering the representation of it when dissected, if a surrounding follicle had not been spoken of, and that almost equal to a goose-quill in thickness.

There are others also, of which mention is made by Alexander Camera-rius (*s*), as containing fat, or a matter similar to fat; but with this other, and still other substances, and amongst these some having glands lying betwixt, or as not existing in the membrana adiposa; so that I cannot consider them as true excrescences of this membrane; as I, in like manner, cannot those that are describ'd in the *Commercium Litterarium* (*t*), as made up "of fat like the udder of a beast, or the breast of a woman, being contain'd in its proper cells, tenacious, hard, and thick, and having very large vessels

(*m*) Epist. 43. n. 10.

(*n*) Epist. 19. n. 18.

(*o*) Epist. 68. n. 6. Adde etiam alterum
ibid. n. 8.

(*p*) Hist. de l'Acad. R. des Sc. A. 1704.
Obs. Anat. 1.

(*q*) N. 22. (*r*) Hist. Steatomat. resect.

(*s*) Hist. Pedis tumid.

(*t*) A. 1741. Hebdom. 1. n. 4.

“ carrying red blood interspers’d with it :” although I do not deny but these might have been so in the beginning, as well as those describ’d by me. Be this as it will, however, I take upon me to persuade you to join these to this section of the Sepulchretum, as you may do it with justice.

And I think just in the same manner of two tumours in particular, one of which was describ’d by Jo. George Hoyer (*u*), and the other by Elias Camerarius (*x*) ; the former in a woman of an advanc’d age, about the region of the left scapula ; the latter upon the knee of a man, and above it. The improper methods of application that had been made use of by mountebanks, might change many things in both tumours, as far as relates to the substances interpos’d to their more deep and retir’d situation, or to the consistence of the fat ; and those appearances that are call’d glandular conglomerations, but are said to consist of a matter similar to the adipose substance, and those parts that are said to be many alveoli, as it were, or small cavities, from which the softer fat was press’d out, might formerly have been the cells of this fat.

But these things amount to no more than conjecture : this is certain, that if I had found a tumour of that kind whereof you have a very small one describ’d in the forty-fourth letter (*y*) under the skin itself, as I did in the mesentery, I should never have {class’d it among the true excrescences of the adipose membrane ; for it contain’d fat which was not separated by the laminæ of the cells, and was every-where comprehended in one spherical follicle.

25. But whatever cause may relax the skin in a certain place, so as to make it give less resistance to the weight or bulk of the many fat cells, which increase more and more in the part where there is the least resistance, especially if compression, or any obstruction be added ; either of the small veins that carry back the fat from those cells, or even of the foramina by which it is transmitted into the neighbouring cells, affords us an easy method of accounting for the origin of these excrescences whereof we speak, and their vast increase also ; the very weight of the fat, for instance, relaxing every day more and more both the cells and the skin : for which reason still other and other cells, upon the removal of the former resistance, expand themselves, and are enlarg’d in a surprizing manner.

How much the removal of resistance contributes to the enlargement even of fat tumours, those two in particular which I spoke of just now (*z*), as describ’d by those celebrated men Jo. George Hoyer and Elias Camerarius, show. For the skin being eroded, or incis’d, by mountebanks, and almost all their adipose substance, or at least a very considerable part of it, being taken away, these tumours began to be enlarg’d in a surprizing manner, and had a very speedy increase in their substances of this kind ; as you will learn from the histories of both.

However, although in speaking of the membrana adiposa itself, I have mention’d nothing of it in this place, but its cells ; I did not, for that reason, mean to determine any thing in relation to its structure. For whether you should chuse to call any of the larger parts of that membrane sacculi, or lobes,

(*u*) Eph. N. C. Dec. 3. A. 7, & 8. Obs. 183.

(*x*) Dec. ead. A. 5, & 6. Obs. 41.

(*y*) N. 3.

(*z*) N. 24.

and the lesser parts lobules, and, in fine, very small cells, or kernel-like bodies ; or whether you chuse to comprehend all these under one term of cells, or to call them membranous *revolutions and complications*, or even membranous *laminæ* variously inclin'd to each other ; it will equally tend to give you a just conception of the matter : and you will find authors, who are by no means contemptible, speaking of each of these modes of structure. For the fourth is from an illustrious anatomist among the more modern ; the third from our Sanctorius (*a*), who by this means led the way, as it were, to those modes which we have from the others ; the second was made use of by Glisson (*b*), though he had not as yet, in my opinion, seen that of Malpighi, when he wrote, nor yet Malpighi that of Glisson, as I believe Malpighi publish'd his (*c*) before the other ; and his was almost the same as that which was pointed out in the first place by me.

And that, if you please, you may follow : for what forbids us to divide the larger parts into smaller, and these into very small ? especially as Malpighi has, if I remember rightly, no-where expressly denied, that these parts have communication with each other, and with the rest ; nor has taught that the membranous “ *sacculi, or lobuli,*” have an oval figure, but “ *almost oval ;*” and even “ *that they are differently figur'd, and are like the small lobes of which the lungs are also compos'd :*” and of how different forms these lobules are, appears from the figures that he join'd to his epistles of the lungs. And he had, moreover, written this before, “ *that in a sacculus were contain'd very small lobules of a very different figure, fill'd with fat.*”

However, to return to excrescences of that kind which I have spoken of ; that some excrescences, very similar to them, exist not only in the adipose membrane, but also in other internal membranes, and particularly in the omentum, is shown by an observation which is transferr'd into the *Bibliotheca Anatomica* (*d*), of innumerable processes, an inch in thickness, and four or five inches in length, that hung from the adipose parts of the omentum, being also turgid with the same kind of half-concreted oleose fluid that the other adipose membranes are. But omitting these more internal tumours, let us go on to speak of those which fall under the notice of the hands and eyes, as the intention of this letter requires.

26. But although, for the sake of some order, I shall speak of those tumours that remain in such a manner as to follow their situation, rather than their nature ; that is, to begin with those which occur in the head and the neck, and after that to descend to the inferior parts ; I would not, however, have you expect that I here take notice of the venereal “ *gummata,*” which discover themselves there, and in other parts ; as I shall, with more propriety, reserve the consideration of them till we come to consider the venereal lues (*e*) ; and much less that I here repeat what I have already written (*f*) on the hydrocephalus, or on the polypi of the nostrils (*g*).

As to tumours of the tongue, I have, indeed, seen many of them ; but

(*a*) Comment. in I. Fen Avic. Quæst. 55.

(*b*) Tract. de Partib. Continent. c. 11, &

15.

(*c*) Exercit. de Omento, Pingued. & cæt.

(*d*) Tom. 1. P. 1. in Adnot. ad cit. Malp. Exercit.

(*e*) Epist. 58.

(*g*) Epist. 14.

(*f*) Epist. 12.

never have had opportunity of examining any by dissection. Yet among those I have seen, I am not willing to omit, in this place, some very small tubercles, like warts, on the upper surface of it, very near to the basis, which were formerly shown to me by a surgeon, in a woman of Padua, in order to take my advice in regard to the proper method of extirpating them. I was not ignorant that Marcellus Donatus (*b*) had mention'd verrucæ, or warts, of the tongue, as a very rare case, and what had been seen by him but twice in the whole course of his life. For which reason, I was the more attentive to examine them, while the woman thrust forth her tongue, and the surgeon depress'd it. And, indeed, nothing could be more like warts in appearance; but, in fact, those tubercles were nothing more than the last and largest of all the papillæ, as the situation and position of them immediately show'd; being diseas'd only in this one respect, that, as this part of the tongue was affected with a phlogosis, they were also become somewhat thicker and higher than usual, and protuberated.

I desir'd, therefore, both the woman and the surgeon to be of good courage, and gave him no other advice in regard to these tubercles, when I conferr'd with him, but that he should frequent anatomical demonstrations; by the neglect of which it happens more frequently than you imagine, that the appearances which are natural are consider'd as morbid; just as when those foramina that naturally open in the neighbouring tonsils are taken for ulcers.

The tonsils, however, I have more than once dissected in dead bodies, either when tumid from a present inflammation, or from one that had preceded.

But I never was willing to persuade any one to have them taken away with the knife, when they were become hard, and growing out into scirrhus tumours; not because I was ignorant that they might be taken out, but because I could not be sure that other surgeons would make use of the same dexterity and felicity, in this operation, as some very experienc'd surgeons have done, and in particular Benevoli (*i*); especially as I am very well inform'd in how much danger some of those who have undergone the operation of extirpating the tonsils have been, on account of a very great effusion of blood, which has not been stopp'd, at length, but with difficulty.

And I was very glad when I heard that very prudent and learned physician Francesco Serao say, in a conference with me, that he us'd to behave in nearly the same manner; that is, to propose, on the one hand, the successful instances of their extirpation, many of which he had seen; and, on the other hand, the examples wherein there had been great fear and danger, which he likewise was not ignorant of: and then leave to the discretion of those who consulted him what they would do, without interposing any judgment or persuasion of his own.

Yet those surgeons better deserve to be forgiven, who, when they see that passage which is necessary for speaking, swallowing, and breathing, already become very narrow, by reason of a scirrhus tumour of both the tonsils, and all other remedies of no effect, fearing that it will be every day more narrow, are bold enough to precipitate the patient into a present danger, in

(*b*) De Medic. Hist. Mirab. 1. 3. c. 5.

(*i*) Osservaz. 12.

order to avoid a future one; better deserve, I say, to be forgiven, than they who undertake to extirpate a wart, or any other harmless tubercle of that kind, from the face, especially if it be congenial and livid; not attending to what Arantius (*k*) has admonish'd us of, that if the case succeed well, very small reputation is acquir'd thereby, as from a case of very small importance; but that great infamy and reproach are the consequences, if, which frequently and easily happens, the most violent disorders are excited even from a slight irritation of the face: I say, of the face; inasmuch as I saw a case which happen'd, not from the extirpation of a tubercle of this kind from the skin of the nose or lips, but from the skin of the cheek, and that to the great disgrace of the surgeon. At first, indeed, there was only a slight ulcer; but this could not be brought to a cicatrix, though in a priest who was in other respects in very good health; and this at length degenerated into a large cancerous and incurable ulcer, in which state I saw it; so that the whole cheek was entirely consum'd, and the patient kill'd by the most severe and excruciating pains. Yet the surgeon had taken off this tubercle by the knife: and this I say, that you may be less surpriz'd to read of a much larger cancerous ulcer having been the consequence, when another surgeon had undertaken to remove a wart of the face (*l*) by "caustic" remedies.

27. But as to what I saw, by dissection, in a recent and large tumour that occupied the cheek, and the parts that are below the chin and the ear (*m*); or in another less recent, that had been form'd behind the ear (*n*); or what kind of matter I found in the parotid gland; and into what a hardness it degenerated by stagnation; has been sufficiently said on a former occasion (*o*). But what makes that tumour in the same gland, which we call the *parotis*, and which every one knows to happen often in the height of an acute disease, while the event of it is yet doubtful; though sometimes it happens even in those who are upon the recovery, and such as are taken up from the bed, and that with success; as it never yet happen'd to me to dissect it, I cannot certainly say: yet you will, perhaps, conjecture, that it may sometimes be brought on from a fluid, which rather distends the common integuments of the gland, than the gland itself; and conjecture it in consequence of what I have taken notice of, as having been seen by me, when describing that tumour which was mention'd in the first place, especially where the gland, after the suppuration and cure of the tumour, performs its office properly as before.

And that the gland itself grows gradually tumid sometimes, without any preceding fever, and becomes hard, just as the other glands that lie lower in the neck do, when they grow large and strumous, is too well known to all physicians and surgeons; to whom they generally create a good deal of trouble. Yet sometimes they are resolv'd much more easily than could be expected. Thus in a Venetian girl of seven years of age, I remember that it had become very hard, and extremely tumid, and could not be touch'd without pain; yet that the whole of the matter which had stagnated there, was

(*k*) De Tumorib. p. n. c. 23. & 31.

(*l*) Eph. N. C. Cent. 5. Obs. 35.

(*m*) Epist. 4. n. 24.

(*n*) Ep. 14. n. 3.

(*o*) Ep. 11. n. 15.

entirely, though slowly, discuss'd ; and that the gland return'd to its natural proportion, merely by the help of anointing it with the *Oleum Philosophorum*.

But in regard to strumas, I have heard our Vallisneri more than once assert, that when a poor woman had brought to him her child, who was a very young girl, and strumous ; he, in consequence of her poverty, had prescrib'd nothing to be taken but a small wine, in which the insects call'd *seres* were macerated ; and the woman had even always put more of them into the wine than he order'd, and by that means excited a great flow of urine ; and that she return'd with her daughter a month after, who was perfectly cur'd, to his very great surprize.

These remedies, however, I do not make mention of as being unknown ; but rather because they are so very well known, and, for that reason, despis'd by some ; whereas they nevertheless may sometimes, and particularly in a tender age, when the disease is not very inveterate, be of greater use to the patient than we could hope or expect.

28. Perhaps you will here enquire, whether some things said by Riolanus upon strumæ, in the second book and fifteenth chapter of his *Anthropographia*, are said with propriety and justice. And these are said with justice and propriety : “ Nor is it without reason that Julius Pollux, in his *Onomasticon*, “ has observ'd that strumæ are form'd about the mesentery. On this subject “ see Philip Ingrassias, in his book of tumours, page two hundred and “ ninety-nine.” But these things, which immediately precede, are not said with justice : “ Nor do strumas ever break out externally, unless the mesen- “ tery has been strumous. And, for this reason, Guido de Cauliaco very “ properly derives the source of strumas from the mesentery.”

For Guido (*p*), and he who is quoted by him, Arnoldus, says this ; that from external strumas, if many in number, the existence of the internal is prov'd. Nor is what Riolanus says universally true ; I mean, that the struma never appears outwardly, unless there are others in the mesentery : and that is deservedly disapprov'd by Thomas Bartholin (*q*). Against whom Riolanus is not well defended in this section of the *Sepulchretum* (*r*), as if he had said no more than what is said by Guido ; that is, if the external strumæ are “ in great number.” For Riolanus has added this in his *Encheiridion* (*s*), and even has more contracted, in that work, what he had before said in his *Anthropographia*, by saying, that strumas “ rarely appear externally in great “ numbers, unless they have their roots seated in the mesentery.” Bartholin, however, did not refer to the *Encheiridion*, but to the *Anthropographia* ; as others have also done ; and among these Schelhammer (*t*) ; and before him Scultetus. Who, as you see from the *Sepulchretum* itself (*u*), attributed this universal opinion to Riolanus ; and added, “ which even Guido and “ Ingrassias bear testimony to.”

(*p*) Chirurg. tr. 2. doctr. 1. c. 4.

(*q*) Anat. quart. renov. l. 1. c. 12.

(*r*) Obs. 6. Schol. ad §. 4.

(*s*) l. 2. c. 18.

(*t*) De hum. corp. Tumorib. S. 2. P. 1. n. 78.

(*u*) Obs. cit. §. 9.

What the first of these authors has asserted, I have already told you; and Ingrassias is not even said to have asserted this by Riolanus; but it is quoted as relating the opinion of Pollux, (which is quite different) and confirming it; that is to say, “that strumas are also form’d about the mesentery;” which Schelhammer and Scultetus would have known, as Riolanus admonishes, by inspecting the book of Ingrassias, and he who added the scholium of this observation in the *Sepulchretum*; in whom, in other respects, there is no reason why we should require this diligence, since neither the passage of Scultetus is accurately copied, nor is the chapter of Riolanus rightly put down; but the fifth instead of the fifteenth; and the thirty-ninth observation of Scultetus instead of the thirty-first.

Some years ago I saw a noble youth that might have been compar’d with him describ’d in the *Sepulchretum* by Platerus (*x*), by reason of the number of his external strumas, and the various, but always useless, methods of cure, that had been made use of; who in the first year, however, had no mark of the mesentery being affected in the same manner. But neither Platerus examin’d the belly of his patient, though he had it in his power; nor I of mine, as he at length died at some distance from hence.

Yet this which I shall immediately subjoin, and which is sufficient against what is pronounc’d by Riolanus in his *Anthropographia*, I remember to have seen in another body.

29. A young man had died in this hospital, about the beginning of November, in the year 1715, from the effects of strumous tumours, which beset his neck.

Being led, by the desire of anatomical researches, to dissect some other parts, and among them the mesentery, I not only found no struma in them, but even no indurated glands: and although they seem’d to be a little larger than they generally are, I suppos’d this to be owing rather to the age (*y*) of the patient, for he was very young, than to disease.

30. That tumours of the thyroid gland ought to be entirely referr’d to the class of strumas of the neck, and that they are improperly call’d bronchoceles, is affirm’d by John Freind (*z*); who acknowledges many kinds of these, but all on the outside of that gland; and amongst them one that is similar to an aneurism; to which, therefore, the scalpel ought not to be applied. But John Riolanus (*a*), before Schelhammer (*b*), who thought himself to be the first that had observ’d this, classes among bronchoceles, which he supposes to differ “widely from strumas,” the thyroid gland, “in a more extended state, which produces a sarcoma;” nor does he mention any one among them that is similar to an aneurism.

For I would have you take care how you suppose that the example which is immediately subjoin’d to this passage of Riolanus, in the *Sepulchretum* (*c*), of a bronchocele of that kind, which was very similar to an aneurism, unless it was rather a real aneurism, belongs to the same author; that is, to Riolanus, or perhaps to Parey; both of whose words and observations had been just

(*x*) Obs. ead. §. 3.

(*y*) Vid. Haller. ad Boerh. Prælect. §. 128.

not. 2.

(*z*) Hist. Medic. ubi de Albucasi.

(*a*) Encheir. Anat. l. 4. c. 7.

(*b*) l. cit. S. & P. ead. n. 83.

(*c*) Sect. hac 2. Obs. 5. §. 2.

before quoted. But if you ask to whom then that example, and the two which follow next (*d*), belong, read Severinus (*e*); and you will find that those three instances are describ'd from him, though with great negligence; and that he has expressly plac'd the last in the class of aneurisms themselves.

To me, however, it has always happen'd, that, among the great number of swell'd necks, suppos'd to be affected with a bronchocele, which I have dissected, I always found the disorder in the thyroid gland; even when there was a cavity similar to that of an aneurism; or one, at least, which was full of blood. But as these observations of mine, of the various and manifold disorder in that gland, when tumid, are already extant in the ninth of the *Epistolæ Anatomicae* (*f*), there is no occasion to repeat them here. Moreover, you have others in other letters which I have sent to you (*g*); and I shall add some here; from which you may more and more understand, how various the disorders of that gland are; or, at least, of what nature the beginnings of this disorder are.

31. A woman, whose body was dissected in this college, in the year 1741, the remainder of whose history I shall send to you when I treat of the gout (*b*), had the thyroid gland much thicker than it naturally is, roundish in its figure, and universally conglobated into itself. In cutting into it I found it to be hard, and even scirrhus; a white substance being here and there interpos'd betwixt a substance which was of a fleshy colour, degenerating into brown.

32. As I was dissecting the head and neck of another woman, in the same place, and the same year, I observ'd the gland we are speaking of to be somewhat hard at the lower part of the left lobe; cutting both lobes asunder, therefore, longitudinally, I saw many and pretty large portions of a white substance intermix'd with both, and particularly the right; and in the other, in which I have said there was a part somewhat hard, I saw a cyst included, made up of a thick and white coat, wherein a yellow humour, somewhat dense in its consistence, was contain'd.

33. A man, whose head and neck were dissected there about the same time, had one lobe of the thyroid gland larger than the other, and considerably higher. When I examin'd with great attention the upper part of that lobe, which was very hard; I observ'd a membranous bladder, of the form of a very round globe, to be half-buried in it: and this bladder being perforated, a humour of a viscid nature and a yellow colour, so as to resemble bile, was discharg'd.

34. The larynx of a woman was prepar'd for demonstration in the same place, in the year 1744. The same gland being taken out, and being larger and more turgid than it generally is, shew'd certain globules, which were in one part of them protuberant, and in the other part buried within the glandular substance, being all of a round form, but of different magnitudes from each other. The largest was equal to the size of a grape: the others were much less. When the coat of these globules was punctur'd, a fluid, like

(*d*) § 3, & 4.

(*e*) De record. Abscess. nat. l. 4. c. 6, & 7.

(*f*) N. 38. & seq.

(*g*) Epist. 16. n. 38. Epist. 23. n. 4. Epist.

26. n. 21. & Epist. 34. n. 15.

(*b*) Epist. 57. n. 2.

water, and without any colour, came forth. But the largest was of a far different kind; for it was made up of a firm substance, as I perceiv'd by dissection, not much unlike that of which the conglobated glands consist, but of a reddish colour, degenerating into a dirty white, except where it was here and there distinguish'd with small spots of black blood, as it were, and in some places with very small cavities that contain'd nothing.

35. Another woman, who was dissected a little after that, but in the hospital, had in the thyroid gland, at the basis of the right lobe, a small white body of the bigness of a vetch, and in some measure of the form, being a little prominent on the outside of the gland: and in cutting into this body, I found it rather to be bony than cartilaginous.

36. A young man having died of an ascites, his head and neck, as no better could be then procur'd, were brought into the theatre, in order to finish the public anatomical demonstrations of the year 1747. In which, though the other parts were in a pretty natural state, the gland that I have so often spoken of was thicker than it generally is, and, at the lower part of one of its lobes, even harder. In this place, when dissected, I saw that it consisted of round vesicles, as it were, full of mucus. The remaining substance, if you examin'd it externally, represented the gland as divided into pretty large lobes; if internally, into very small lobes, but more than usually distinct.

37. From these observations you perceive, that the tumours of the thyroid gland, or the beginnings of these tumours, happen more frequently to the female sex, than to ours. And this I have also hinted at in the *Epistolæ Anatomicæ* (i); and you will conjecture it from the examples of a bronchocele which are transferr'd into the Sepulcretum, first, if you compare them altogether; for you will not only find them in this section of the Sepulchretum, but also in the eighth section of the third book (k), and in the second section of the second book (l), which I wonder that Bonetus should have forgot to mention here, according to his custom; and in the second place, if you set aside those things that rather relate to true aneurisms, which you will very easily find out by comparing them with the books from whence they are taken.

But I suppose it will be of no consequence to compare one of those that are propos'd in the second book, from Moinichenius, for instance; for in this case I should put you in mind that, instead of *Epid.* 77, as it is publish'd in the Sepulchretum, you should read *Epist.* 87; for Moinichenius wrote that to Bartholin at the end of this letter (m). And there would be no need of conjecture, if they who have told us what they found in the bronchocele, had not omitted to take notice in what state they found the thyroid gland: to which, however, I suppose them most frequently to have belong'd; and this not only from some of the author's words, but still more from all the observations I have made quite to the present time.

But I would, likewise, have you examine those that have been publish'd

(i) *Epist.* 9. n. 40.

(k) *Obs.* 31. in fine.

(l) *Obs.* 9. § 1, & 4.

(m) *Vid.* in Bartholini Cent. 2. *Epist. Medic.*

by men of eminence since the second edition of the *Sepulchretum*, Henricus Albertus Nicolai (*n*), Philip Conrade Fabricius (*o*), the French physician Lalouette (*p*), Janus Plancus (*q*), Albertus Haller (*r*), and others; and among these, as I learn from Boeclerus (*s*), Lauthius. That different persons have seen different disorders in the thyroid gland, you will find by reading their observations; but that most of them met with hard bodies of a cartilaginous, bony, or stony nature, and sometimes even found the gland itself become bony, or of a stony nature.

Do not, however, imagine, because there is more than one of them, as well as myself, who have sometimes observ'd these or other disorders in one lobe of the gland only, the other being quite sound; do not, I say, imagine that this gland is not solitary, but consists really of two; unless you chuse to suspect the same of the spleen or the liver, when one part of them is seiz'd with a disease, though the other is sound. And still more beware, where you read some disquisitions upon the thyroid gland, lest you are easily allur'd by the promises which you find in the beginning. But previously read, with attention, whatever is written of this gland, not only in the ninth of the *Epistolæ Anatomicæ* (*t*), but also in those passages that the same epistle refers to of the first, fourth, and sixth *Adversaria*; and then, at length, read over those disquisitions also.

You will, indeed, commend, in concert with me, the design of the author, and his endeavour to promote and illustrate that suspicion of mine, of many but very slender tubuli going from the thyroid gland, and terminating in the larynx. But you will wish, at the same time, that he had conjectur'd these to be far different from lymphæducts, bearing in mind the office and structure thereof: and, in other things, that what is mine he would attribute to me; that what is not mine he would not attribute to me; as, for example's sake, where I am said to have prohibited the immission of air, or to have rejected the compression of this gland, in order to enquire into the tubuli thereof.

Is not it sufficient to have inspected, though never so slightly, a page or two of that epistle (*u*), in order to show whether I prohibited immission of air? Did I reject the compression of the gland? I admonish'd that this was to be done with caution and gentleness: which was very well understood by that experienc'd man Boecler (*x*), when, dissenting from the author of the *Disquisitiones*, he has said that he was on my side of the question; for, says he, "we could not elevate the rest of the vesicles, (and even then not all of them) except by strongly inflating one; so that we suppose the air to have made a way from hence into the cellular membrane, by rupturing the vessels, and by this means to have swell'd the whole gland."

And how many times I have made use of the compression of this gland, I have not only not spar'd to declare, but have, moreover, expressly refuted

(*n*) Dec. Obs. Illustr. Anat. Obs. 4.

(*o*) Idea Anat. Pract. Sect. 4.

(*p*) Memoir. de Math. & de Phys. présentés à l'Acad. R. des Sc. Tom. 1. pag. 168, 169.

(*q*) Epist. de Monstris & cæt. cum Tab. 3. Fig. 1, & 2.

(*r*) Opusc. Pathol. Obs. 6.

(*s*) Dissert. de Thyroidææ, Thymi & cæt. Functionibus, not. 9. ad § 18.

(*t*) N. 30. & seqq. usque ad 41.

(*u*) N. 36, & 37.

(*x*) Dissert. cit. not. f ad § 8.

the reasoning of those who would attempt to prove it useless. How then is the case? Is it possible that the reason which another advances, and which I soon after reject, has been taken for mine by him who read it in a very cursory manner? Something of this kind, certainly, seems to have drawn into an error another certain person, who, in a kind of anatomical problem, not, perhaps, observing how that is to be understood, in disputations, which is set apart for the sake of *gratification*, as it were, by way of hypothesis, and in the mean while is left as doubtful and undetermin'd; and thinking that I contested against Cowper in that passage, in which I continu'd to defend this very Cowper, did not hesitate to defend him against me; and not only this, but, like an exulting victor, took upon him to subjoin the following words: "Let Morgagni now say what, & *cæt.*" Upon reading which words, a friend of mine replied, And what should Morgagni say but what I formerly heard him say, when some young men, who had very often found in the books of learned authors, that Morgagni had observ'd some certain things "after" Berengarius, Falloppius, Arantius, and other anatomists, but were ignorant that these authors were expressly referr'd to by Morgagni in those observations, so as to confess by whom he had profited, and yet to show what he had added to their discoveries; when, therefore, these young men were surpriz'd, that the passages of so many authors which I have quoted had escap'd his eyes or memory; his reply was, I would not have you be too hasty in judging.

But of myself I have spoken more than enough, and enough of tumours of the thyroid gland, when I have added this, that they who have remark'd a change of the voice from thence, may have different methods of accounting for this change, either from the influx of fluid into the larynx being obstructed or chang'd, or from the distraction or compression of the adjacent muscles of the larynx, or from the weight that lies on this tube, and the bulk that forces against it: which I have very briefly hinted at in that ninth letter (*y*).

Yet far more violent symptoms may happen from the pressure being too much increas'd, whether this fall upon the jugular veins, from whence the illustrious Haller (*z*) saw a soporific disorder and an apoplexy, or principally confine the aspera arteria, which the same author has observ'd, so that the breath could not be drawn without difficulty: and, indeed, sometimes it could not be drawn at all; as others have observ'd, and Kerckringius (*a*) in preference to the rest, who, mov'd by the suffocation of a miserable woman, blam'd the physicians for having omitted to endeavour, by a diminution and diversion of the humours, to prevent the tumour from increasing so fast, at least, and pressing the aspera arteria against the vertebræ of the neck by its precipitate increase.

38. But now, as I have already written to you of tumours of the jugular glands (*b*), and of those aneurisms in the neck which are real (*c*); come, let us go on to the chest.

In respect to tumours of the breast of women, our Fabricius de Aqua-

(*y*) N. 40.

(*z*) Obs. cit. 6.

(*b*) Epist. 22. n. 19. & Epist. 29. n. 12.

(*a*) Obs. ex Sepulchr. supra cit. 9. § 1.

(*c*) Epist. 26. n. 21.

pendente (*d*) denies, that he had ever seen those which came on at the time of the milk's coming, not perfectly cur'd. Yet the patients frequently suffer various and very troublesome inconveniences, before the abscesses, into which they degenerate, are perfectly heal'd. For which reason it were the more to be wish'd, that there were remedies at hand, by which women, after delivery, who abound with milk, but, for certain reasons, cannot give suck, could safely drive away their milk, before it could be turn'd into abscesses.

There was a physician at Bologna who asserted, that this might be done by suspending a little dried fish, which they call the hippocampus, or sea-horse, betwixt the scapulæ, especially, as he himself said, when taken at a certain time; wherefore, as he had two, he said that the one was more efficacious than the other, and willingly lent the most useful of the two to those who ask'd it of him.

Among these was an ingenious young man, who applied to the study of medicine there with me, before the beginning of this century, and had already begun to practise it there: and this gentleman, having tried the effect of that fish upon two women, asserted that it had answer'd in both of them. But hearing nothing of this experiment for thirty years after and more; I, at length, found it spoken of in the posthumous works of our Vallisneri (*e*), who says, that he had made the same experiment often, and that it had succeeded in the same manner: but in the contrary manner, if the woman who desir'd to encrease the quantity of her milk, hung it on the opposite side, that is betwixt her breasts; which, though in like manner affirm'd by that physician of Bologna, the fellow-student of mine, whom I have mention'd, had no opportunity of trying.

I am very sorry that I neither made the enquiry formerly, nor Vallisneri has remark'd, whether the milk which was driven away in this manner, had been, in any point, detrimental to the women; for it might not be injurious at all, if it was driven away gently and gradually: and by this way of acting, the celebrated Degnerus (*f*) has very frequently seen that quicksilver included in a goose-quill, and worn, in the same manner, betwixt the breasts, discusses the milk "without any injury;" and has not only been well-inform'd, that even among the women in Holland, this is "a safe, familiar, and approved" remedy. However, it is certain, that though at the time I am speaking of, this second remedy was unknown to the Italians, the chief physicians at Bologna did not use the first, either because they did not believe its efficacy, or suspected that it might be hurtful.

I therefore remember that Albertini reliev'd the complaint of two noble matrons, when their breasts were so turgid with milk, that they could neither sleep nor move their arms without pain, merely by diverting the milky fluid to the intestines; and that by a clyster, which consisted of nothing else but broth, with some butter dissolv'd in it, and the usual quantity of sugar. And this I take notice of because both of them began to be so reliev'd, and with such surprizing felicity, at the very time of going to stool, that their

(*d*) De Chirurg. Operat. ubi de Chir. Thorac.

(*e*) Opere Tom. 3. P. 4. Saggio Alfab. d' Ist. Med. alla voce Ippocampo.

(*f*) Act. N. C. Tom. 5. Obs. 149.

breasts afterwards decreasing in their size, neither of them had occasion for any other remedy. And indeed Albertini affirm'd to me in a solemn manner, that by one of them was discharg'd a matter which he himself saw, and which was perfectly similar to milk; so that this case brought into my mind that of the woman in whom, after weaning her child, the tumour of the breast decreas'd, as soon as ever the milk began to discharg'd into the mouth, instead of saliva: which observation, and the explication of it, that may be accommodated to this of Albertini, you will read in Nuck's *Sialographia* (g). But in what manner, in a certain epidemical constitution of lying-in women at Paris, of which the celebrated Malovin (h) has written, as on the third and fourth day after delivery, the breasts not only were not swell'd, but were flaccid; how I say, after death, which happen'd betwixt the fifth and the seventh day, the milk could be found coagulated, and adhering to the external superficies of the intestines; although they seem'd to have been inflam'd, and much affected with pain, and the disease had taken its origin from a diarrhæa, and from the continuance of it; is not easily to be explain'd; unless, perhaps, from that milky serum (which probably being redundant in the blood, was found in other places in some bodies, but in the cavity of the belly of all which were then dissected) the thicker and more viscid parts had subsided, and had adher'd to the subjected intestines.

39. But as to tumours of the breasts, which do not arise at the time of the milk (although Hildanus produces examples even of these (i), and I have seen one, which were form'd at that time, and degenerated into a cancer) notwithstanding our Fabricius (k) asserts, “that he had seldom seen any “which did not emulate the nature of a cancer;” yet, to omit others, and inspect Ludovicus Mercatus (l) alone; you will be abundantly convinc'd, how many different species of tumours occur in the breasts, which do not emulate the nature of a cancer.

But there are even others besides what he describes; as, for instance, that which was observ'd by me in a Venetian virgin, who was forty years of age. This woman, at a time when the menstrua began to flow some days later than usual, frequently us'd to have a tumour bigger than a pigeon's egg, (not unequal, nor changing the colour of the skin, but very hard, and creating pain in the motions of the neighbouring arm) arise in one of her breasts, which was the left; so that if it had occupied the whole of the breast, it would have seem'd to be scarcely at all different from one of those, which are describ'd in the first place by Mercatus. Yet it was not altogether similar to that which they call glandular, as it was not only not cut into little extuberances; but soon after, when the menstrua appear'd, it was immediately reduc'd, without the application of any remedy, and without leaving any traces of it behind.

40. There are tumours also which arise within the breasts, and which, when the menstrual flux is at hand, are wont to be subject to troublesome tensions. These being hard, and distinguish'd into certain knots, as it were,

(g) c. 2.

(h) Mem. de l'Acad. R. des Sc. A. 1746.

(i) Cent. 2. Obs. 78.

(k) loco supra ad n. 38. indicato.

(l) De Mulier. Affect. l. 1. c. 17.

or sometimes occupying the whole gland of the breast, not only continue, but, pains afterwards coming on, seem already to degenerate from a scirrhus nature into that of a cancer. Read those describ'd by the most excellent Trew (*m*), and you will learn how he extirpated them radically, but without the knife, within the period of the revolving year, so that not even the least traces remain'd behind. But there are other tumours sometimes, which, not only by adhering for a long time, and even for a very long time, but also by other marks, emulate the nature of a cancer, and yet are not cancers. To tumours of this kind the following history particularly relates.

41. There was at Padua a nun who had begun, thirty years before, first to labour under tubercles within one of her breasts, which lay at a distance from each other. These tubercles, at length, seem'd to be join'd together into one tumour, in the inferior part of the breast; and had such an inequality of surface, and excited such pains, that made it be universally consider'd as a cancer. Last of all, the pains being greatly encreas'd, the tumour open'd of itself. Then from the manner of its opening itself, from the nature of the matter discharg'd, and from the other appearances, an ingenious and skilful surgeon judg'd it not to be a cancer, and undertook to cure it.

However, the cure never proceeded according to his wish, or expectation, till about the end of the year 1739; when he extracted from the tumour a tuberos body, of the bigness of a walnut, which he brought to me. This body consisted of many little pieces of bone, some larger, some smaller, dispos'd in no certain or regular order, as I have seen them in the cases of fracture. Betwixt the pieces was interpos'd a substance almost similar to a ligament. This substance, when dried, grew black: but the bony fragments show'd their whiteness. The breast was therefore heal'd up: and although the exulceration return'd, the virgin did not die thereof, but of quite another disease, and at the end of three years after the extraction of that bony body.

42. I suppos'd this body to have had its origin from the coats of the vessels which are given to the breast for the sake of the milk, or of the blood, or from other membranes that had become bony. And from thence, probably, another (which I found, when a young man, in the same bitch in both of whose kidneys, as is already written to you (*n*), I saw calculi) had likewise its origin. Nor will it be foreign to our purpose to produce, on this occasion, observations made upon brute animals; since into this very second section of the Sepulchretum (*o*) is transferr'd an account of tumours, which were found in a calf and a dog.

43. A bitch had one of her dugs, among the rest, more tumid than it ought to be. This bitch being kill'd, I dissected her through curiosity; and under the very teat I found a small roundish body, unequal in its figure, made up of many little bodies, and of more than a cartilaginous hardness.

(*m*) *Commerc. Litter. A.* 1742. Hebd. 52.
n. 2.

(*n*) *Epist.* 42. n. 17.

(*o*) l. 4. Obl. 4. §. 3. & in *Additam. Obs.* 12.

But a matter of a yellow colour, degenerating into lividnefs, with which two tubercles, of the form and magnitude of a pretty large lentil, that protuberated into the cavity of the ftomach, were full, eafily yielded to the preffure of the fingers. The cyfts of thefe tubercles were betwixt the flefhy and internal coat. And under the external membrane of the lungs I obferv'd, in a certain place, fome granules, as it were, of a kind of tartareous matter; which lay at a diftance from each other, in feveral parts. And why thefe things ought not to be omitted here, I fhall immediately fay.

44. For as, in the fame bitch, I found calculi in both kidneys; befides a very confiderable diforder in one of them, which I juft now put you in mind of; I did not think it proper to conceal the matter in the lungs, which was already of a tartareous nature; and that in the ftomach likewife, which would perhaps have been of the fame kind: fo that if you fhould be difpofed to fufpect, that the body which lay under the teat was of the fame matter, in confequence of its abounding fo much in the body, rather than of a bony nature, you are at liberty for me to fufpect it: although neither in the bitch, nor in that nun (*p*), did it feem to me to be tartareous; and there is extant in the Sepulchretum (*q*), an example of another nun, in whom the breasts, as far as appear'd from one of them, were found to be “ univerfally bony,” the fkin only excepted.

Yet, as it is controverted even in refpect to the arteries themfelves, as I have taken notice to you in former letters (*r*), whether that which feems to be bony, be really bony, or only tartareous; and as, in the cafes in queftion, fuch examinations were not made as are fufficient to fhew clearly of what nature the concretions in thofe tumours were; I will fo much the more readily leave it undetermin'd; becaufe tartareous, or ftony concretions, or, as Celfus (*s*) fays, “ certain bodies fimilar to ftones,” are fometimes found in other tumours; as he himfelf teaches us, and as the Sepulchretum in this fection fhows (*t*); but particularly in tumours of the breasts: fo that in a widow, of whom the celebrated Baffius (*u*) gives the hiftory, the bodies contain'd in thefe parts, “ by their mutual attrition and collifion againft each other, gave forth a “ found like little ftones;” and I myfelf have feen in a man, a matter fimilar to indurated lime.

For the breasts of males fometimes grow out into tumours alfo, as well as thofe of women; one of which I have read the defcription of by Bidloo (*x*); and Heifter (*y*), who quotes Bidloo, afferts that he alfo had made a fimilar obfervation; and the celebrated Jo. Mart. Wolffius (*z*) has added another; and I once faw the beginning of this diforder in a goldfmith, to whom nothing was of fo much fervice as keeping the arm on that fide quiet for a long time together, in the manner prefcrib'd by me: and I again faw it in a perfect ftate, but containing the fame kind of matter which I fpoke of juft now: and in this manner did the cafe appear.

(*p*) *supra*, n. 41.

(*q*) l. 3. S. 21. in Additam. Obf. 61.

(*r*) Epift. 27. n. 20. & feqq.

(*s*) De Medic. l. 7. c. 6.

(*t*) Obf. 15. §. 4. & Obf. 17. §. 1.

(*u*) Dec. 2. Obf. 6.

(*x*) Dec. 2. Exercit. Anat. Chir. 5.

(*y*) Inftit. Chir. P. 1. l. 4. c. 17. n. 3.

(*z*) Commerc. Litter. A. 1742. Hebdom. 44. n. 2.

45. A noble and learned man, the son of that matron whose diseases and dissection I describ'd to you, when I treated of vomiting (*a*), being in his thirty-first year, had a very small gland, as it were, begin to be prominent in the upper part of the right breast. This gland, increasing gradually, within about a year grew out into a tumour of the bigness of a fist, and very hard, but wanting all the peculiar marks of a deprav'd nature.

This tumour, about the beginning of the year 1742, and in the fourteenth month from the time of its beginning, spontaneously open'd itself; and show'd within the cortex, or shell, that was made up of the integuments, and fleshy fibres, nothing but a matter which, in some places, resembled a hard calcareous concretion, and in others, a softer concretion of the same kind.

46. I then even saw and touch'd this matter, as it lay within the gaping tumour, being call'd into consultation upon the case, together with some other professors of the college.

As his father and grand-father had been greatly subject to the gout, but this patient never, except that sometimes he had just observ'd a slight and short pain in the great toe of one foot; it seem'd reasonable to all of us to suppose, that the tartareous matter, which in them had fall'n upon the mucilaginous glands of the joints, had, in this gentleman, fall'n upon the mammary glands; perhaps because the other parts, being very firm, had given too great resistance; and this the more easily, as I observ'd the sternum, when it had scarcely measur'd a third of its length from the upper part, to subside suddenly, and in a great degree; for which reason I conjectur'd that, in consequence of the mammary vessels being inflected in an angle here, at the sides of the sternum, the motion of the blood through the breasts was become very slow.

But this opinion, in regard to the gouty matter of that tumour (which was so much the more probable, because Preussius (*b*) had seen a gouty matter "in the form of a calx," which could no longer be deposited in the extreme joints of the limbs, come out through an ulcer of the breast) made most of us very cautious in giving our opinion; as we fear'd, for instance, lest when the tumour was cut out, and the seat of it heal'd up, the matter should perhaps turn itself to other and more noble parts; since the observation of Albertini (*c*) had also lately shown, how many tumults had been excited in the constitution, and especially in the belly, by the repulsion of the gouty matter from the lower limbs; which were strengthen'd by anointing them with the *Oleum Petrolei*, till it was, at length, discharg'd by the way of the intestines, in such a manner, that it was surprizing "what, and how many, " concretions, made up of lime, or of gypsum lately cemented, and nearly " similar to the matter from whence the gout is produc'd," were discharg'd that way.

Since, therefore, for these reasons, the advice of those who were for waiting did not at first displease, and the matter was gradually taken away from the tumour; behold a new fever came on; and to that matter which re-

(*a*) Epist. 30. n. 7.

(*b*) Eph. N. C. Cent. 3. Obs. 17.

(*c*) Comment. de Bonon. Sc. Acad. Tom. 1. in Opusc. ubi de Cortice Peruv.

main'd, a new matter of the same kind was, in fact, added. After this, however, the patient being quite wearied out with waiting, committed himself to the care of a resolute surgeon; by whom, as the patient himself earnestly desir'd, the tumour being entirely cut out, and the wound brought to a cicatrix without any difficulty, he so far recover'd as to be seiz'd with no disorder afterwards that I know of: so successful, sometimes, in medicine is an unreasonable boldness.

47. To what kind of tumours those parts of the breasts which were harder than natural, and which, though a brown, green, and black humour was express'd, I found to be pretty found to appearance, in that dissection which was describ'd to you in the twenty-first letter, under number forty-seven; I say, to what kind of tumours these belong'd, or rather would have belong'd, if the woman had liv'd for a considerable time longer, I cannot easily determine.

For although you might then refer those tumours only to that humour which distended the lactiferous vessels, yet who can for a certainty affirm, that a humour so very preternatural and deprav'd would not have produc'd some tumours of a very bad nature, by its long confinement there? Indeed, I have read of women that were seen by Riverius (*d*), and by Lanzonus (*e*), from whose breasts a green milk was discharg'd; and two are spoken of in the *Ephemerides Naturæ Curiosorum* (*f*), and in the *Commercium Litterarium* (*g*), one of which had black and very acid milk; and the other, as often as she pleas'd, could press out of both breasts "a kind of very thick fluid, of a colour extremely black;" and this being receiv'd upon linnen rags, within twenty-four hours "became green like verdigrease, and at the same time seemingly put on a corrosive nature."

But although I see that most of these women were not at all healthy, yet I do not know what was the end of any one of them; and whether the breasts in particular, if either the milk did not flow out, or what remain'd of this kind of humour was not press'd out, were seiz'd with any pain, or, finally, with any tumour of a malignant nature.

You perceive that at present I speak of the cancer, a tumour which is so often form'd, and especially in the breasts, and which is a case the malignity whereof is as evident as the cure is difficult: so that Johannes Bapt. Cortesius (*), when he wanted to show "how far it does not always follow, that a disease which is known may be immediately cur'd;" and this "chiefly on account of its malignity;" has, with great propriety, made use of the cancer in particular, as an example, "which, although it be known by all, is, nevertheless, seldom cur'd by any."

Indeed, it does but rarely happen that the cure is in every respect happy. And I have very often seen those consequences which Celsus (*b*) has foretold; that whether it be cut out by the most experienc'd and skilful surgeons, "it has, nevertheless, return'd after the wound was cicatriz'd," in the same or some other place; or any other persons "have made use of caustic appli-

(*d*) Cent. 2. Obs. Medic. 100.

(*e*) Animadvers. var. ad Medic. & cæt. 125.

(*f*) Dec. 2. A. 4 Append. n. 5. XLIII.

(*g*) A. 1734. Hebd. 1. n. 1:

(*) Miscell. Medic. Epist. 6.

(*b*) De Medic. L. 5. c. 28.

“cations,” and put the poor women to the most severe torture for a long time together, that the event of these cases has been worse, or, at least, not better.

For there was, even amongst us, before the volume of the Memoirs of the Royal Society at Paris, for the year 1739, came out, a person who, by the application of a caustic herb, was said to destroy cancers radically. But whether this was the *dentellaria* of Rondeletius, as we conjectur'd from some marks; for the person himself conceal'd it as much as he possibly could; or whether it was any other, the man at first got himself a great reputation, as is frequently the case; but the success of his cures not corresponding to his fame, he was soon after deserted.

Whether it has continu'd to answer among the inhabitants of Montpellier, I am ignorant: among us, at least, physicians and surgeons are more confirm'd in their opinion of preferring excision by the knife, when they are at length overcome by the entreaties of the patients (who do not at all consider those things that have been said above (*i*)) and compell'd to undertake the cure; since, if this method be not attended with a less severe pain, that pain is at least shorter in its continuance: so that by this means the prolonging of life, at least, if not life itself, costs the patients less, although the cancer should return afterwards; and they are free, in the mean while, from the continual and excruciating tortures of a very filthy disease.

But I forbear to say at present, how many, and what circumstances are requir'd in patients, in order to give us reasonable hopes that their life may be prolong'd. Some of these requisites, and, in like manner, many circumstances diametrically opposite thereto, you will collect from an observation which I shall give you here in particular, though I might have given it on other occasions. For from the same observation you will see what was the structure of a scirrhus degenerating into a cancer; and will, at the same time, see it confirm'd, “that a contusion, which would be of no importance in “the skin,” may, to use the words of Boerhaave (*k*), “produce the worst of “scirrhi in a conglomerated gland;” and, in like manner, “that a cancer is “with great difficulty cur'd in a melancholic woman.”

For there are, even among us, some women of this temperament; but they are not all so: nor can I conceive who could impose upon that great man in such a manner as to assert (*l*), “that the Italians, to the eighteenth year of “their lives, were lively and playful; but that after the thirtieth year they “all became sad, morose, melancholy, and afflicted with the piles.” However, this observation was communicated to me, some years ago, by that learned and respectable man Jo. Bapt. Charburi, formerly my much-esteem'd auditor, but now first regius professor of the practice of medicine at Turin.

48. A rustic woman, about fifty years of age, happen'd to have a blow upon her left breast: and therein, after near a month, a tumour discover'd itself, which they in vain hop'd to have dissolv'd by fomentations, or prevented from growing larger by the compression of a hollow plate of lead. For it increas'd in such a manner, that within the seventh month after receiving

(*i*) N. 16.

(*k*) Prælect. in Instit. § 903.

(*l*) Ibid. ad § 897.

the blow, from the upper, and at the same time from the external part of the breast, where it was much thicker, harder, and of a more irregular figure, it now descended below the areola: the nipple of which lay hid, almost universally, among some transverse rugæ.

Under the neighbouring axilla, other rugæ, similar to these, were observ'd: there was a pain at the axilla, when the shoulder was lifted up; and the whole of that limb was affected with an œdematous tumour. Which circumstances, and, besides these, the adult and melancholic temperature of the woman, were immediately repugnant to the opinion of those who propos'd the excision of the tumour. On the contrary, the robust body of the woman, and her intrepid mind, which was prepar'd to undergo the operation, were favourable to their proposal; which was, moreover, urg'd by other things, but in particular by this, that the pungent pains, which increas'd upon the patient in proportion as the tumour had increas'd, were now become extremely more violent, and were attended with almost continual watchings.

The excision of the tumour was, therefore, undertaken; and what appearances this had internally, will be said below. The operation seem'd to have been perform'd successfully, and according to the opinion of those who propos'd it, till the seventh day, at which time the wound was always of a lively colour, and soft. But after this time it was seiz'd with an inflammation and corruption, which not only consum'd all the cellular part of the breast that remain'd, but that part of the pectoral muscle, also, which lay beneath the breast, and that part both of the external and internal intercostals which was opposite thereto; so that the pleura appear'd to be naked, betwixt the ribs, in that part, to the extent of about five inches, that is, from the sternum transversely.

However, the ulcer was at length cleans'd, and for five days was soft; at which time there was a laudable pus; and the pulse was not quick, except in the evening, and this only for a few hours; all the other circumstances being nearly in their natural state, if you except an obstinate costiveness of the belly, which was now-and-then obviated by clysters.

But after those days, every thing chang'd for the worse. The ulcer, in which was seen the cartilage of the fourth rib, of a black colour, and in a manner disjoin'd from the sternum, grew dry, and discharg'd a small quantity of an ichorous pus, which had a very disagreeable smell: and the œdematous tumour of the neighbouring limb, which had lost its motion, and almost its sensation likewise, on the first days after the excision, except that both of them continu'd in the hand nevertheless, was increas'd: the lower limbs were also swell'd in the same manner: and, at the same time, the frequency of the pulse, the thirst, and the watchings, were increas'd. To these symptoms were added a diarrhœa, a loss of appetite for food, a decay of strength, a perpetual sleepiness, a difficult and frequent respiration. And, finally, the last-mention'd symptoms were succeeded by four long febrile paroxysms, which were violent, and join'd with a rigor; one following the other at the interval of about ten hours: and by these the woman was carried off.

The body was every-where flaccid and lax; yet the lower limbs, even when the integuments were cut into, had no remains of the œdematous tumour.

The belly had all the viscera of its cavity in a tolerably sound and natural state, if you except the spleen being a little larger than is natural, blacker, and more lax; and, on the other hand, the uterus being very hard, and giving resistance to the knife.

Both the cavities of the thorax were almost full of water, but particularly the left: and therein the lungs, on the side which corresponded to the ulcer, were dry, and almost scirrhus, adhering closely to the pleura in that part, which adher'd much more closely to the ribs, and was become callous, as it were, in that place where it had been expos'd to the external air. Then examining the heart, the cavities on the right side of which contain'd something polypous, we return'd to the external parts: and all the axillary glands on the left side were found, not only to be somewhat thicken'd, but also to be chang'd into a heap of scirrhus tubercles, of a very great firmness, and a livid colour; and this was contain'd in the neighbouring cellular membrane, which was itself, also, converted into a hard steatoma.

And from these tumours, whereby the neighbouring vessels and nerves were compress'd, was understood the cause both of the imperfect paralysis and the obstinate *œdema* under which that limb had labour'd, and also of the pain at the axilla when the shoulder was lifted up; and, finally, of the imminent danger lest another tumour, of a very bad nature, should grow out under the axilla after the former had been amputated from the breast.

This tumour, being examin'd immediately after the excision, and after the fat which adher'd to it was taken away, was found to be of a figure approaching to an oval, the larger axis of which was equal to about an inch and a half. With this tumour were continu'd three or four others, of different magnitudes, but all small. At the center of these and of the former, blood which was putrid, and of a pale colour, was found: and this blood was surrounded by a matter of a middle nature betwixt puriform and sebaceous.

49. Some things which were observ'd with accuracy and skill, during the respiration of the woman, in the pleura, in the ribs, and part of the intercostal muscles, when these lay expos'd, I have pass'd by, not because these circumstances were less worthy of notice, but because they do not immediately relate to the intention of this letter. But that history which is describ'd by Gahrlepius (*m*), is one of the first that relates to the subject of this letter, as it has many circumstances which may be compar'd with that I just now gave you, and this, moreover, which was found in the dissection of the body; I mean, that the cancer which had been cut out from one breast, “had propagated its virus from thence to the other breast, also, in a transverse direction, over the bone of the sternum;” and this in a latent manner, so that nobody suspected it during the life of the woman.

But now, as we are hastening on to the remaining tumours both of the thorax and the belly, that which I saw in the clavicle, I think, may with more propriety be deferr'd till I treat of exostoses below (*n*). And as to those which relate to aneurisms of the great artery, that raise up the parietes of

(*m*) Eph. N. C. Dec. 3. A. 5, & 6. Obs. 163.

(*n*) Vid. n. 58.

the thorax or abdomen, as they have been already sufficiently spoken of (*o*) by me, when I treated of the internal diseases whereto they belong, I am not at leisure here to repeat them, in imitation of the Sepulchretum.

And indeed, if by chance, as in the living cook I distinguish'd an aneurism of an intercostal artery, from the pulsation being very much produc'd in the longitudinal direction of the artery, and the transverse direction of the body, but never equalling the whole interval, which was betwixt the two ribs in its latitude; so I had also seen that interval rais'd up into a tumour at length, as Lancisi saw it (*p*); and in the body after death, as happen'd three or four times to Ruysch (*q*), had found so small an artery expanded to the size of a hen's egg; I do not know whether I should not have plac'd it among the tumours of the thoracic cavity, rather than among these I am speaking of now; though it would have been more allowable to have done the latter, than, as in the Sepulchretum, to refer to this class, tumours of the viscera themselves, whereby the abdomen is forc'd outwards: of which tumours (*r*), and of the herniæ of the abdomen itself (*s*), and of the hydro-rachitis also (*t*), I have written to you in other letters.

There are, however, now and then, certain tumours of the abdomen, which, although they really belong to the abdomen itself alone, seem to belong to the viscera. One of that kind I saw in a pious and learned priest, prominent in the manner of a large hemisphere. This tumour being open'd, and having discharg'd a great quantity of matter, of a very filthy odour, was observ'd by the surgeon, upon introducing his probe, to penetrate as far inwardly, as it had protuberated outwardly; so that it was generally suppos'd, without any doubt, to belong to some one of the viscera. There was not, however, any discharge of matter which confirm'd this opinion, nor were there any marks of a viscus being injur'd; and finally, the perfect cure of the patient, who liv'd in a very good state of health many years afterwards, clearly shew'd, that what had been collected together in this very large tumour, had, in fact, forc'd inwards, in an incurvated manner, the muscular parietes of the abdomen, and the peritonæum, far into the cavity of the abdomen; but had not perforated them, nor yet brought about a communication betwixt the cavity of the tumour and the cavity of the belly, and much less a communication betwixt the cavity of the tumour and any of the viscera.

50. Tumours of the testes, and the involucra, wherewith they are surrounded, of which I can write somewhat more, you remember have been treated of by me in a former letter (*u*).

But as to those that relate to the penis, anus, and the genital parts of women, although I have seen many of them, yet as I never had any opportunity of dissecting them, there is scarcely any thing for me to hint at. I was present when Valsalva amputated a cancerous tumour into which the glans, and a very large part of the penis adjoining, had grown out. The two cir-

(*o*) Epist. 26. n. 19 & Epist. 40. n. 26.

(*p*) De Aneurysm. l. 2. c. 2. Propos. 28. cujus, & præcedentis titulo ne fallaris, faciet Propos. 25.

(*q*) Thef. Anat. 9. n. 5.

(*r*) Epist. 36. & 39.

(*s*) Epist. 34.

(*t*) Epist. 12.

(*u*) 43.

cumstances which he was afraid might happen, did neither of them happen. One was, lest the very small part of the penis which was to remain behind, should happen to be immediately drawn inwards. And the other was, lest, though the penis should remain in its usual situation, the arteries should be drawn inwards nevertheless. And as he intended, which he really did, to tie these up by passing a needle and thread round them; this operation would have become extremely difficult by either of these circumstances happening.

Against the first-mention'd accident he had before provided: and if the second had happen'd, he then would have been oblig'd to do what he was very unwilling to do. For he always studied to diminish, as much as was in his power, the painful tortures of those whom he cur'd by the knife. For which reason he was not willing to make use of fire in this case, as Scultetus did (*x*), or leave any of the diseas'd part behind, as the same author did; nor yet apply a tight ligature round the penis, and above the diseas'd part, in such a manner, that whatever was below the ligature might die in a short time: for how much pain is brought on in this case, by such a constriction, the thirtieth observation of Ruysch (*y*) sufficiently shows.

Yet I would not have you believe, for this reason, that other very experienc'd surgeons, among whom are Heister (*z*) and Benevoli (*a*), have preferr'd this method of constriction without very good reasons. For although Valsalva perfectly cur'd this patient of his; yet there was some danger on one of the first nights, by reason of the blood's beginning to open itself a passage, if an attendant who, according to Valsalva's order, lay just at hand, had not very speedily prevented it in the manner that had been previously shown him. This patient was of an advanc'd age.

Another patient was of an advanc'd age also, from whose anus an excrescence, of a very bad kind, and similar to a kidney, both in size and shape, hung down by two depress'd peduncles. This excrescence being taken off by another senior surgeon, when I was a young man, and look'd on, by drawing it down, and cutting the peduncles across; and the lower part of the intestine, from whence they had grown out, having immediately drawn itself upwards, and conceal'd itself both from his hands and eyes; I at first saw that the man was confus'd, as he had expected no such thing, although none had had greater experience than he, and he was really eminent in his art; yet soon after, as no great quantity of blood was discharg'd, his courage being reviv'd, he inserted a middle-siz'd tent, daub'd over with the white of an egg, and sprinkl'd with powders that have a strong astringent virtue, and departed from the patient.

But scarcely had a quarter of an hour pass'd, before blood began to be discharg'd in a considerable quantity; and what show'd that it had been discharg'd into the cavity of the intestines, in a much greater quantity, the patient began to beg that the tent might be taken away, because he could no longer resist the vehement desire he had of going to stool; and his pulse had sunk in a very great degree. The surgeon being call'd again took away the

(*x*) Obs. Chir. 60.

(*y*) Cent. Obs. Anat. Chirurg.

(*z*) Instit. Chirurg. P. 2. S. 5. c. 132.

(*a*) Osserv. 27.

tent, and this was follow'd by very large pieces of coagulated blood. Then the surgeon, introducing his finger, compress'd the wound thereby, for a considerable time; nor did he remove it, till a tent was prepar'd to be inserted, daub'd and sprinkl'd over with the same medicines as the former, but much thicker, which ought to have been attended to at first: and by this means the blood was at length, with much difficulty, check'd.

Yet these things I have taken notice of for no other reason, but that you might understand what was the opinion of Valsalva, in regard to the method of amputating the penis, at that time so much controverted; and, in like manner, that every thing which may happen during an operation, is to be well consider'd and provided for, even by the oldest and most experienc'd surgeons. However, in regard to the first method of cure, I would have you read Benivenius (*b*) among the ancient authors: and as to the second, Heister among the more modern authors (*c*); for you will find in both an example of a successful cure.

In regard to condylomata of the vagina in women, there may not only be many causes thereof, but I suspect that one of them is sometimes such a cause as exists from the original formation; and of what kind this is will appear from the following observation.

51. A young virgin, of fifteen years of age, having been, for a long time, in a cachectic habit of body, was as length seiz'd with a very violent disorder, and pass'd the latter days of this disorder, and of her life, in the hospital at Padua, in such a manner, as, to all appearance, to die of an inflammation of the lungs, which happen'd about the end of the year 1750.

When the thorax was open'd, a dropfy of that cavity appear'd; and in the lungs was scarcely any appearance that argu'd a slight inflammation thereof.

The genitals were the principal parts which were taken away from the belly. And though in demonstrating the structure of these parts, I found it, in almost all of them, to be nearly natural; yet these few things, which were preternatural, I did observe. At the foliated extremity of one of the Falloppian Tubes was an hydatid. From the orifice of the urethra a small reddish body was prominent; and this, when cut into longitudinally, I perceiv'd to be nothing else but the internal coat of that meatus, which being universally black above, from the subjected vessels being distended with blood, had inverted itself outwards at the lower part, and become protuberant: and this I remember also to have seen in another woman, of whom I shall write (*d*), when I treat of lameness; and I remember to have taken notice of both, when on the subject of difficulty of urine (*e*), and to have enquir'd into the cause of that little disorder.

The vagina being open'd at length, and being found to be smear'd over with a whitish and thickish humour, I met with that appearance which gave occasion to my writing this observation in the present place. That is to say, near to one side of this cavity, at a finger's breadth above the hymen, the anterior and posterior surface of the vagina were tied to each other by a kind of short band, of a moderate breadth and thickness, made up exactly of the

(*b*) De abdit. morb. & sanat. caus. c. 68.

(*c*) Eph. N. C. Cent. 8. Obs. 67.

(*d*) Epist. 56. n. 21.

(*e*) Epist. 42. n. 42.

same substance as the vagina itself, and furnish'd, in the same manner, with a rugous surface; so that it was manifest this connection had existed from the first formation, especially as no trace of foregoing erosion appear'd, either above or below. Before I cut this band asunder, the vagina was very narrow on that side; but when it was divided, this cavity immediately extended itself into a proper breadth.

52. But if this virgin had been married, you naturally conceive that this band must have been ruptur'd, either by the embraces of the husband, or by the birth of the foetus, and might afterwards have grown out into a condyloma, by being nourish'd in this very moist place. When I dissected this body, at least, it brought to my mind the case of a young married woman, from the orifice of whose vagina I saw two condylomata hang down, after a very difficult birth, similar to this band if it had been ruptur'd in the middle, and had grown out a little after the rupture; and similar even in this circumstance, that they did not arise at a larger interval above that orifice than this band did.

53. Tumours of the limbs still remain to be spoken of. But as almost all these are nearly common to both the upper and lower limbs, I choose chiefly to insist upon those which are seated upon the lower limbs, some of a very large, and some of a moderate size. That was of a large size which distended the thigh of a nobleman to such a degree, and in the manner of an abscess, that Valsalva, who was call'd to undertake the cure, was afraid to open it, in which caution he was very happy; for in a few days the whole of it vanish'd away spontaneously, and the patient recover'd so perfectly, as to live many years afterwards, in a very good state of health; and affirm'd the same frequently to the physicians and surgeons, from whom I had this relation, and even affirm'd it himself to me, who was one of his intimate friends; all of us being surpriz'd whither so great a quantity of matter, which evidently fluctuated under their hands, had been carried, and that without any injury.

But it was suppos'd, that Valsalva had been deterr'd from opening a tumour of that kind, in the first place, by this consideration, lest it should be as difficult to heal it up as it was easy to open it; and in the second place, lest, by reason of the immoderate discharge of matter, the patient should sink, either during the space of a very long cure, or at the very first time of incision; as if it had not been in his power, at that time, only to take away as much as the strength of the patient could bear.

And upon my replying in this manner, I remember that it was ask'd of me, as happens in private conferences, what was the reason that, if a surgeon suffers the whole contents of a very large tumour to be immediately discharg'd, the patients frequently fall into a swoon: and I remember to have answer'd, that some persons chose to attribute this to the blood suddenly rushing into the vessels of that part, in a very great quantity, in consequence of their relaxation, by the weight of the incumbent matter being taken off; so that the quantity which returns to the heart is much less than it ought to be. And in this manner did I answer what appear'd to others rather than to myself; first, because in all tumours, there are not large vessels to be compress'd; and, in the second place, because those neighbouring vessels which

the uterus compresses when distended with a nine months foetus, are certainly large, and that compression, in a very happy and quick birth, is taken away in a point of time, and yet faintings do not for this reason come on; so that we are under a necessity of seeking out another way or accounting for it, or at least it seems that some other answer ought to be added to the former.

But there are other tumours of the limbs, even still larger than that I have spoken of: which you may in vain desire to open; for what they contain is in great part not fluid, nor can be turn'd into pus; and, indeed, frequently the structure of the muscles that are interpos'd is vitiated, and chang'd to a surprizing degree. You will see some describ'd in a dissertation (*f*) of Jo. Hentelerus, wherein many examples of tumours of the same kind are pointed out; some of which are not so recent but they might have been added to the Sepulchretum, and be join'd to that of Wedelius (*g*), which is omitted in this dissertation.

You will also read of many in a dissertation that had before come out, of Alexander Camerarius (*h*), and some in a volume of the *Diarium Italarum Litteratorum* (*i*), which had been publish'd before either of the other; for, even amongst us, these examples are not very rare, but pretty frequent, and surprizing in their nature. I myself have also seen another in this place, which was large, although not to be compar'd, by any means, with the preceding, wherewith the leg of a nobleman was exceedingly distended. And this I pronounc'd it to no purpose to open, for the reasons just now given: nor was I deceiv'd in the event, as the patient would nevertheless have the tumour open'd afterwards.

However, I cannot be induc'd to believe that the arm of a man, whereof Sanctassanus wrote to Vallisneri (*k*), was turgid with a tumour of this, or of a similar kind; for the primary surgeon having made an incision into it, so great a quantity of blood burst forth therefrom, that the operator was struck with astonishment, and suppos'd the man to be about to die instantly: but the flux of blood ceasing, a serum was discharg'd for many weeks, from the effect of which discharge the arm was reduc'd to its proper bulk; and the man was troubl'd with no inconvenience of the limbs as long as he liv'd, though he liv'd many years.

This case rather brings to my mind that which you read in Xenophon (*l*) and Plutarch (*m*), of Agesilaus, king of the Lacedæmonians, that, as he was ascending, "blood, though from the rupture of what vein is uncertain, flow'd down from his body into the sound leg," for he was lame of the other; "and when the parts about the calf, and the skin, were exceedingly swell'd, and intolerable pains came on, a certain Syracusan physician open'd a vein in the leg near to the ankle; and when the blood had once begun, it continu'd to flow night and day, and, in spite of all their endeavours, they could not restrain this hæmorrhage, till Agesilaus at length fainted away,

(*f*) Hist. brachii prætumidi § 14.

(*g*) Sect. hac 2. Obs. 17. § 3.

(*h*) Hist. pedis tumidi.

(*i*) Tom. 29. art. 4.

(*k*) Opere Tom. 1. P. 6.

(*l*) Rer. Græcar. l. 5. versus fin.

(*m*) in Vita Agesilai.

“and then the blood ceas’d to flow;” such a state of health being the consequence of it, as confin’d the king to his bed the remaining part of the summer and the whole of the winter. Which case, though in other respects worthy of attention, I do not remember whether any learned physician has consider’d.

It is likewise uncertain from what vessel the blood flow’d, in order to make up two large tumours mention’d by Marcus Aurelius Severinus (*n*), and the famous Albertus Haller (*o*). The one, indeed, had distended “the arm quite to the upper part of the shoulder, and to the anterior part of the thorax which lies about the arm-pits,” into such an immense bulk as the figure which is added, and the pain whereof the man died, mutually demonstrate. But the other, having arisen “suddenly after a very great pain, yielding to the touch of the hand, and vanishing away when compress’d,” extended itself from the scapula almost to the tenth rib. As to the first, however, we could not so much as suspect what it contain’d, if he had not propos’d it among the number of sanguiferous abscesses, or “aneurisms;” as Severinus says nothing besides those words, and does not seem to have dissected it. But the other we know to have been fill’d with blood, as the man was kill’d by the discharge thereof, not many hours after the incision; and a great quantity was found in the tumour, afterwards, when it was dissected.

However, if it could have been added, in respect to both of the tumours, that they had pulsated in the beginning at least; as in regard to another which contain’d blood, and “cover’d the knee universally,” and which was shown to Preusius (*p*) at length, after an interval of some years, this author has slightly hinted; there would have been less room for doubt left to those who might have read the remarks upon bloody tumours communicating with the ruptur’d trunk of some vein, which, as is taken notice of above (*q*), are inserted in Valsalva’s treatise of the human ear, and in the thirteenth of my *Epistole Anatomicæ*.

54. On the contrary, there are tumours which we have heard are easily cur’d, though in a manner not readily to be explain’d; and this is the reason why I do not think they ought to be pass’d by. A physician of Verona, a man of eminence and reputation, related to me, and to some learned friends, who happen’d to be with me at Venice in the year 1707, the following history. When he was in the place of his nativity, and that very lately, a horse of great value had both his hinder legs swell’d to a very great degree, at the knee-joint, with a watry tumour; but a watry tumour which was hard, and attended with pain: and when no other remedies were of any advantage, that there was a horseleach who promis’d to cure the disease in this manner; that is, he would open the skin a little above the tumour, and having laid bare a vein of a considerable size, which is there, he would tie it up strongly with two ligatures, and would cut it asunder betwixt these two.

This method was, at first, cried out against by every one, and especially by those to whom the circulation of the blood was known, as one which was so

(*n*) De récond. Abscess. nat. l. 4. in fine
Schol. ad c. 7.

(*o*) Opusc. Pathol. Obs. 32. Hist. 2.

(*p*) Eph. N. C. Cent. 3. Obs. 19.

(*q*) N. 2.

far from being likely to be of utility, that it must even be greatly hurtful. However, as he mention'd that seven or eight horses had been cur'd by him in this manner, and two of them in the same city; and as it appear'd, upon immediately making inquiry into the circumstance, that what he said was true; he was allow'd to perform the operation, which was done in the manner I have describ'd, and in the presence of the person who related the affair to me. The tumours then decreas'd continually, even on the first days after the operation, till at length, within about twenty days, they quite vanish'd away.

And as I happen'd to be making the same relation to some others, among whom was that very ingenious man Dominic Gulielmini, he chose rather to suppose it probable that some nerve was tied up together with the vein, which nerve went to the diseas'd part; and that this nerve, therefore, being cut asunder together with the vein, the pain was by that means taken away; as it might be suppos'd not to have its origin from the tumour, but rather to have given rise thereto: wherefore, the force of the stimulus, which, as it had produc'd, might in the same manner continue the tumour, being taken away, the tumour was without difficulty carried off. Be this as it will, I was determin'd not to conceal this cure from you; for it never has done any harm to physicians to know what succeeds with farriers; and perhaps many things have been tried and done by these men, as it is allowable to make experiments upon brute animals, before they were transferr'd to men.

You see, for instance, that Petrus Crescentius, who, when he wrote upon agriculture, four hundred years ago, interspers'd some things relating to the chirurgical part of farriery, has taught us to take blood from a diseas'd ox by incising the veins under the tongue (*r*); or how to receive what was to be given by way of clyster in a kind of bag, the orifice of which is furnish'd with a tube, and to inject it into the belly of a horse (*s*); or in what manner, if blood happen to burst forth from any vein in cutting out a tumid gland from a horse, this is to be immediately stopp'd (*t*), by laying hold of the vein, and tying it up tight with a silk thread. Do you suppose that he did not take those things from more ancient authors? and these from authors still more ancient? so that before Celsus (*u*) and Galen (*x*) taught how to restrain the flux of blood, in parts that are wounded, by throwing a ligature round the wounded artery or vein, this method had, perhaps, been made use of by them while they were extirpating some gland, or while they were endeavouring to cure horses that were wounded in battle.

But whether this method of stopping the blood has been transferr'd from other animals to man, or was first tried on him; I cannot help wondering that, as it has been describ'd in different places, in the books of surgeons, from the times of Galen; and Benivenius had made use of it, among others, in that cure of the amputated penis which was referr'd to above (*y*), “by laying hold of each of its veins which pour'd out blood,” that is to say, the arteries, “and by tying them so as to bring on a coalition of their pre-

(*r*) L. 9. c. 65.

(*s*) Ibid. c. 18.

(*t*) Ibid. c. 16.

(*u*) De Medic. l. 5. c. 26. S. 21.

(*x*) Meth Med. l. 4. c. 3.

(*y*) N. 50.

“cluded orifices;” I say, I cannot help wondering that there was nobody before Parey (z), who thought of transferring this to those wounds which are made in the amputations of the limbs.

But lest you should happen to believe, that they were afraid of the thickness of the arteries that are the principal in the limbs, which bears no comparison with the slenderness of the branches that Galen order’d to be tied; at least, that is the principal trunk in the arm which unskilful men often wound when they think they open only a vein, from whence afterwards, unless great diligence be made use of to resist the beginning, an aneurism arises. And yet that this principal trunk was itself also wont to be tied up with ligatures, in the chirurgical cure of this aneurism, they could not be ignorant, not only from the writings of Aetius (a), Paulus (b), and Albucasis (c), but even from those of much later authors, as Guido de Cauliaco (d), and others.

However, I am reminded by the mention of an aneurism in the arm, which was merely accidental, rather to subjoin an observation of an aneurism which was form’d in the ham; not only that I may not recede too far from tumours of the lower limbs, on which I had determin’d chiefly to insist; but also on account of those things which have been said above (e) of aneurisms in the ham; a very clear example whereof, describ’d by Hornius (f), I have in vain enquir’d after in the Sepulchretum.

55. A builder, or mason, had a very small tumour begin to appear and pulsate in his ham. And this, being neglected, grew to the bigness of an apple. Then many things being prescrib’d by the physicians and surgeons, they were partly of no use, and partly seem’d rather to be injurious, and particularly compression. Wherefore, it had so increas’d within a very few months, as to equal a small melon; and gave the patient the most excruciating pains. To these was added an œdematous tumour of the whole leg and foot, and a tumour of the knee itself in particular. Finally, a gangrene, and soon after a sphacelus, came on. And a rupture being the consequence of this, as had been predicted, a great profusion of blood was brought on, whereby life was immediately taken away; and this happen’d about the end of March, in the year 1740, at which time I was demonstrating some things relative to the anatomy of the brain, to the pupils in the hospital.

In dissecting the brain of this man, at that time, likewise, besides other circumstances which do not relate to the present subject, I observ’d that, notwithstanding he had seem’d to die from a great loss of blood, bloody points, nevertheless, appear’d in the sections of the medullary substance, which even became much larger when I compress’d them laterally: and I also observ’d what seem’d to deserve our attention and admiration; I mean, that when I cut the corpora striata into small pieces, as I generally do, although the scalpel was directed to whatever part I pleas’d, and inclin’d in every direction during the division of the whole of these bodies, I no-where, however, saw any medul-

(z) L. II. c. 24.

(a) Tetrab. 4. Serm. 4. c. 40.

(b) De Re Med. l. 6. c. 37.

(c) Chirurg. P. 2. c. 49.

(d) Chirurg. Tr. 2. D. 2. c. 4.

(e) N. 10.

(f) Epist. de Aneurysm. ad Donzell.

lary striæ, as I have done always at other times; but that, in place of them, a kind of continu'd medullary band, as it were, shew'd itself, which was intercepted on each side, according to the longitudinal direction of those bodies, by the cortical substance: and yet it did not appear that the man had suffer'd any thing unusual in regard to the use of his brain or nerves: and this I would have those gentlemen consider, who are pleas'd with certain offices of these striated bodies which were formerly assign'd to them.

But let us at present omit these things, and go on to the dissection of the ham, which was perform'd by our Mediavia. It is true, a sphacelus had affected all these parts; and yet not in such a manner, but that all the circumstances which I shall mention appear'd very clear. The crural artery began to be dilated immediately upon its passing from the internal side of the thigh to the posterior part. Then, for the extent of some inches, you might have look'd for the trunk of the artery in vain; but the branches, into which it divides itself, at length appear'd in the calf of the leg. Yet in the whole of this tract was there nothing but a very large cavity fill'd with ill-condition'd blood; all the parts being eroded, and even the nerve and vein which are associated with the artery, betwixt the lower processes of the os femoris that are prominent on the back part, being so far consum'd, that scarcely any thing remain'd beside the coats of the vein which adher'd to the bones. But the bones themselves were also in part eroded; that is to say, the posterior surface of those processes I have mention'd, and the upper part of the fibulæ.

56. But now let us go on from the tumour of the vessels to the tumour of the bones, that is, to the exostosis; and without being, in this letter, at all solicitous with Schelhammer (*g*), whether the exostosis, the sarcoma, the polypus, and other disorders of this kind, are with justice class'd among tumours; nor yet with Bidloo (*h*), whether in a man who is not "healthy in the other parts of his body," a tumour of the bone may not be call'd an exostosis; especially as Gorræus (*i*), who is very accurate in determining the proper significations of medical words, expressly says that a polypus "is a tumour," and that exostoses "are tumours frequent even to those who labour under the lues venerea."

However, although I shall not controvert the point with any one, and should chuse rather to comprehend under the name of exostosis, as if under a certain class or species, any tumours of the bones which are preternatural; yet I cannot approve of those who, in enumerating the examples of exostoses, produce, among these, such as it is not certain do belong to the tumours of the bones; or, if this be certain, do not distinguish the exostoses into different species, as it were, with the addition or junction of a peculiar name.

It is not certain and clear, that the monstrous arm, describ'd in the sixty-ninth observation of the fourth century of Hildanus, does belong to the class of bony tumours; so that he himself (*k*) rather thought it ought to be

(*g*) De hum. corp. Tumor. S. 1. n. 3.

(*h*) Dec. 2. Exercit. Anat. Chir. 9.

(*i*) Defin. Medic. in πολύπυς, & in Εξόστωσις.

(*k*) Hist. ibid. cit. § 4.

reckon'd among those tumours which I have taken notice of above (*l*), with Henselerus. Yet although Tulpius (*m*) had quoted, in the latter part of one of his observations, that which I have said is extant in Hildanus, and had therein describ'd the os humeri as being in a very bad state, without saying, however, that it was found to be increas'd in bulk; Stalpart (*n*), in treating of exostoses, not only takes notice of that example of Hildanus, but even affirms that Tulpius had there describ'd "an os humeri" which "was much encreas'd in its bulk:" and this circumstance Tulpius seems to hint, as if he judg'd from the external appearances, in the beginning of a history, which is likewise related in the Sepulchretum (*o*), though not without some typographical error; but when he comes to the dissection he by no means confirms it.

After these, you will see that both of the examples are, without any scruple, related among the number of exostoses, by some authors, just as another from M. Aurelius Severinus (*p*) has also been, since Mery (*q*) quoted it, as similar to the exostoses of the fingers describ'd by him. But M. Aurelius, though he has really describ'd and delineated a hand which was not unlike these of Mery externally, has, however, expressly said, "that the matter which was found under the diseas'd part, when cut into," was not bony at least; but "that it appear'd like the substance of the bulbous root of sow-bread boil'd; and that it was friable moreover, and yielded to the slightest touch:" so that we could pardon, with a better grace, him who recounted among exostoses, a hand which, to external appearance, was not very much unlike one, and which was examin'd by Ruysch (*r*), in the beginning of this century; for although it was not possible to see through the part, and distinguish whether the tuberosities, into which it had grown out, took their origin from the bone itself, yet he found that one of them was compounded of innumerable lesser tumours, as it were, "partly cartilaginous, and partly osseous."

57. But it is not even sufficient to comprehend under one name of exostosis, except in a general way, those tumours which it is certain are real tumours of some bone, as they greatly differ from each other. For there are some, in which there seems to be nothing contrary to the general tenor of nature, besides a swelling or excrescence of the bone; such as Mery (*s*) has said that the common exostoses are, and such as Bidloo (*t*) has suppos'd to be the only ones that deserve the name of exostosis; requiring the bones to be perfectly sound, not only above and below the tumour, but also that they should be properly cover'd with the periosteum, and not show the least traces of any inflammation internally or outwardly, nor yet of acrimony, putrefaction, or corruption, in the least degree: and this opinion has had more than one follower; and among these the disciple of the celebrated Kulmus, in that

(*l*) n. 53.

(*m*) Obs. Med. l. 4. c. 13.

(*n*) in Schol. ad Obs. Med. Anat. 94. Cent. 1.

(*o*) Sect. hac Obs. 15. §. 3.

(*p*) De recond. Abscess. nat. l. 4. c. 11.

(*q*) Mem. de l' Acad. R. des Sc. A. 1720.

(*r*) Epist. Anat. 14.

(*s*) Mem. de l' Acad. R. des Sc. A. 1706.

(*t*) Exercit. cit. supra ad n. 56.

dissertation (*u*) which was publish'd in the year 1732, while he himself was president, entitled, *De Exostosi Steatomatode Claviculæ*.

Yet many others, both before and after them, call'd tumours of the bones, wherewith a caries was likewise join'd, exostoses. But in both kinds we meet with divisions again. For the tumour of a bone which is not carious, is either made up of a dense and solid substance, such as Bidloo (*x*) has in the greatest part represented, or of a substance "wholly" cellular, or spongy; as Ruysch (*y*) saw in a thigh bone, which is naturally very hard, and which was encreas'd an inch in its thickness; or, finally, as the same author delineated (*z*) in the os tibiæ, of a substance externally very thick, hard, and compact; yet internally cavernous.

But tumours of a carious bone are either the consequence of a caries, the cause of which was external injury, as in the lower jaw of a girl who had fall'n from a high place, and who is describ'd in the History of the Royal Academy of Sciences at Paris (*a*), or, as is more frequently the case, of an internal disorder of the humours; whether this be from a lues venerea, as Stalpart (*b*) observ'd in the os tibiæ, and even as the figure shows in the os femoris; or from some other cause, as Bogdanus (*c*) found in the whole os tibiæ, referring the cause to that disease which the Arabians call'd the *Ventositas Spinæ*: and, indeed, that the bones do become tumid from this disease, is very well known; and not only in the limbs, but in other parts also; as Severinus has observ'd (*d*), and the celebrated Kaltschmiedius (*e*) has lately confirm'd, by a singular example in the lower jaw.

Yet how much these tumours differ from each other, where we consider either the various magnitude of the cells which they comprehend, or the various matters which are contain'd in these cells, may not only appear from other observations, but particularly from those that we read in the History of the Academy just now quoted (*f*), and in their Memoirs (*g*); as that of Farcy in the upper part of the thigh, that of Mery in the inferior processes of the thigh-bone, and of the same author in the fingers.

However, even when the exostoses contain nothing that is foreign to the nature of bones, and for that reason nothing which is apt to produce caries, pains, and ulcers; the protuberances themselves, nevertheless, especially those that are large and situated in the joints, by greatly distending the tendons that lie thereon, are exceedingly injurious to the motions of the parts in which these tendons terminate: in the two observations, therefore, of Mery, which were last of all referr'd to, they could by no means be mov'd: but it is singular in that which Richius (*h*) sent to Paris, that a sensible motion of flexion remain'd in the leg, when the lower part of the os femoris was greatly enlarg'd.

(*u*) §. 13. & 24.

(*x*) Exerc. cit. Tab. 2. Fig. 3.

(*y*) Thes. Anat. Max. in fine ad litt. H.

(*z*) Thes. Anat. 10. Tab. 2. Fig. 10.

(*a*) A. 1727. Obs. Anat. 6.

(*b*) Cent. Poster. P. 1. Obs. 44. & Tab. 14. Fig. 1. & 2.

(*c*) Obs. Anat. Chirurg. 12.

(*d*) De recond. Absc. nat. l. 5. c. 16.

(*e*) Progr. de raro Spinæ Vent. casu.

(*f*) A. 1737. Obs. Anat. 1.

(*g*) A. 1706. & 1720.

(*h*) Hist. de l' Acad. R. des Sc. A. 1739. Obs. Anat. 4.

But that which the very great anatomist Eustachius (*i*) has given us in the history of a Roman matron, is much more surprising. In her case, the inferior processes of the femur “were grown out into such a tumour as to far exceed the size even of the largest human head;” as dissection, at length, in the dead body demonstrated to the other physicians, who did not give credit to the nature of this tumour; yet the woman “mov’d very freely and easily to all sides;” which circumstance being observ’d by Eustachius, and this at the same time, that those processes, or heads, “although they were become so tumid and turgid, retain’d their natural figure nevertheless,” had brought him to attain to a true knowledge of the case while the woman was still living.

Mery, therefore, in the case of that large exostosis which I have just now taken notice of, as describ’d by him in the same processes, has, with great propriety, accounted for the impossibility of flexion in the leg, not only from the tendons being vehemently distended, but also from the figure of these processes being so chang’d, that the lower surface of them was, from a convexity, become plane and flat, and even rather excavated.

58. From these you will collect other distinctions of exostoses in their figure, and not only in their situation; which, both formerly and in our times, you find to have been observ’d even in the extremities of oblong bones, although it is said to occur more frequently in the trunk of them, which they call the diaphysis; and that cannot be denied. But this disorder attacks other bones, also, besides those of the limbs: though it is not agreeable to our purpose here to take notice of all the examples of this kind. I have slightly touch’d upon some from the books that are now in my hands, from whence you will easily imagine how many might be added to this section of the Sepulchretum, in which not only recent examples, but even some ancient ones, are wanting.

If you enquire after others, you will find them in several places, but particularly in that dissertation which I referr’d to above (*k*). The author of which, moreover, gives you a peculiar observation of an exostosis of the clavicle; in which bone he confesses he does not remember whether it had been seen before by others, especially of so considerable a size. I saw, four years after the publication of that dissertation, an exostosis protuberating from the left clavicle in like manner, (which had also formerly receiv’d a blow) and that in the form of a very large spheroid, in a young man, by descent an Italian, who had come hither from Vienna, to see if he could find any one here, who, after so many methods having been tried by various persons, and all to no effect, would undertake to cure him.

This tumour might easily have impos’d upon me also, as it had done upon others, by reason of the teguments wherewith it was cover’d. But the bony hardness which lay beneath, and its very firm connection and continuation with the clavicle, caus’d that dissertation to come into my mind; and I pronounc’d that no cure of it could be made without the application of a saw: which, to say nothing of the danger, neither the decay’d strength of his slender

(*i*) De Multitudine, c. 8.

(*k*) N. 57 Vid. ejus c. 2.

and delicate little body would bear, nor the deprav'd state of his fluids, which was even original in him, would permit: all which suppositions I confirm'd by letters to the chevalier Nicolaus Garellius, deservedly chief of the imperial archiaters, who had in particular advis'd the mother of the patient, from his peculiar partiality to me, that she would suffer nothing to be done but by my advice; and, at the same time, referr'd him to the dissertation I have quoted, which he had never yet seen.

Nothing, therefore, was done; he himself also, as he wrote back to me, approving my advice, and affirming that the tumour, when shown to him in the beginning, and before any congestion of stagnating humours was made, was really bony, and had its origin from the clavicle itself. Of what structure, therefore, this exostosis was, and what it contain'd, I did not see. But I did see in another, which was prominent from the thigh of a man. Yet before I speak of this, I will answer a kind of tacit interrogation of yours. For you will desire to know how it can happen, that the most rigid and hardest laminæ of bones may be so extended as to form exostoses.

59. In the first place, then, call to mind those things which have been quoted above (*l*) from a certain response of Valsalva, that there are some exostoses, as they seem at first to be, which are, in fact, nothing else but ligaments and tendons, the thickness and hardness of which being increas'd by the stagnant matter, resemble a tumour of the bone whereupon they lie. Exostoses of this kind occur after a blow, a luxation, and other injuries of that kind, externally applied; and one, in particular, occur'd in a noble abbot, a colleague of mine, who, after having his foot luxated, and replac'd, had so considerable a hardness in a certain place, on the upper and back-part of the foot, that the bone might have seem'd to most persons to be prominent beyond its situation; yet, by the use of cerates containing gum ammoniacum, by time, and walking, it was at length entirely taken away.

Nor, probably, were those exostoses of a different kind which Severinus (*m*) says he himself had been troubl'd with at the lower part of each elbow, and which perpetually incommoded him when he lean'd upon them, till some years after they were discuss'd without any remedy. These, he says, "are wont to be call'd *soppresso*" by farriers, as if "accessions of bony matter made upon the bones:" and it is surprizing that Stalpart (*n*), in copying this passage from a nameless author, after some other things, which follow soon after in the same Severinus, should understand this Italian word *soppresso* in so wrong a sense, as to say that it signified "an ulceration of the bones."

But to come from false exostoses to the true, and from ligaments and tendons to the periosteum, which adheres very closely to the bones; Boerhaave (*o*) proposes a double kind of exostosis: the first, wherein the periosteum alone is obstructed, and after that swells by various degrees till it attains to the hardness of bone; the second, where the lamellæ of the bones recede in such a manner from their usual contact, that he saw the bones of the cranium four times thicker than they naturally are, and altogether fungous, so as to resemble a pumice-stone.

(*l*) N. 13. (*m*) De recond. Absc. nat. l. 4. c. 9. § 4. (*n*) Schol. ad Obf. cit. supra, n. 57.
(*o*) Prælect. ad Instit. § 711.

The former of these modes, then, you may make use of in order to explain those exostoses which, being protuberant on the external surface of the bones, consist of a compact bony substance, as in those examples that I have quoted from Bidloo and Ruysch (*p*); but you will much more readily explain them in this manner, after you have read the explications of the celebrated Duhamel (*q*), which are not only not different, but even confirm'd by his own experiments, while he inspected exostoses of this kind excited by himself in living animals, in their various degrees of induration, and attended to it from whence they proceeded. And, indeed, although he confesses that he could never yet excite exostoses of another kind, that is, spongy exostoses; yet he hints at a mode wherein we may conceive that these, also, are made up of the periosteum; and in fine concludes, that whatever wounds, irritates, inflames, or makes the periosteum tumid; which kind of injuries, it is certain, have very often happen'd before the production of exostoses; may without doubt give origin thereto: and this opinion of that very experienc'd man will have somewhat more weight with you, when you read over the memoirs which he previously wrote, wherein he deduces the production and reparation of the bones from the periosteum.

Yet as there are not wanting some who oppose contradictory experiments, and as he himself, like a prudent and cautious observer, denies that he contends for the opinion of all exostoses proceeding from some disorder of the periosteum; if you suppose those are to be excepted, in which, according to the second mode mention'd by Boerhaave, the laminae of the bone itself have receded from each other; you will not easily understand by what means they could, when they are very hard and very rigid, be mov'd and forc'd outwardly, be curv'd, expanded, and increase; unless you suppose them to be again made soft, and to have return'd to the former nature of a cartilage, as it were.

Many examples of this change are, certainly, extant in the books of physicians, some of which you will see pointed out by the very learned Haller (*r*); and not to go far from the observations taken notice of above, Tulpius, also (*s*), saw bones “so tender, flaccid, and soft, that they could be cut very easily with a knife, like wax;” and Richius (*t*) found them so soften'd, that he took the exostosis for a certain species of the *spina ventosa scorbutica*. To these add those that have been found, more than once, by the celebrated Heister (*u*), and not in children only, but in men also, so soft as to be very easily cut with the knife, when they were affected with a *spina ventosa*: wherefore, as he supposes that from deprav'd humours of the venereal, scorbutic, variolous, and even ricketty kind (for it is certain that ricketty children are also subject to tumours at the extremities of the bones) effus'd by the eroded sanguiferous vessels into the cavities and cells of the bones, and vitiating the medullary oil; as he supposes, I say, that the bony lamellae are

(*p*) Supra, n. 57.

(*q*) Mem. de l'Acad. R. des Sc. A. 1743.

Mem. 6. sur les Os, Obs. 31. & seqq.

(*r*) Not. *b* ad Praelect. Boerh. in Instit. § n. 5. & Diss. de Off. Tumor. n. 28. & seqq.

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(*s*) C. cit. supra ad n. 56.

(*t*) Cit. supra ad n. 57.

(*u*) Instit. Chir. P. 1. l. 5. c. 9. not. *a* ad

soften'd by humours of this kind, so he thinks that, when soften'd, they are by degrees urg'd outwards, from the congestion and pressure of these fluids, and expanded in their compass.

And I scarcely doubt but you will follow this, or some other similar explication, in those tumours, in particular, which are as yet comprehended by soft bony lamellæ; though you might rather hesitate in regard to those in which, though these lamellæ were perceiv'd to be every-where rigid and hard, the bulk, nevertheless, still continu'd to be increas'd, and even gain'd a very great increase in the latter years of its existence; suppose, for instance, an increase equal to that of the fingers spoken of by Mery (x), and of the clavicle in that dissertation quoted above (y): although in these two examples some room is left for the explication; in the latter, by reason of the cartilaginous parts being here and there interpos'd to the bony in the circumference of the tumour; and in the first, by reason of the same circumference being interrupted with carious ulcers in many parts.

But so far on this subject; for we have even said more than is necessary to show you of what kind, and from what cause, this exostosis was which was seen by me in that person of whom I shall immediately speak, and examin'd by dissection after the death of the patient.

60. The body of a man, of thirty years of age, of whom we could learn nothing more than that he was taken off by an apoplexy, was brought into the college, when I was teaching anatomy there, in the month of January, in the year 1732, and his limbs made use of for the public demonstrations; by which I had an opportunity of examining a protuberance on the left os femoris, of the form of a spheroid, and of the bigness of a middle-siz'd apple. This tumour was prominent at a little distance above the inferior heads, or processes, of that bone, and on the posterior surface.

The bone being cut with the saw in a longitudinal direction, on examination I found it to consist of bony cells, which abounded with a medullary oil, of a liquid consistence, and of a yellow colour; the cavity of the bone, which corresponded to that protuberance, being fill'd with a very large quantity of the same kind of oil. And the yellowness and liquid state of this oil, in both places, became worthy of remark, on account of the marrow in the farther cavity of the bone being somewhat red and concreted; and the occasion of this observation was increas'd by the great coldness of the season, with which, though other fluids were frozen to ice, a part of that oil, nevertheless, had not in the least become concreted.

61. Whether that change of the medullary oil in an exostosis, and about an exostosis, was the consequence of this tumour, or preceded it, I leave to you to determine. For I think I have said more than enough of bony tumours, at least as far as relates to the present purpose, and I perceive that this letter is already grown out beyond the bounds of my first intentions. And yet I have not touch'd upon all the tumours, even of those which happen chiefly in the lower limbs, tho' I, last of all, insist principally on those; and of this kind, among others, are varices, œdemas, and clavi or corns of the feet.

(x) Cit. supra. n. 56.

(y) Cit. supra, n. 57.

But in regard to varices, I had scarcely any thing that was worthy of remark, unless I should perhaps have chosen to refer you to Bidloo (z), to be inform'd of the immense size of some varices; in order to understand which, when already form'd, it is necessary to suppose a laxity of the coats of the veins, or a loss of tone, in consequence of too violent exercises, too long-continu'd exertions in standing, or carrying heavy burdens; and constrictions or compressions that prevent the free motion of the blood, with other things of a similar kind.

And who can allow that a laxity of the valves has no effect, in completing that dilatation which is begun to be form'd? I should even suppose, that to the commonly-known office of the valves, which relates very much to the present case, another might be added, as having the same relation; I mean, that like bands or ligaments they may strengthen the vein, as far as it is possible, by passing from one paries to the other; so as to make it less to be wonder'd at that the dilatation is increas'd, when they are relax'd or lacerated.

And as to œdematous tumours, I have spoken of them sufficiently when writing of the chronic and hydropical affections of the viscera: and indeed it is from the previous histories of these affections, that almost all the examples of œdemas are taken in the Sepulchretum, in order to be repeated here.

Nor should I have any thing to add in regard to clavi, if you had not lately ask'd me my opinion of that incurable clavus, from the irksomeness of which it is said, by the younger Pliny (a), that Silius Italicus, a consular man, and at the same time no contemptible poet, would have put an end to his own life by hunger. "The cause of death," says he, "was his ill health. He was affected with an incurable *clavus*."

If he had said more than these words, you would not, I suppose, have then ask'd me what this clavus was, or where it was. You therefore would have me divine. For you cannot be ignorant, when you read Celsus (b) and Aetius (c), that clavi may arise not only in the feet, but in the eyes also, not to mention other places; and of those which have their origin in the eyes, that the disorder call'd clavus by Aetius, is different from that to which Celsus gives the same name; for the former means the tunica uvea prolaps'd, in a considerable part of it, on the outside of the eye, and already become hard, in the same manner as Paulus (d) and Actuarius (e) understand the terms; but Celsus means callous tubercles in the white of the eye: and he says also that clavi, which exist elsewhere, arise not only from contusions, but sometimes from other causes also.

Yet as you know that all these tumours, whether form'd in the feet or in the eyes, or in any other part, have been call'd clavi from the similarity of their figure; you plainly see how many cases, that are various in their nature, situation, and causes, are comprehended under this term alone, and how easily clavi may be incurable; and not only in proportion to these varieties,

(z) Dec. 1. Exercit. Anat. Chir. 6.

(a) 1. 3. Epist. 7.

(b) De Medic. 1. 5. c. 28. S. 14. & 1. 7. c. 7. S. 12.

(c) Medic. Tetrabibl. 2. S. 3. c. 34.

(d) De Re Med. 1. 3. c. 22. ubi de prolaps.

(e) Medic. 1. 2. c. 27.

but also in proportion to the severity in the method of curing them (*f*), be sometimes the occasion of great irksomeness and pain, not to say always; particularly in a man such as Silius Italicus, who, as the same author Pliny (*g*) has told us, “had pass’d through his seventy-fifth year, and was of a delicate habit of body.”

But though this is the state of the question, as there is nevertheless so great a latitude in understanding the case, and consequently a great difficulty in ascertaining the truth, I do not think that it is in my power greatly to resist the opinion of any one, who may think differently from me; yet perhaps this will not prevent you from thinking that I come pretty near to probability, if I say that no other clavus was here meant by Pliny, than a clavus of the feet. For those that are form’d in the eyes are more rare; and the others “sometimes indeed have their origin in other parts, but chiefly in the feet,” as Celsus (*h*), and those Grecians (*i*), and even the fact itself, confirm; so that he who speaks of a clavus, without making mention of its particular situation, and particularly if he is not a physician, seems to signify a clavus of the feet, rather than of any other part: although, indeed, one who is not a physician would certainly scarcely omit that particular mention, or some other adjunct, if he meant, by the term clavus, to point out any other disorder, but that of which this word most generally conveys the idea; of which rare kind, clavi of the eyes, or a certain species of furunculi, are; yet you read in Ingrassias (*k*), “that some us’d to call this species clavus or spina;” and certain clavi of the feet themselves, when explain’d in the manner they are by the author of the *Finitiones Medicæ* (*l*), which are ascrib’d to Galen, are rare also; for in this work we read that, “a clavus is an orbicular ulcer in the sole of the foot, which has contracted a callus.”

And if this definition had come into the mind of that learned physician Lochner (*m*), when he describ’d a species of a very malignant kind of clavus, as having been seen by him, not without death being the consequence; he would, in my opinion, more readily have made mention of it, than of the disease call’d by the ancients *gemurfa*, inasmuch as it is a disease which, if it were in fact any species of the clavus, has not its seat, however, in the sole of the foot, but, as Festus says (*n*), “arises under the little toe, and even betwixt the toes,” as the elder Pliny had said, who is likewise quoted by Lochner, in the twenty-sixth book indeed, but in the first chapter, when speaking of the *gemurfa*, as of a disorder which was “soon put a stop to in Italy,” and that long ago, so as for “even the name of it to be obliterated.”

All which things I was willing to take notice of for example’s sake; not that I believe there to have been so many significations of the word clavus among physicians, and still less among others, in the age of the younger Pliny; though there certainly was, among all, that sense in which I, for this reason,

(*f*) Vid. exempla plura apud mox citandum Lochnerum, & in Epistola indicanda.

(*g*) Epist. cit.

(*h*) Sect. 14. cit.

(*i*) Aet. Tetrab. 4. Serm. 2. c. 82. & Paul. 1. 3. cit. c. 80.

(*k*) De Tumor. p. n. ubi de Furuncul.

(*l*) jam propius finem.

(*m*) Eph. N. C. Cent. 1. & 2. Obs. 192.

(*n*) De Verbor. Signific. 1. 7.

suppose him to have made use of it also. And from hence, and from the word *natus*, which he has made use of, not so proper to all diseases as to the diseases of this kind, you will, at the same time, understand, why I did not fall into the opinion, as I am wont to do at other times, of another very learned physician, who in a particular letter, publish'd some years ago, upon the clavus of Silius, supposes it to have been that pain of the head; which, however, he, in consequence of his very commendable ingenuousness, confesses he could never find to have been call'd by the name of clavus, before Valescus de Taranta, that is, before the fourteenth century. Farewel.

LETTER the FIFTY-FIRST

Treats of Wounds and Blows of the Head.

1. **T**HERE are, in the papers of Valsalva, so many observations which relate to wounds and blows, that, if I meant to comprize all of them in one letter, I should seem to send you a book instead of a letter. Being, therefore, under a necessity of dividing them according to their various situations, I now send you those that relate to the head, and shall send the others hereafter. And beginning with those wherein the cranium was either not at all hurt, or only slightly, I shall go on to those wherein it was found to be either quite fissur'd, or fractur'd.

2. A young man, of sixteen years of age, was struck with a stone which was thrown, in the left part of the sinciput, near to the lambdoidal suture, at the distance of about two inches from the sagittal. No symptom that was worthy of remark was the consequence; except the lips of the wound beginning to swell, and that some days only before the eleventh day. On which day a fever discover'd itself, with a coldness and a vomiting, but without any pain of the head. After this follow'd convulsive motions, speechlessness, deafness, and blindness; and, finally, in the beginning of the fourteenth day, death itself.

The cranium was unhurt, and yet the dura mater, in that part which lay under the wound, for almost as large a space as the wound was continu'd, was found to be thicken'd, and very lax, of an unequal surface, and of a colour verging to a yellowish hue; and betwixt this membrane and the pia mater, a concocted pus was found to stagnate betwixt the falciform process, and the upper part of the cerebrum which lay near thereto, quite to the anterior parts. In the whole of the cerebrum itself, however, was found no injury which fell under the notice of the senses.

3. A man

3. A man, who was near sixty years of age, receiv'd a blow with a stick, a little above the extreme part of the forehead, and the left temple ; no morbid symptom appearing then, or in the following days ; so that he came by himself every day to the hospital of St. Mary de Morte, at Bologna ; where the usual remedies were applied to his wound, which was suppos'd to be no more than cutaneous, and of no importance.

And, indeed, during four or five of these days, he continu'd in the market selling chesnuts, according to his usual custom, in a very cold season. But about the sixth day his wound became worse, and a fever, attended with a coldness and rigor, came on : and this returning every day in the same manner, without any other symptom being added, than a slight gangrene of the wounded part, the man was gradually carried off thereby.

The carcase was contracted, as it seem'd, from the coldness of the season. A little sanies had descended from the wound betwixt the extreme margin of the temporal muscle and the bone. And the gangrene, by its erosion, had dilated the wound to the size of that piece of money which is called a Roman crown : and there the naked bone came into sight.

On cutting out the upper part of the cranium, no sign of injury could be observ'd in that bone, even upon the most strict examination, Yet the meninges were found to be sanious, and somewhat thicken'd, in the whole of that space wherein the bone had been laid bare. The cerebrum, which lay beneath these thicken'd parts of the meninges, had contracted a very evident, though a very slight injury. For externally, the substance thereof was corrupted to the size of a small vetch ; and in the middle it seem'd to be perforated with a very small foramen. But this foramen, together with the corruption, did not descend lower than to a very small depth.

4. Before I here add other histories of the same kind, you will certainly make some enquiries ; and this in the first place, how it could be that, though the bone was unhurt, the meninges which lie beneath were nevertheless both purulent and sanious ; and how the brain itself was found to be not without some injury in this man ? Berengarius, indeed, as you have it even in that second section of the Sepulchretum (*a*), suspected it might happen that the sanies should pass through the pores of the cranium, from the external wound, especially if it had not a free exit from the wound : and that this may happen in some certain places is not to be denied ; as, for instance, where the sanguiferous vessels are pierc'd through, or where the sutures are very lax. Yet, for the most part, it is better to suppose, with him, what I shall speak in the words of Celsus (*b*), “ that although the bone remain'd entire, some “ vein, being ruptur'd internally, in the membrane of the cerebrum, from “ the blow, discharges a little blood :” and that this vein is ruptur'd from a violent concussion of the cranium.

In the same manner you will explain many observations, similar to those I have produc'd ; as, in particular, that of Mauchartus (*c*), wherein, till so far as the tenth day, there appear'd no bad sign ; and yet how much mischief was conceal'd under the cranium, which was every where unhurt, the

(*a*) l. 4. in Schol. ad Obs. 1.

(*b*) De Medic. l. 8. c. 4.

(*c*) Eph. N. C. Cent. 9. Obs. 40.

dissection of the patient, who died suddenly before the fourteenth day, sufficiently shew'd. And by what means it may happen that, in a concussion of the skull, the vessels within its cavity shall be ruptur'd, has been shown at large by Peter Simon Rohault (*d*). But if the concussion should have been very small, and within the cranium, which is not at all injur'd, the internal parts be found to have been hurt; see in what manner Bohn (*e*) conjectur'd that this might happen in his observation, and that of others; from whose writings (*f*) you will pick out several that you may add to this section of the Sepulchretum.

But to return to those observations which I have given you from Valsalva; you will ask me, in the next place, why the blood, which was extravasated within the skull, did not begin to give tokens of its effusion immediately, instead of beginning so many days after? Without doubt, because very small drops, distilling from a small vessel slowly and by degrees, could not arrive to such a quantity as to be injurious till after some days had pass'd, and at the same time could not arrive to such a state of corruption as to vitiate the meninges and brain.

Yet both of these circumstances were brought about the sooner in him who, continually exposing himself to the very cold air, gave occasion, by the contraction of the external vessels, for a greater quantity of blood being carried through the internal parts; and that in a less salubrious state, by reason of insensible perspiration being retain'd. The contrary external cause may also produce the same effects, by exciting and heating the blood; as in the son of Theodorus (who died of a wound in the head, which was to appearance slight) Vallesius (*g*) conjectur'd, and with very good reason, since, after having been expos'd to the sun "on the ninth day, the first fever came upon him "on the tenth."

But if you ask me why, of the two first whose histories I have written, he whom the fever seiz'd the soonest was carried off by no disorder besides this; but he who was seiz'd with a fever later, was carried off by so many other very violent disorders in conjunction with it; many reasons may be given for this difference: first, the delay itself, whereby both the quantity and the depravity of the extravasated matter, although latent in the concocted pus, was, without doubt, increas'd: in the second place, the different disposition of the humours and parts in different bodies and different ages: and, finally, the different kind of violence applied by the throwing of a stone, and by the blow of a stick.

Thus, in the fifth book of the Epidemics (*h*), you see that "he who was "struck on the head with a stone by the Macedonian, was entirely depriv'd "of his speech, heard nothing at all, and was agitated," that is, "in a convulsive manner," as the same Vallesius (*i*) rightly interprets it; which are almost the same symptoms that were suffer'd by our young man, though later, that is to say, on the eleventh day, and not, like the other, on the third:

(*d*) Traité des Playes de tête ch. 4. & 10.

(*e*) Dissert. de Trepanat. difficult.

(*f*) Etiam de Renunc. Vulner.

(*g*) Comm. in l. 7. Epid. ad 29. & in l. 5.

(*h*) N. 24. apud Marinell.

(*i*) Comm. ad eam historiam, quæ ipsi est n. 56.

neither did this young man; like him, fall down from the blow, nor had he his skull fissur'd, and that "above the right temple;" as the same history, which is repeated somewhat more at large in the seventh book, teaches (k); though Vallesius, who had remark'd so many other things, does not observe this, and enquires; therefore, "in what part of the head this man had receiv'd the blow." And from this history you will perceive, that the various force of the striking body, and the part of the head besides which is stricken, ought to be attended to in the distinctions of wounds of this kind. But now let us add other observations.

5. A young man, of about thirty years of age, had two wounds inflicted by cutting instruments; the one on the left part of his forehead, the other opposite thereto, as it were, in the occiput. He had a vain irritation to vomit. He died about the twenty-fifth day.

In dissecting the head, nothing was found, either internally or externally, that was worthy of remark, as far as related to the wound of the occiput. But that of the forehead first shew'd a sanies about it, betwixt the skin and the cranium, which in that part had eroded the pericranium and the internal surface of the skin itself, like a *herpes exedens*, and had in some measure separated the anterior, and at the same time superior, part of the temporal muscle. But internally, although the os frontis shew'd no more marks of injury than the os occipitis did, yet betwixt the bone and the dura mater there was a sanies to the quantity of two drachms, which had eroded that membrane. And, indeed, on the right side, under the upper part of the cranium, in the interstices of the blood-vessels of the same membrane, was found a matter similar to sanies, but thicker. The other parts within the cranium were in a natural state.

6. An old man, of sixty years of age, who was very subject to epilepsies, being seiz'd with a paroxysm, and falling upon the ground, receiv'd a blow upon the left part of the thorax, and, at the same time, on the left side of the head, above the temporal muscle. That part of the thorax was in much pain: his respiration was difficult, and, in the beginning, blood was thrown out at the mouth by the strainings to vomit. His head was weak, dull, and heavy; so that when ask'd a question, he scarcely gave any answer.

His thorax being open'd after death, the left cavity of it was found; but in the right cavity was found serum, to about the quantity of a pint; and the lungs on this side adher'd to the pleura in their upper part, and were universally indurated, as they generally are in a peripneumony. The ventricles of the heart contain'd polypous concretions; that in the right being very large.

In the head, the left temporal muscle was a little bruis'd: and when the head was open'd, a portion of coagulated blood was found betwixt the left os petrosum and the dura mater; which bone adher'd so closely to the dura mater, that it could not be separated but by force. However, the pia mater shew'd a little gelatinous concretion of serum at the sides of the vessels; and the ventricles contain'd a little extravasated serum: the remaining part of the cerebrum was found.

7. A man, of forty years of age, falling from a high place, bruise'd his left eye: and the skin above the eye-brow was, probably, torn by a sharp stone. In the beginning he was seiz'd with a fever; which remitted a little afterwards. But about the twelfth day, after the commission of an error in the prescrib'd method of living, a more violent fever came on; to which, about the fourteenth day, a convulsion of the whole left side of the face was added, together with a cruel pain in the very ball of the eye. And at length the patient died about the twentieth day.

When the head was examin'd, these appearances were found. Under the skin that was lacerated above the eye-brow, was that nerve which, coming forth from the orbit, is reflected upwards on the forehead; so that being either contus'd, or in any other manner injur'd, it might easily excite convulsion. And the ball of the eye being somewhat putrid on the external part, had brought on a slight erosion in the bone which is interpos'd betwixt the orbit and the brain, yet not to such a degree as to affect the brain, which was found in this place. Towards the left part of the occiput, however, a small portion of the brain inclin'd from its native colour to that of a brownish colour. And the dura mater, which corresponded with this portion, was somewhat moist externally with a sanies.

8. Although, in falling from high places, it frequently happens, that besides the part which is manifestly contus'd, some other is also contus'd less-evidently, and it is, for this reason, less surprizing, that upon dashing the os frontis against a hard body, some injury and a sanies should be found internally at the occiput; yet in the young man also (*l*), who was wounded on the left side, as a matter similar to sanies was found on the right side; and as, in the old man (*m*), not that part of the thorax which was struck against the ground, but the opposite, show'd an internal disorder; I shall add something upon these subjects below (*n*), as I also shall of convulsions, in consequence of injuries of the nerve which is reflected under the eye-brow.

Yet I do not attribute the convulsions and death of this man to that nerve only, but also to the sanies, wherewith the dura mater was moist; as I do the disease and death of the old man, partly to the peripneumonic state of the lungs, and partly to the blood which was coagulated betwixt the basis of the cranium and that membrane, and which adher'd thereto, no less than it adher'd in that man who, being kill'd within the space of four days, by a fall from a considerable height, is spoken of in the commentaries of the Imperial Academy of Sciences at Petersburg (*o*).

However, the marks of injury which were found within the cranium in these three observations, without the cranium itself being injur'd, may be explain'd, you perceive, in the same manner, that the former two, which you have read before them, were explain'd (*p*). Nor will you suppose, I believe, that the five which I shall immediately subjoin, ought to be differently explain'd; the cranium in them, indeed, being injur'd externally, but internally quite found.

9. An old man, about seventy years of age, falling from a considerable

(*l*) n. 5. (*m*) n. 6.
(*n*) n. 41. & n. 16.

(*o*) Tom. 7.
(*p*) n. 4.

height upon the ground, receiv'd a blow on the posterior and right side of the sinciput. After his fall he lay half-stupid: and although his stupor was discufs'd soon after, and he walk'd by himself into the hospital, he nevertheless denied that he knew any thing of his fall, or had any remembrance of the affair. The wound was attended with no symptoms during the first days.

Yet scarcely was the seventh day pass'd over, but it was seiz'd with a gangrene: and to the gangrene a fever was join'd. However, the gangrene being remov'd in the space of a few days, the fever was remov'd likewise. After this the patient complain'd of a pain that oppress'd the posterior part of the head, which, however, was not violent. But about the twentieth day he was seiz'd with a fever, a rigor, and a vomiting. And this fever returning afterwards, without the vomiting, sometimes twice, and sometimes three times, every day, all the vital actions gradually decay'd, and the patient was carried off about the thirtieth day.

The os sincipitis, on the right side, near to the sagittal and lambdoidal futures, had its exterior lamina somewhat injur'd and broken; but internally it was perfectly sound. Betwixt the two meninges, and in the ventricles of the brain, was serum; the whole of which weigh'd nearly four ounces. The cerebrum was soft and flaccid; and was contain'd in a pretty lax space within the cranium.

10. In this patient, four of those circumstances seem'd to be united, which, when join'd together, may justly give us reason to believe that there has been a very considerable concussion of the brain: the fall from a high place, the stupor immediately following the fall, together with the total forgetfulness of the fall itself, the cranium not being broken, and the interval betwixt this and the brain being encreas'd.

Ludovicus Duretus (*q*), upon that passage of the *Coacæ Prænotiones*: "They who have a concussion of the brain, and have felt pain therein after being struck, or having fall'n, are immediately bereft of their speech, do not see nor hear, and for the most part die," sufficiently shows how much more liable to concussion the brain is, "if it happen to have lost that fulness or plumpness that took up the whole cavity of the cranium." And as Falloppius (*r*) (in the same manner as Fernelius (*s*) in the full moons) acknowledges this fullness, "when the moon shines through the whole night;" so he affirm'd it to be true, that, "when there is no full moon, the skull is not quite fill'd up by the brain, but there is some space, and that the vessels, by which the parts are connected, are a little distracted;" and that he himself "had observ'd it in dissections."

But whether this has (by the anatomists after him, as Piccolhominus, whom I before spoke to you of (*t*), when I happen'd to be upon the same subject) not only been affirm'd in words, but confirm'd by accurate observations also, I do not call to mind; although this confirmation might very well agree with the opinion of those who did not doubt but, according to the various phases of the moon, the force of diseases was various, particularly of diseases affecting the head, and that the danger from wounds of this kind is different.

(*q*) Interpret. l. 3. tr. 2. c. 2.

(*r*) Tract. de Vulner. c. 12.

(*s*) Pathol. l. 7. c. 8.

(*t*) Epist. 4. n. 32.

Yet I remember to have read in some authors, and particularly in John Salzmann (*u*), that in several subjects, betwixt the anterior lobes of the cerebrum and the cranium, “a space, almost equal to the thickness of an inch, “is sometimes seen;” and even it has not appear’d to me that the cranium has been equally fill’d with the brain, at least not in all, as I have hinted in the *Adversaria* (*x*): although whether this variety answer’d to the various phases of the moon, is neither said by them, nor has ever, to confess the truth, been attended to by me.

It does not, indeed, escape me, as Glisson (*y*) formerly asserted, “that in “living animals there are only potential and not actual cavities,” betwixt the viscera of the belly; “and that all the parts thereof are contiguous, by “the force of the equable compression of the abdominal muscles;” and, at the present day, that no interval is acknowledg’d by many of the most excellent men, betwixt any of the parts of a living body whatever. However, as the cranium is unchangeable in its figure, and the brain may be more or less turgid, either from the phases of the moon, as is asserted by the very learned Mead (*z*), or from any cause whatever, which may encrease or expand the blood; I do not well see how we can deny, but the brain may sometimes be more or less distant from the scull, even in the living body. And to this may be added, the contraction and density of the brain; which, from what cause soever it may arise, (for the ancients, and among these Liebauius (*a*), suppos’d it to happen from old age itself) must of course diminish the bulk of the brain, and consequently make it retract from the enclosing cranium.

At least Littre (*b*) not only found the substance of the cerebrum in the state I have mention’d, but also found it at a considerable distance from the cranium, in a robust youth, who had run, in the most violent manner imaginable, with his head against the wall, so as to kill himself in the smallest moment of time. And although he considers this state of the brain as the effect of the concussion; there will be some, perhaps, who, with Duretus, would rather chuse to consider it as the cause of the concussion being more violent; and still a greater number, who will consider the scull’s not being broken, and giving way, and the dashing of it against a hard and immoveable body, as the causes of this concussion being so violent.

For you know much is attributed to both these causes of concussion by the more modern surgeons; to the second for this reason, that “the brain being “shaken against a hard body, and driven back again thereby, suffers two “motions, diametrically opposite, in one moment of time;” and to the first, because “if the cranium is not broken, the whole impetus of the percussion “is directed to the brain,” in consequence of its being “intercepted” by no large fracture, or by “a bone which is broken into many pieces.”

Why then, you will say, since in the old man you have just now describ’d from Valsalva, these two causes were not wanting, (for he had dash’d his

(*u*) Differt. de mira cranii Fract. §. 17.

(*x*) VI. Animad. 84.

(*y*) Tract. de Partib. Continent. c. 16. Aph. 58. S. 7.

n. 21.

(*z*) De imper. Sol. ac Lun.

(*a*) Schol. ad Holler. Comm. in Hippocr.

(*b*) Hist. de l’ Acad. R. des Sc. A. 1705.

Obs. Anat. 12.

head against the ground, and had not his cranium fractur'd) and though there seem'd to be so many other circumstances from whence a great concussion of the brain might be conjectur'd, did he not die before the thirtieth day, nor suffer so considerable disorders, nor yet show any blood, or pus, to have been extravasated within the cranium? I suppose because he, probably, did not fall from a very high place, though from a place of some height; nor yet upon stones; and because part of the violence of the blow was intercepted by the external lamina of the cranium giving way, and being broken in pieces. And the slight and short stupor, and the loss of memory, which then happen'd, as they happen'd without the other disorders that are enumerated by Hippocrates, shew'd the concussion of the brain to have been less.

For our Peter de Marchettis, as you have it there (*c*) in the Sepulchretum also, saw "some persons who had only this symptom appear after a fall, or a blow upon the head, (that is to say, an alienation of mind, with a privation of sense and motion;" which are certainly more violent symptoms than those that immediately follow'd the fall of our old man) saw those persons, I say, "quite free from disease on the following day."

Since, therefore, this concussion was more slight, and so much the more slight, if the brain happen'd to be at that time soft and flaccid, or approaching nearly to this state, it is not to be wonder'd at that the larger blood-vessels were none of them ruptur'd; but only such very small ones as would naturally discharge, by a very slow distillation, those four ounces of serum, which, by gradually injuring the vital actions, at length totally destroy'd the man.

But if you should choose rather to suppose that fluid to have proceeded gradually from the small vessels, not of the blood, but of the lymph, which were ruptur'd, supposing that, by this means, both the rupture of these vessels, and the long stagnation of that extravasated matter, without any evident corruption, may be better conceiv'd of; you will have some authors, in conjunction with whom you will think, and among these Rohault (*d*), and before him Bohn, who has even produc'd the dissections from whence he made this conjecture (*e*); and has affirm'd, in a succeeding work (*f*), what he at first had left undetermin'd, that he had seen the lympheducts "about the convolutions of the brain, in particular, very turgid" in a certain boy.

However, that some vessel is broken in the concussion of the brain, appears from very frequent observations; to which you may add that publish'd by Christian Vater (*g*): yet that this is perpetual in a fatal concussion, as if the extravasated humours always were the causes of death, and the concussion of the brain never was of itself fatal, it does not seem possible for those to assert, to whom the history I have quoted from Littre, and another, in like manner, of the celebrated Hævelius (*h*), are known. For in neither of these was any thing found to be extravasated after the most violent blow upon the head.

(*c*) Schol. ad Obs. 12.

(*d*) Tr. cit. supra ad n. 4. c. 11.

(*e*) De Renunc. Vuln. Sect. 2. c. 1.

(*f*) De Trepan. diffie.

(*g*) Eph. N. C. Dec. 3. A. 9. & 10. Obs. 165.

(*h*) Commerc. Litter. A. 1741. Hebd. 14. in fin.

Nor will any one have the better side of the question, in asserting that an extravasation was not made for this reason, that immediately after the concussion the motion of the fluids ceas'd, together with life. For besides that it appears, from the second history, that the man had liv'd about twelve hours after the blow was receiv'd; it is certain that neither of them was kill'd by an extravasation where there was none at all. Death, therefore, was brought on by the concussion alone. Wherefore there is even room to doubt often, when an extravasation is join'd with it, whether the one, or the other, of the two, had the greater efficacy in producing the catastrophe.

But in order to conceive in what manner the particles of the cranium are shaken, at the time of a violent percussion, and when shaken give a still greater concussion to the brain than they suffer themselves, and how the concussion of the brain renders it unfit for its necessary functions, by injuring its proper, not more invisible than tender, internal structure, by stretching the fibres thereof, by relaxing, by distorting, by compressing, by entangling, by lacerating, or by vitiating them, in any other way whatever; I say, in order to conceive how these changes happen, you may read the conjectures of Bohn (*i*). After having read which, you will, perhaps, think it quite superfluous to enquire, whether any injury of the same kind be brought upon the small trunks of the nerves also, where they already go out from the medulla oblongata, by the great concussion of the brain; and whether, if it be brought on, this injury, of itself alone, is capable of bringing on all those violent disorders which then follow.

But now, laying aside these disquisitions, let us go on to propose more violent effects of wounds in the head, than appear'd in the old man describ'd; whether we consider them as following in the living body, or found in the body after death.

11. A woman, of more than forty years of age, falling from a high ladder, hurt the left part of her sinciput, a little above the os temporis. She lay as in a manner dead after her fall: yet a little after this she seem'd to be in health as before; nor did there appear to be any wound, except of the skin. And although, about the fourteenth day, the skin was seiz'd with a gangrene in the wounded part, which gangrene a fever accompanied, yet within a few days the gangrene was first overcome, and after that the fever. But before the thirtieth day, the fever came on again with a coldness: and to this was added, about the thirty fourth day, an apoplectic affection, with a loss of speech, and a privation of motion in the whole right side of the body, though the sense remain'd at the same time. However, she shew'd by nods and signs that she understood what was said: and a kind of epileptic convulsions, as it were, which sometimes affected the whole body, agitated that part no less than they did the left side. At length she died about the fortieth day.

The external lamina of the cranium was open'd into the form of a semi-circle, in the part where the head had been injur'd; but the interiors of the bone were sound. Yet the part of the pia mater which lay under that place

was sanious; and the brain, in the same place, was ting'd of a brownish and pall'd colour. But the ventricles thereof were sound, as the whole right side was also.

12. A virgin of five and-twenty years of age, having fall'n upon the ground, was wounded with a very sharp stone in the left part of her forehead. Being receiv'd into the hospital, she was troubl'd with a continual fever, which increas'd every day. The wound began to be seiz'd with a gangrene, which in that season, (for it was the month of June, 1689) came upon all wounds. Some time after, the patient became idiotic, as it were; she heard but little; she spoke not at all; she fix'd her eyes stedfastly on those about her. At length, a tremor of the whole body came on, during which she died; and this was about the beginning of the twenty-eighth day.

The bone that lay beneath the wound was hollow'd out with a small dent, and a foramen, as it were, externally; about which were seen three chinks. But neither these chinks, nor the foramen, reach'd to the internal parts. Yet the meninges, in that part which answer'd to the wound, were both of them eroded; and from hence a serous colluvies was discharg'd, which, being diffus'd through the whole substance of the brain, had infected it with a disagreeable odour, and ting'd it of a blackish colour.

13. If it had happen'd to be the same season wherein a gangrene came on in the wound of the head of the woman, and of the old man last spoken of, and of the man of whom we spoke almost in the beginning (*k*), that it was in the case of this virgin; we might, perhaps, refer hither a passage from the fourth book of the Epidemics (*l*): “In Aenum, whosoever was “wounded in the head, the wound had a horrid aspect, was malignant and “suppurated:” and, certainly, that observation of Pigræus, which you have there in the Sepulchretum (*m*), and which mentions a certain year “wherein “a gangrene came upon almost all wounds,” may be suppos'd to relate to the present case. At least, some preceding deprav'd state of aliments, or present constitutions of air, although sometimes hid from the senses, add, in general, a deprav'd state of some other particular disorder to diseases happening at that time; as has often been observ'd by physicians; and particularly a gangrene, in general, to all wounds, as happen'd some years ago at Paris (*n*), and even in the very city which we are at present speaking of, I mean that of Bologna (*o*).

14. A young man, of eighteen years of age, slender, and of a blackish colour, having receiv'd a blow by a stone that was thrown against one of the ossa sincipitis, where the temporal muscle arises from it, pass'd two days without any symptom worthy of remark, if you except a fever. But on the sixth day after that, as he lay in the hospital of St. Mary de Vita, the wound became livid, and the discharge which came from it was exceedingly foetid; besides which he had an acute fever. To these symptoms was added, near the eighth day, a soporific disorder; so that when spoken to, he made no

(*k*) N. 3.

(*l*) N. 26. Apud Marinell.

(*m*) In Schol. ad § 6. Obs. 6.

(*n*) Malovin Mem. de l'Acad. R. des Sc.

A. 1748, & 1741.

(*o*) Vid. Commerc. Litter. A. 1738. Hebd.

42. n. 1. sed & aliis postea annis idem accidit ibidem.

answer. Sometimes he sent forth a kind of suspirious voice. His whole face became tumid and yellow. With all these symptoms he went on to the eleventh day; on which, with a very great expiration, he died.

The whole body seem'd to be that of an icteric person. From the wound a purulent matter had made itself many passages betwixt the cranium and the cutis; which it had also eroded. And the bone had contracted some roughness on the surface, from the stroke of the stone; but show'd no injury on the internal surface, which fell under the notice of the senses. However, betwixt the bone and the dura mater, in the interstices of the vessels of this membrane, was observ'd a cineritious matter, not much unlike a condens'd pus, in that part only which lay under the blow: and in the same part only the cerebrum had contracted a livid colour, to the depth of two inches.

All the other parts within the cranium were sound. All the parts in the thorax were sound also. But the blood was extremely fluid, except that, in the right ventricle of the heart, was the beginning of a polypous concretion.

15. Another young man, of the same age, of a sanguineous temperament, and of a fatish habit of body, was wounded, on the first of November, in the year 1688, in the upper part of his forehead to the left side; on which he immediately fell down, being somewhat confus'd in his head. Being brought from the place of his fall into the hospital of St. Mary de Morte, he seem'd to hope that he might have a successful cure, as he perform'd all the natural functions of life, and was without any fever. But behold, on the eleventh day, he was attack'd with a fever; which becoming more violent on the day following, gave occasion to open a vein once more. The wound, instead of concocted pus, discharg'd a serous and bloody humour: the part of the forehead which lay under the wound became swell'd: and pains of the head, limbs, and back, were added; which, about the end of the fifteenth day, degenerated into spasmodic affections. And at the same time, as he began to be delirious to such a degree, on the beginning of that day, as to make it necessary to confine him down in bed, he ceas'd to live any more.

The common integuments about the wound being cut asunder, a great quantity of sanious matter was found to lie therein, and extend itself quite to the eye, where the forehead was swell'd. But the bone had been injur'd by the wounding instrument, only superficially. These were the appearances externally. And within the cranium, betwixt the dura and pia mater, in the part where they corresponded to the wound, a quantity of sanious matter was found; notwithstanding, we could discover no mark of injury in those membranes, and none in the whole brain; except that the sanguiferous vessels, which lay hid under the pus, were turgid with very black and coagulated blood, so as almost to resemble varices. The viscera of the thorax, which are sometimes found to be affected in disorders of this kind, were unhurt: and only a polypous concretion was found in the right ventricle of the heart.

16. From what is said in the latter part of this history, you see why it was remark'd, in the latter end of the preceding history, that every thing in the thorax was sound. But what marks of injury Valsalva has sometimes seen in the thorax of those who have died of wounds in the head, the four next observations will shew. The first will, at the same time, confirm some of

those things which I have already said (*p*) in regard to the injuries of the nerve which is reflected under the eye-brow. For, according to the different force and state of these injuries, sometimes slight convulsions, which spread no farther than the eye, arise; but sometimes very violent and far-diffus'd ones. To these slight convulsions relates, perhaps, in some measure, that passage of the *Coacæ Prænotiones* (*q*) which I have mention'd in a former work: "The sight is obscur'd in wounds made upon the eye-brow, and a little higher:" and to the very violent ones, in my opinion, the words of Lancisi, which I have likewise quoted heretofore (*r*), refer, "that wounds which happen in these parts are very dangerous:" and to the same, I should believe, related, in some measure at least, the convulsion of the face in the man whose wound was describ'd above (*s*) at the eye-brow; as well as those much more widely-diffus'd and very violent convulsions, which immediately follow'd the wound that was inflict'd on the part I shall speak of immediately.

17. A young man, of six-and-twenty years of age, had a stone thrown at him by an enemy, and was wounded on the right side of the left eye-brow. He fell down immediately, indeed; but soon rose up again, and pursu'd his enemy with alacrity. He afterwards came to the hospital of St. Mary de Vita with the same vigour of mind: where, after the proper remedies were applied to the wound, it was necessary, in a manner, to compel him to remain; so light did he set by a wound of this kind. On that very day, the paroxysm of a quartan intermittent fever, wherewith he was then troubl'd, happen'd to be expected, and really came; but it became a continual fever, with a large and vehement pulse, and a considerable pain of the head.

About the seventh day a delirium was added to the fever, together with some convulsive motions. Near the eleventh, one or two febrile accessions came on, with a peculiar rigor. At length, the delirium ceas'd, and the man lay in a soporose state, except that he was shaken by convulsive motions. And, indeed, those who were about him said, that they had, many times in the night, observ'd him to have rais'd himself up from the bed by an almost incredible exertion, lifting up his head, and clinching both his hands: at the ceasing of which motions he lay like a person dead. Yet his right hand was for two days before his death paralytic, as far as related to the motion; for as to the sensation, it was not quite destitute of that; but after eight hours, the right foot began to be mov'd more weakly likewise. And his respiration having already become laborious before this time, he at length died in the conclusion of the fourteenth day.

By examining the wound externally, a little abscess was observ'd at the side of it; and part of the fanies of this abscess had crept, betwixt the muscles and the skin, towards the ear. But the bone beneath the wound was fissur'd, and the dura mater that answer'd to it was slightly injur'd: the interior part of the cranium on the same side, that is, on the left, was fill'd with pus, which was shut up betwixt the dura and pia mater. And this pus the substance of the brain that lay beneath, seem'd to have imbib'd; for it

(*p*) Epist. Anat 18. n. 7.

(*q*) N. 3. apud Marinell.

(*r*) Epist. Anat. 18. n. 7. in fin.

(*s*) N. 7.

was of the same colour; but on the surface only. Every thing else was found; except that a little serum was found at the basis of the cerebrum.

The thorax being open'd, in the lungs were found, here and there, various tubercles, of a considerable hardness: some of which, when cut into, discharg'd a pure sanies; the others, being not yet suppurated, resembl'd the firmness of a glandular body.

18. A boy, about thirteen years of age, was wounded by the throwing of a stone in the right part of the sinciput, above the temporal muscle. He immediately fell down, with some obscuration of the internal senses, and vomited. He was carried into the same hospital, but was not seiz'd with any fever till the fourteenth day. This coming on, a great quantity of sanies was discharg'd by the wound; and a little purulent matter from the mouth by spitting. About the twentieth day a delirium came on; and about the twenty-fifth he died.

In separating the skin from the cranium, about that and the pericranium small abscesses were observ'd: but these had no communication with the wound, which fell under the notice of the senses. Under the wound, however, the bone was broken and depress'd, and adher'd closely to the dura mater, in which it also had fix'd some of its acuminate particles. Yet no laceration of this membrane discover'd itself to the senses; nor yet any injury of the brain, if you except one or two ounces of serum, which ran out by the infundibulum, while the brain was taken out. The thorax being open'd, the lungs were found to be very red, and in them were found small abscesses full of pus.

19. A young man, being struck by a stone on the left side of the sinciput fell down in consequence thereof: yet he came by himself into the hospital of St. Mary de Morte. There were no symptoms of disease. About twenty days after, when the patient had indulg'd himself in eating, a dreadful fever came on; which, by returning many times, afflicted the patient very much. And although he was freed from this fever, yet a cicatrix could never be brought on the bone, which was laid bare in the wound, as long as he liv'd. After these fevers, the patient was attack'd with a cough; which, for a long time, was dry, till two or three days before death he threw up a purulent matter by spitting. In the mean while, a gangrene had seiz'd upon the buttocks by long lying; and besides, on that night which preceded his death, a large abscess was observ'd in the back; and this, being spontaneously ruptur'd, discharg'd a great quantity of pus. Wherefore, no sooner had he pass'd over the second month but he died, without any injury of the intellectual powers.

The body, from a long disease of this kind, and from delay, because we were not permitted to dissect it till some days after death, was very putrid and offensive; yet was dissected with accuracy. The integuments of the head being remov'd, at the upper side of the wound was seen a disjunction of the sagittal future: but the os sincipitis, in that part of it which had been always uncover'd, was without any injury; yet in other parts it was here and there eroded with a caries, but especially near the squamose future, where the caries had perforated the whole thickness thereof. The dura mater, however, which lay under that bone was unaffected, except that it inclin'd to a some-

what livid colour, and show'd several bony particles adhering to it; and on the internal surface, under the very place of the wound, it had an abscess annex'd to it, lying in the excavated substance of the brain, which was small however, so as scarcely to be able to contain a little filbert; and from this, while that membrane was pull'd away from the brain, a thick and green pus was discharg'd. In the dissection of the brain a serum, but in small quantity, was observ'd in the basis of the cranium.

The thorax being open'd, the lungs were found to be hollow'd out with many and various small abscesses; some of which, inclining from the nature of a tubercle to the condition of an abscess, contain'd a sanies not as yet perfect, but such as had only begun to be matured into a fluid and sanious matter. The pericardium contain'd a great quantity of water; the heart no polypous concretion.

At length we thought proper to enquire whether any passage lay open to the cavity of that large abscess in the back, through the interstices of the muscles, whereby matter might have flow'd thither from the head. However, no appearance of this kind was met with; as the parts which lay between, and especially the external ones, were sound. But the muscles in this body were here and there pale, and those that are call'd abdominal were livid.

20. A man, of fifty years of age, was struck with a stick on the left part of the scapula, no morbid symptom being the consequence of the wound. He came by himself to the hospital; where, by experienc'd surgeons, there was judg'd to be no injury, but an external one; and the cure succeeded happily till the fourteenth day, without the appearance of one bad symptom. But on that very day a fever attack'd him, with a rigor and a pain in the belly. On the following days, in like manner, a difficulty of respiration came on, with a sense of weight, a cough, and a purulent spitting. And at length he died, about the twenty-second day.

As nothing morbid, besides that injury which appear'd externally, could be found in the head; that is, neither in the cranium nor the brain, except that a little serum flow'd out during the dissection of the latter; the thorax was open'd. Both of the cavities of which were full of pus; and the lungs, although loose from the ribs, were found to be distinguish'd with many tubercles, some of which, being already suppurated, emitted a sanies upon incision.

In the pericardium was but a small quantity of water. In both the ventricles of the heart were polypous concretions, that in the right being very large, that in the left but small. The belly at length being open'd, in the right part of the liver frequent tubercles were seen; and amongst these, some which had already come to suppuration.

21. You see that Valsalva is induc'd, by his own observations, to say (*t*); that the viscera of the thorax are sometimes affected in wounds of the head: although he might have been induc'd even by others. For Nicolaus Massa (*u*) had already seen, in the year 1553, Victor Trincavella, with other very learned men, being present, such things as I do not remember to be extant, and not only here in the Sepulchretum, but even not in any authors who have treated

(*t*) Supra, n. 15. in fin.

(*u*) lib. Introd. Anat. c. 28.

of subjects of this kind; for which reason I will mention them to you here in a brief manner.

A certain man having receiv'd a wound upon the right side of his head, near to the sagittal future, together with a wound of the meninges, he died delirious and paralytic; which paralysis, for the most part, says he, is wont to happen on that side of the body which is opposite to the wound. In the head were found two imposthumes, the pus of which was laudable; one in the substance of the brain, near to the wound; the other in the posterior part of the cerebellum. And in the thorax was a great quantity of sanies, and that of an ill-condition'd kind, found within an ulcer of the left lobe of the lungs, the cavity of which was larger than half the shell of a hen's egg. There was also a manifest sanies on the external surface of the left auricle of the heart, the whole of which was ulcerated. But even in the right ventricle of the heart, and in the carnea columna, was a remarkable imposthume, which ascended quite up to one of the valves; this valve also being affected with a considerable tumour of the *apostematous* kind.

And that you may not suppose these apostems to have existed in the thorax, before the wound; Massa asserts, that he knew the man, and that he had not ever complain'd of any pain, nor was troubl'd with any cough, even after he lay ill of the wound, &c.

To this ought to be added the observations of our Marchetti (*x*). And as these are much more known, and even related in the Sepulchretum (*y*), you may there see how often he found the lungs and the pleura eroded in wounds of the head, and half the cavity of the thorax fill'd with pus; and how he argues against those who do not deduce this from the wound of the head. For he himself did not doubt, by reason of previous pains in the neck, especially in the hinder and lateral part, but a purulent matter descended from the wound into the cavity of the thorax. Yet this passage, as you have seen by the observation of Valsalva on the young man (*z*), could not be confirm'd, even in regard to the abscess of the back.

22. You have others then, besides Valsalva, who, in cases of wounds in the head, have sometimes found pus within the thorax. There are even some who have found pus in the belly, as the same Marchetti (*a*), who has even found a taint of the spleen and purulent pustules; as there are others, which I see transferr'd into the Sepulchretum (*b*), who say, that abscesses have been translated into the stomach also, the intestines, and mesentery. Yet not only the same observers, and Marchetti and Bohn (*c*), who likewise mentions the pleura, the lungs, and the spleen promiscuously, do not omit the liver; but most others mention this, as the only viscus into which pus can be carried from the head when wounded.

And that you will learn from all the histories and scholia which are propos'd under the sixteenth observation in the Sepulchretum. Nor will you be puzzled by the carelessness of the printers (*d*), who write *apostema in capite*, or

(*x*) Obs. Med. Chir. 15.

(*y*) Schol. ad § 2. Obs. 16.

(*z*) supra, n. 19.

(*a*) Schol. cit.

(*b*) Obs. 5. § 4.

(*c*) De Renunc. Vuln. S. 1.

(*d*) § 1. & 3.

vulneribus hepatis, instead of *apostema in hepate*, and *vulneribus capitis*. But it would, perhaps, rather hurt your understanding to believe, that Ballonius had propos'd, as a thing well-asertain'd to himself, what he has said of an abscess observ'd in the concave part of the liver; since, upon inspecting that appendix to his little book on convulsions, from whence this passage is taken, you do not find what we have in the *Sepulchretum* (e); “ And this I know
“ to have been observ'd by most surgeons;” but the following words: “ Whe-
“ ther this does really happen I am ignorant; yet I have heard that it has
“ been observ'd by the greater part of surgeons. But if it does happen, by
“ what means it can come to pass, and whether it is probable that it can
“ happen, will moreover be worthy of enquiry.”

You will be cautious then of placing Ballonius among the observers of this abscess, who ought, in fact, to be plac'd among the explainers of it; as, on the other hand, a certain person ought not to have number'd among the explainers, those who were only witnesses of the observation; but among the observers. And you will be still more cautious, if you happen to be desirous of explaining the affair, of supposing any thing that does not agree with the observations, as if, in most of them, or almost always, or always, as Barbette (f) does not scruple to suppose, pus were translated from the head into “ the liver alone.” For you have read by whom it has been seen translated even into the heart, the lungs, and the spleen: and, in regard to this last-mention'd viscus, I wonder it should be asserted by him, I do not mean in these cases, but in general, “ that it is very rarely found in a preternatural
“ state, in the dissections of bodies.”

But we are often compell'd to these things, by a greater solicitude in explaining, than in observing, certain circumstances. For which reason, among those who have written of these things afterwards, the celebrated Molinelli is the more to be commended (g), because he has very properly judg'd that the matter ought first to be accurately observ'd by him, rather than explain'd: and he saw pus sometimes translated into other parts, but not into the liver; and in many not translated into the liver, nor into the other parts; yet in others into the liver certainly, but just in the same manner from other wounded and ulcerated parts, as from the head. And to convince you that it is not so frequently carried into the liver, take this remark with you, that it never happen'd to me, as far as I can remember, to see it: to Valsalva, in such a number of dissections, not more than once; and that when it was, at the same time, translated into the lungs also, and into the cavities of the thorax itself, in great quantity.

Yet it may happen that he did not see it sometimes, because he did not enquire after it; and particularly in that young man (h) whose face became yellow before death, and whose whole body seem'd to be ictical after death; for you have, in the *Sepulchretum* (i), an example of a jaundice with hardness and pain in the region of the liver, and with the putrefaction of this viscus, in consequence of a wound in the head. But by reason of that yel-

(e) § 4.

(f) Schol. ad § 6.

(h) supra, n. 14.

(g) Comment. de Bonon. Sc. Inst. T. 2. P.

(i) Obs. 16. § 5.

1. inter Medica.

lowness which Valsalva observ'd, it is not easy to believe that he did not enquire in what state the liver was : and although, in those especially in whom there are these and other marks of the liver being injur'd, and the wound of the head becomes dry, or suddenly and unexpectedly discharges less pus, it may be suspected by many confirming observations, which I have read, that the pus is translated into the liver ; yet the case is not to be predicted for a certainty : for there may be sometimes a fallacy in the symptoms, whether many, or even all of them, occur.

23. If you read the observation of Molinelli (*k*) on a man in whom, as soon as the sanies had ceas'd to flow from the wound of the head, the abdomen began to swell, and be tense ; and yet there was no disorder in the liver, but a kind of small ulcers deform'd the surface of the intestines, with a great quantity of sanies, and a great number of tubercles lying at a distance from each other, here and there ; you will easily conceive, that if these disorders had beset the part of the intestine colon in particular, which lies immediately under, and contiguous to, the liver, it must have happen'd that many signs of pus being translated into the liver, though fallacious, would have been join'd together. And indeed it may sometimes happen, that all of them come together, and, nevertheless, that he may be deceiv'd, who shall predict that pus will be found in the liver. Read over again the observations of Valsalva which I last of all describ'd to you. You will, for the most part, find that the tubercles, either in the lungs, or in the liver itself, were not all suppurated ; and indeed that many of them, at times (*l*), as yet resembled the firmness of a glandular body.

What if, when the patient was dying, there were not as yet any that began to contain pus ? And it seems according to those observations wherewith, in my opinion, the observation of Molinelli may be join'd, that the pus carried from other parts into the viscera, is not always deposited in the form of a pus, but frequently at least, that many of its particles, being mix'd with the blood, and entirely disjoin'd from each other, stick in some narrow passages, perhaps of the lymphatic glands, and by obstructing or irritating them, as happens in the production of venereal bubos, and by retaining the humours therein, distend them, and give origin to the generation of a much more copious pus than what is carried thither ; which generation is shown by those rigors and horrors (*m*). And by this means we may also conceive how it is, that much more pus is frequently found in the viscera, and cavities of the bodies, than a small wound could have produc'd.

But in what manner not only a few, but even sometimes a great number of purulent particles, pass to other parts from wounds of the head ; and not from these only, but also from the wounds of other parts, or their abscesses and ulcers ; as when from the lungs of pleuritic patients, and even from suppurated limbs, it is often so evidently carried to the passages of the intestines, or kidneys, that the fœces and urine are purulent, as long as no pus flows from the limbs ; and, on the other hand, those excrements are pure as long as the limbs discharge a pus, and sanies, which was the obser-

(*k*) loco paulo ante indicato.

(*l*) n. 17.

(*m*) supra n. 17. 19. 20.

vation of Parey (*n*); is sufficiently explain'd by the circulation of the blood (*); which also illustrates another observation of the same author (*o*), and, to omit those of others, one very excellent observation which is added lately by the very experienc'd Benevoli (*p*). Yet there is not room for these explications, if at any time the wound is dried up, in consequence of the powers of nature decaying: which I here take notice of, that you may also beware of the fallacy of this sign, which is propos'd among those above.

24. The four observations of Valsalva that I have last produc'd, if you except one, which, like the others before produc'd, mentions no injury of the cranium that **relates** to the internal parts; all of them show it to have been either loosen'd, or depress'd, fissur'd, fractur'd, or eroded. Let us go on, therefore, to describe other observations which relate to each of those kinds of injuries.

25. A woman, of fifty years of age, being busy in washing linen on the bank of a river, was struck, by another woman, on the right and posterior part of the head with a stick, in consequence of which blow she fell into the water. Being immediately taken out, she lay in some measure stupid. But the stupor being discuss'd, and no other symptom appearing, and the hope of her safe recovery being confirm'd more and more every day; behold, about the fourteenth day she was attack'd with a fever, which began with a rigor; of which fever she died about the twenty-second day.

The integuments of the cranium being taken off, it was observ'd that behind the right ear, which had been struck, the indentations of the lambdoidal future were separated from each other; and that from their interstices a little serous humour was, by a slight pressure, discharg'd. And within the cranium, at the same place, a little blood was stagnant. However, the brain was entirely sound.

26. A young man, who was struck with a stick upon the sagittal future, near to the coronal, pass'd over six or seven days without any bad symptom; so that he did not lie in bed, but walk'd about the hospital. However, about the tenth day the wound was very foetid: and one or two days after that the edges of the wound swell'd; and a certain heat was perceiv'd at the throat. After this a fever attack'd him, with a rigor: he was also attack'd with convulsive motions: and he at length died on the beginning of the thirteenth day.

The cranium, when examin'd externally and internally, did not show the least injury, except that the future, where it had lain under the wound, had a tortuous little line running betwixt its indentations, which appear'd very evident by a brownish colour. And at the very side of the future, some portion of the dura mater adher'd to the cranium, in a peculiar kind of manner: this, however, being easily separated, show'd a very slight appearance of sanies adhering to it on the surface. But the pia mater, which lay beneath, was pale. Besides these appearances, nothing was observ'd; for the other parts, as well as the whole brain, were in a natural state.

27. A man, of more than thirty years of age, receiving a blow with a blunt instrument on the upper part of the lambdoidal future on the left side,

(*n*) Oper. l. 16. c. 49.

(*) Vid. etiam Epist. 25. n. 20.

(*o*) l. 10 c. 12.

(*p*) Observ. 22.

when returning to Bologna from the country, where he had been, fell down, indeed, but immediately rose up; and instantly pursuing his journey, which was in extent three miles, betook himself into the hospital. While he lay there, it was observ'd that the wound was not of a very laudable colour, and that some days after an abscess was produc'd at the side of it: and this abscess being afterwards open'd by art, and in a short time cleans'd, the cure of the wound seem'd to proceed in a much better way.

But many errors in diet being committed, and some febrile accessions having already preceded, about the eleventh day a very violent epileptic convulsion attack'd him: and when this remitted the patient did not speak: although he signified that he understood what others said. After this, convulsive motions were observ'd in the left side of the body; but in the right a paralysis; his face sometimes representing the risus sardonius as it were. In the mean while the pulse was natural: but this afterwards becoming quick, turgid, and impetuous, death follow'd in a few days; that is, on the nineteenth day.

Drawing down the skin from the head, under it on the left side, and in many places, although in such as were far distant from the wound, was found a stagnating pus, wherewith the os temporis was eroded on the surface. Moreover the lambdoidal suture, where it lay under the wound, had its indentations distinct from each other. And the dura mater show'd a kind of cineritious colour, which it had contracted from pus that was collected betwixt itself and the pia mater. Part of that pus adher'd to the pia mater, in the form of a thick gluten as it were; the remaining part was fluid, and scarcely equall'd half an ounce. The substance of the cerebrum, which lay under this portion of the pia mater, to the extent of about two inches both in length and breadth, and of one in depth, inclin'd to a somewhat livid colour. However, the remaining parts of the whole cerebrum were found; if you except the existence of a little serum, which was found not only in the ventricles, but also at the beginning of the spinal marrow.

28. An old man, of sixty years of age, falling down from some height, receiv'd a blow upon his head, under the angle of the lambdoidal suture. At first he lay half-dead. But coming to himself afterwards, he complain'd of a pain in the injur'd part: and this continuing he did not, however, confine himself to bed, till the fourth or fifth day, when he came into the hospital of St. Mary de Vita. There he not only could not bear the contact of the probe in examining the wound, but not even that of the lint or tow with which it was wip'd, without a great deal of pain. About the seventh day he was seiz'd with a paralysis of the left arm; to which, upon opening a vein, motion was restor'd; but not in a perfect degree. This patient liv'd quite to the twenty-third day, on which he died in a soporose state.

While the skull was saw'd open about the right temple, pus flow'd out from its cavity: and this pus had been also seen in the place of the wound, while the head was examin'd before cutting into it. But in this place no injury of the cranium was found, except a disjunction of the lambdoidal suture. In that part the cerebrum had an ulcer on the right side, to the depth of two inches, which had certainly been hollow'd out in this manner by the sanies. But in the nearest part of the left side it was of a palish

colour. Betwixt the dura and pia mater, where they cover'd the whole anterior lobe on the right side, was contain'd a moderate quantity of pus, with the colour of which the meninges had been ting'd. In the ventricles of the brain, and at the beginning of the vertebral tube, a small portion of limpid serum stagnated.

29. The sudden disjunction of the futures, if you attend to the cause of it, cannot happen without some considerable concussion of the brain; and if you attend to the effect, not without a violent distraction of the dura mater, which adheres more closely in that part than in others, and a laceration of the connecting small fibres and vessels. To this may be added, that the passage for the pus from the wound into the cavity of the cranium, is by this means with less difficulty obtain'd. It is not, therefore, to be wonder'd at, that, in these four observations of Valsalva, and in another, in like manner, which had been describ'd above (*q*), the patients died, sooner or later, where there was a disjunction of the futures; being affected with more slight or more violent disorders, both according to the various disposition of each, and according to the condition of other circumstances, all of which cannot be known.

But as to a paralysis occupying the side opposite to the wound or the injury; as this has been also observ'd in other patients, of whom I shall write below, as well as in the two last, I shall hint a few things in regard thereto hereafter (*r*). Now let us come from the laxated cranium to the depress'd cranium.

30. A certain herb-man was struck in the forehead, near to the coronal future, and a little to the left side, with an instrument which was more apt to bruise than to cut. After the blow, he felt the beginning of a slight swooning. Having come into the hospital just now mention'd, till the eleventh day there not only was no symptom of ill success in the cure, but every thing seem'd to portend a happy event. However, on that very day the man was seiz'd with a vehement fever, which began with a rigor, and a vomiting of a great quantity of bile, which return'd again in the evening.

This fever recurr'd every day in the same manner, till, on the fourteenth day from the blow, which was the fourth before the next full moon, the wind blowing pretty nearly from the south, he first became dull, yet so as to answer readily any one who ask'd him a question: but after a few hours, while he was turning himself from the right to the left side, he was depriv'd both of his internal and external senses entirely, and was oppress'd with a difficult respiration; which, although it afterwards was brought back almost to a natural state, yet return'd again in a laborious way: and in this manner he died on the same day that I have mention'd.

The os frontis was slightly depress'd in that place which was pointed out; and an unequal and sharp scale, separated from it internally, which inclin'd to the right side, had injur'd the dura mater on that side; so that betwixt this membrane and the pia mater pus stagnated, which had overflow'd from the vertex of the head almost to the basis of the cerebrum, and the terminations of the cerebellum on the same right side. And the dura mater, which

lay under the pus, being somewhat thicken'd, was easily separated from the cerebrum; which in that place inclin'd to a cineritious colour, not unlike the pus whereof I have spoken. Moreover, the cerebrum was very much confin'd within the cranium.

31. In regard to the brain being very much confin'd within the cranium, and the causes thereof, among which we have seen that some place the full-moon, and to which the state of air, during the blowing of southerly winds, as a cause of expansion and rarefaction in the blood, must be added; both of which Valsalva has taken notice of in this history, you know, that I have written of them above (s). But as to the apoplexy seizing upon this man, while he turn'd himself from the right to the left side, as it has done so many others, according to what has been hinted in the *Epistolæ Anatomicæ* (t); the cause of it, in this case, might be, that the quantity of pus which was on the right side by this means compress'd the cerebrum, which was wholly subjected thereto, in so much a more dangerous manner, in proportion as it was now the more compress'd by reason of the more confin'd space within the cranium.

32. A man, of fifty years of age, being wounded with a cutting instrument on the sinciput, immediately vomited. Being receiv'd into the same hospital, the bone was found to be so depress'd under the wound, that it could not be drawn back by any art whatever. In the beginning there was no pain in the wound; but after some days it was affected with the sense of a creeping motion. And to this convulsive motions of the whole body being added, on the beginning of the eleventh day life was exchang'd for death.

That portion of the bone which had receded from the other by the force of the percussion, adher'd strongly to the dura mater, which was there slightly inflam'd. Betwixt this and the pia mater was a fluid similar to serum, both in consistence and colour.

33. A woman, who was about the same age, was wounded with a blunt instrument above the left eye-brow. After the blow, she vomited and became stupid. Yet the stupor was, after some time, dissipated; and the case seem'd to the surgeon to be going on very well, till, the tenth day being elaps'd, she was seiz'd with a pain of the left ear, together with a horror and a coldness, which was succeeded by a heat. At length, convulsions of the whole body coming on, she died within a few days.

The bone which lay under the part where the blow was receiv'd, had wounded the brain by an acuminated lamina; and the brain was, for that reason, sanious in this part, and corrupted. But although the disorder had descended very deeply, it did not, however, reach to the ventricles. Part of the sanies had flow'd down to the basis of the cerebrum, about some of the pairs of the nerves.

34. A woman, of thirty years of age, had been struck upon the head with many stones; a languor and vomiting being the immediate consequences thereof, which continu'd for many days. Yet the wound did not seem to promise an unhappy event. But about the tenth day, a fever coming on, with a coldness, it became dry and pallid. To these changes was added a

(s) N. 10.

(t) XIII. n. 24.

delirium, which degenerated gradually into a soporose affection. And by this the patient was at length carried off about the twentieth day.

In the right side of the cranium was found a fissure of four inches in length; yet that portion of the cerebrum which lay under the fissure, was affected with no injury. But on the left side, where there appear'd to be a very considerable contusion externally, the cranium was not only cleft by a fissure, which was drawn in the form of a circle, and had a diameter equal to half an inch of the measure of Bologna; but it was also, in some measure, depress'd in that part: and, indeed, from that depress'd portion an acuminate lamina had receded internally, and had wounded the dura mater. To this membrane, therefore, a purulent matter adher'd in that part; and the cerebrum, which lay beneath, was morbid to the extent of three inches both in length and breadth, and to the extent of two in depth; so that the injury did not reach to the ventricles.

35. A man, of a middle age, being struck in the right part of the sinciput with a blunt instrument, but affected with no symptom whatever in consequence thereof, came of himself on foot to the afore-mention'd hospital, and went to bed there. After two hours he began to stammer; and, a few hours after that, was seiz'd with a paralysis in the whole left side of his body.

He, nevertheless, open'd his left eye perfectly, when he answer'd, in a stammering manner, to the questions which were ask'd him: the right he kept half shut. But he could not even move the right part of his body, without great pains and endeavours. Two or three days after receiving the wound, he was delirious. At length, becoming lethargic, he died on the fifth day.

The head of this man Valsalva, indeed, could not himself dissect, being taken up with more important business. Yet he did not omit to mark down what was related by his friends, Peter Molinelli and John Anthony Guicciardini, who had dissected it. The cranium was broken in such a manner, that two large fragments of it, being depress'd, had, by making an angle inwards, as it were, made a considerable wound in the meninges and the brain itself, and had penetrated into the substance thereof, to the breadth of two inches. There was in that wound of the cerebrum a coagulated blood; and the vessels, also, were turgid with blood to a considerable degree. While the brain was taken out of the cranium, some portion of serum was discharg'd.

36. As to my heaping together so many observations here, I do not do it so much for the sake of brevity; for many things remain to be added; as to prevent the same animadversions from being frequently repeated. For those things that seem to be worthy of peculiar attention, in any one of them, I will take notice of below in their proper places. In the mean while, however, let us not stand still: but, as we have done in the examples of the cranium being depress'd, let us, moreover, subjoin other observations of its being broken or fissur'd.

37. A woman, of fifty years of age, fell headlong from a ladder upon the ground. A wound appear'd above the left eye: her face was tumid and pale; her temples were livid: blood was discharg'd from her mouth. The

woman

woman understood nothing, felt nothing, mov'd nothing except her right hand, and that only a little while, slightly, and feebly. She died fifteen hours after her fall

The external integuments of the sinciput were red. In the bone which compos'd the superior part of the orbit of the left eye, were many fractures. On the right side, the artery which passes through the dura mater, being lacerated, had pour'd out its blood; about two ounces of which were seen to be coagulated betwixt that membrane and the os petrosum. This blood, thus concreted, had injur'd that part of the cerebrum which corresponded to it, so as to make it appear as if it were eroded.

38. An old man, of sixty years of age, being attack'd by a he-goat, fell down on the ground, and hurt the left part of his head. He could scarcely speak: he vomited: he threw out blood from his mouth: he gave no sign of any internal senses: his hands were agitated by convulsive motions: his face was red: he therefore died after two days.

The injury of his head, which was about the upper margin of the temporal muscle on the left side, seem'd to be slight externally. But when the skin was taken off, that muscle was found to be universally suffus'd with blood: and when the cranium was open'd, a considerable quantity of grumous blood was found to adhere so tenaciously to the dura mater, where it corresponded to the same muscle, that it seem'd to be one substance therewith. And in the same place there was a fracture of the skull, with a rupture of the internal vessels.

However, as to the same membrane, where it corresponded to the right temporal muscle also, a still larger quantity of the same kind of blood adher'd, and could not have come thither by any means from the left side; and as no fracture of the cranium was, by any means, discover'd on the right side; Valsalva was very much suspended in his mind thereon. For although, when he was afterwards about to examine the bony fabric of the internal ear, a subject on which he was then wholly employ'd; and had driven a chissel against that right part of the cranium with a mallet, a fissure came into his view; yet he was in doubt whether this was to be ascrib'd to the mallet, or to the blow receiv'd in falling. As to what remains, the whole brain was in a natural state, if you except a little serum which was in the ventricles.

39. A man, of fifty years of age, was struck with a stone almost in the middle of the left eye-lid, where the nerve goes out from the orbit. Many hours being elaps'd after the fall, he was carried into the hospital I have so often mention'd, where it was necessary to tie him down in bed, on account of the very great convulsive motions whereby his whole body was agitated. His eyes were shut: the actions of his mind were at rest. At length, when the thirty-sixth hour from the time of receiving the blow was completed, the convulsive motions having ceas'd for the last hour, he died.

Many portions of the cranium, above the orbit, were broken; and one of them that was acute prick'd the dura mater, which for this reason was inflam'd in that part. And, indeed, a fissure was also found on the opposite, that is, on the right side, in that very part which corresponded to the fractur'd bone on the left side. In the brain was found a serum in some measure sanious.

fanious. However, as the head of this man had been wounded before also, you might see, in that part from whence a fragment of the cranium had been taken away, a kind of thick membrane, which supplied the place of a bone. To this membrane the dura mater strongly adher'd.

40. Besides this last circumstance, which you will see agrees extremely well with what was observ'd formerly by Berengarius (*u*); and besides that which relates to the nerve reflected under the eye-brow, the very injury of which is also succeeded by violent convulsions, as has been shown above (*x*); this observation contains two other circumstances, whereon we may insist a little. One of these, however, I shall more conveniently touch upon below (*y*). And the other relates to that celebrated controversy in regard to the counter-fissure. Which most persons were formerly induc'd not to acknowledge, by a reason that was weak, nevertheless, in consequence of its depending upon that utility of the sutures of the cranium, which they, following Galen (*z*), ascrib'd thereto, as if they were created to stop the progress of a fracture; whereas fissures may be known to every one, as well as to us (*a*), which are produc'd from one bone of the skull into another, and even frequently into more than one.

Another difficulty likewise offer'd itself in regard to this question; I mean, to confess the truth, that the case cannot be so plainly and clearly explain'd by any reasonings or similitudes whatever, as to make every one acquiesce therein. However, although the explications, which are now read in the dissertation of Georgius Wolfg. Wedelius, *de Contrafissura* (*b*), were not as yet brought to light; it was not just to deny any thing for this reason, that the cause of it is not understood. Finally, the opinion of most persons was moreover with-held by this argument, that very eminent anatomists and surgeons, out of whom it is sufficient to mention Jacobus Berengarius (*c*), Gabriel Fallopius (*d*), John Baptist Carcanus (*e*), Isbrandus Diemerbroeck (*f*), in so many cases of fractur'd skulls, and in so many inspections of them after (which I mean to say of Carcanus in particular, although I see none of his observations transferr'd into the Sepulchretum) had never found the bone fissur'd in the part opposite to the blow.

From hence, indeed, we might have argu'd the rareness of the counter-fissure; but could not have denied its existence, if, at the same time, it were only certain that it had been actually sometimes found by others. And that it has been found, not only many not recent, but even many recent, observations are extant to confirm: and as you have some of these here in the Sepulchretum, not under number five, as is erroneously said by the printers, but under number eleven (*g*), and others in the dissertation of Stofchius *de Resonitu* (*h*); I shall not take notice of them here.

Yet I will put you in mind of this, which Paulus (*i*) formerly hinted, that

(*u*) Tract. de Fract. Calvar. in Document. prope fin.

(*x*) n. 16.

(*y*) n. 48. in fin.

(*z*) De Us. part. 1. 9. c. 17.

(*a*) Epist. 52. n. 35. 36.

(*b*) Sect. 1. membr. 3.

(*c*) Tract. cit. c. 1. & 2.

(*d*) De Vuln. c. 12. & Expos. in Gal. de Off. c. 13.

(*e*) De Vuln. capit. Serm. 2. Lect. 6.

(*f*) Anat. 1. 9. c. 4.

(*g*) § 2. 5. 7. 8. 9. (*h*) c. 4.

(*i*) De Re Med. 1. 6. c. 90.

the head being stricken in more than one part, “as happens in falling, the
“fissure of the scull, which is brought on without a solution of continuity in
“the skin, but appears afterwards, in consequence of an abscess being form’d
“around it, and the skin being cut through, was suppos’d to be made in the
“part opposite to that on which the blow was receiv’d;” I will, I say, put you
in mind of this, as it is necessary that it should be cautiously and prudently
attended to in the examination of every observation. For which reason Fal-
loppius (*k*), although in one person he saw the bone fractur’d on the side op-
posite to that which had been struck by the kick of a horse, as there was a
suspicion that this fracture had been produc’d by being dash’d against the
ground, nevertheless thought he could not assert that he had seen a counter-
fissure.

And Berengarius, Carcanus, and Diemerbroeck, have judg’d nearly in the
same manner of this counter-fissure, when describ’d by others: and very often,
at least, the patient cannot speak, or remember how many blows he receiv’d,
or in what places, or on what part of the head he fell. This must be at-
tended to besides, whether the fissure which is describ’d in the opposite part
be there only, or whether it be produc’d thither, beginning from the part
which was evidently struck, or from some other very near to it.

When thus continu’d, it is not properly the counter-fissure, of which the
question is at present; for they suppose, with Celsus (*l*), “that the gaping of
“the bone is not found on that part where the skin is cut asunder;” but that
the bone is “fissur’d on the other side.” If you, therefore, observe these
things, you will perhaps find much fewer examples than some may imagine,
in which you will think it reasonable to allow of a counter-fissure.

41. Nor indeed is it properly a counter-fissure, if it at any time appear,
that one and the same of the bones of the cranium had receiv’d a blow in
one place only; and yet that it has a fissure, not in that place, but in some
other: for that this may actually happen, was not denied by Carcanus (*m*),
and his preceptor Falloppius (*n*). And, indeed, the latter of these authors
has shown (*o*), that in this manner the words of Hippocrates (*p*) may be un-
derstood, in which others have believ’d that the counter-fissure, properly
taken, was evidently spoken of; that is to say, that the bone is sometimes
broken in a part of the head distant from that where the wound is; for if
he had intended to speak of the opposite side only, there was certainly no
reason why he should consider it as a great calamity (which he immediately
subjoins) that the physician is then ignorant in what part of the head the
fracture has taken place; as, by the general signs of a fracture then existing,
it would be certain that it was in the opposite side.

But I do not see why he would not have (*q*) Celsus interpreted in the same
manner, and by a similar kind of reasoning. For Celsus (*r*), where the
marks of a fractur’d scull are found, and these he does expressly suppose to
be found, but the fissure does not appear under the wound, would not have

(*k*) c. 13. cit.

(*l*) De Medic. l. 8. c. 4.

(*m*) Lest. 6. cit.

(*n*) c. 12. cit.

(*o*) Comm. in Hippocr. de Vuln. Cap. c. 14.

(*p*) De Cap. Vuln. n. 10. apud Marinell.

(*q*) c. 12. cit.

(*r*) c. 4. cit.

enquir'd after other signs of the part wherein the cranium is fractur'd, if he had meant only the opposite part; since he has said, "And it does even not uncommonly happen, that the blow has been receiv'd in one part, and the bone has been fissur'd in another."

Be cautious, therefore, how, rather than give credit to Carcanus (*s*), you here give credit to John Baptist Cortesius (*t*), who readily affirms, "that the more elegant Latins, by the *altera pars* of any thing, always understood the opposite part." For if this author had attended, but a little while, to the words of Celsus; just now copied by me, he would not even have written, a little before, that Celsus, in this passage, "had spoken according to the opinion of the vulgar," and not according to his own.

But much less are we to reckon among the instances of a counter-fissure, as has been done by some, those in which there has happen'd to be either extravasated blood, or sanies, or any other mark of disease whatever, found within that part of the cranium which is opposite to the blow, at the same time that the bone was there uninjur'd. Since, altho' Berengarius (*u*), Falloppius (*x*), and others, assert, that they have found these appearances in many, yet they, at the same time, deny that they had seen a counter-fissure. For this is never understood by them, and the more ancient authors, unless the bone be fractur'd: and in what manner the vessels may be ruptur'd, in the opposite part, under the uninjur'd bone, not only they have explain'd in their own way, but may be conjectur'd from the dissertation of Wedelius (*y*), which I have already commended.

Wherefore, if you even suppose that no part of the scull, besides what evidently appear'd to have been struck, was struck in that young man (*z*), and in that man (*a*), in whom, in the same manner as I shall say in the next observation, I have said above, that a sanies and marks of injury appear'd to Valsalva in the opposite part; you will have from whence to explain the affair, as in a woman in like manner (*b*); although in her it is more natural to suppose many blows; and in the old man (*c*), in regard to whom I last of all wrote that blood was extravasated in the opposite side. And from those things which I have taken into consideration, in relation to the word counter-fissure properly, or less properly, taken, you would, without doubt, choose rather to ascribe the fissure observ'd in the opposite bone, in the same old man, to the anatomical mallet, but that which was seen in him (*d*) whom we immediately describ'd afterwards, to the one hostile blow, inasmuch as it was not, like the former, found in a different and not contiguous bone, but in one and the same.

42. A man, of thirty years of age, who was very delirious from an acute fever, threw himself down from a window upon the ground, and wounded the left side of his head, above the temporal muscle. He could not speak: his face was red: the whole left side of his body lay immoveable; except that an hour or two after the fall, while the wound was handled, the foot con-

(*s*) Lect. 6. cit.

(*t*) Traët. de Vuln. Cap. P. 2.

(*u*) c. 1. cit.

(*x*) c. 12. 13. 14. cit.

(*y*) Sect. 1. Membr. 3. & 4.

(*z*) n. 5.

(*a*) n. 7.

(*b*) n. 37.

(*c*) n. 38.

(*d*) n. 39.

tracted itself slightly, and was afterwards extended. And in this manner he liv'd till the third day, when he died.

Under the left temporal muscle was a fissure of the skull; to which, however, no internal injury that fell under the notice of the senses corresponded. But in the part opposite to this, betwixt the dura and pia mater, was blood extravasated to the quantity of about two ounces; so that the hemiplexia of the left side was brought on by this extravasation, and not by the wound or fracture on the same side. However, the whole cerebrum was sound, except that all the vessels which crept through the pia mater, were very turgid with blood, and the neighbouring parts in some measure inflam'd: but these appearances, probably, related more to the delirium than to the blow.

43. You see how easily any one might be deceiv'd, who, considering only the situation of the wound, should take upon him to judge of the seat of the cause by which the hemiplexy was produc'd. For that this ought not to be done will, in like manner, appear from an observation of mine similar to this, which you read in the *Epistolæ Anatomicæ* (e).

But to the seat of the cause of a hemiplegia of this kind, which was enquir'd after by dissection, as it ought to have been, besides others which are describ'd above, that history also belongs which I shall immediately describe: for the other circumstances that occur in the history last describ'd, either in regard to the blood being found in the part opposite to the wound, or in regard to the vessels being very turgid with blood in a delirium, you remember I have spoken of just now in part, and in part on a former occasion (f).

44. A young man, of twenty years of age, being struck by a sharp instrument, had the left temporal muscle cut in a transverse direction. After the blow he proceeded on his way for a little time, but at length fell down, and lost the power of speech. However, to those who ask'd him questions he answer'd by nods, though slowly. Being brought into the same hospital which I have so often mention'd, after some days had pass'd he spoke a little, though deliriously. In the mean while, he mov'd his right hand no more: yet if this were prick'd, the patient shew'd that it felt pain. About the fourteenth day he died.

The cranium being open'd, it was found that the wound, which had not only cut the temporal muscle, but the bone, had penetrated deeply into the brain; and that a ferous colluvies, which was found there, had, moreover, eroded the brain: so that the erosion penetrated quite into the left ventricle. And as a serum not unlike this was discharg'd about the fella equina, while the brain was taken out, it was probable that it had flow'd down thither, from the same ventricle, through the infundibulum.

45. A young man, about two-and-twenty years of age, receiv'd a very great blow with a cutting instrument, by which he was wounded at the upper part of the left temporal muscle. He immediately fell down, and lost his speech; so that he scarcely seem'd to be alive. After which, the power of speaking, and all the other faculties, were restor'd.

(e) XIII. n. 16.

(f) Epist. 7.

But about the fourth day his *aphonia* return'd; although, after that, he sometimes brought out a few words, yet seldom only: and with the *aphonia* were join'd convulsive motions; but these in the left part of the body alone sometimes, and slight; yet in the whole right side of the body, they were continual, and so violent, that the body seem'd sometimes to be curv'd to this side. During the torture of these symptoms, nevertheless, the patient shew'd, by nods, that he understood what was said. However, as the fever increas'd every day, and the convulsive motions, at length, grew weaker from a decay of bodily strength, having even quite ceas'd some hours before death, he died about the thirteenth day.

The wound had not only penetrated through the temporal muscle, but had descended, through the bone that lay beneath, deep into the substance of the brain. The dura mater was become much indurated about the wound. About the same, and within it, a sanious humour was found; from the pungent nature of which, perhaps, the convulsions had been excited: at least, though the wound seem'd to have reach'd so far as to be only an inch distant from the left ventricle, yet it did not appear that the instrument had penetrated so far, but that the excavation had been made deeper by the eroding juices which were generated in the wound. In the ventricles of the brain a little serum stagnated.

However, that in this young man, the left part of the brain being injur'd, the convulsions were most violent in the right side of the body, Valsalva thought was to be referr'd to the same cause as the paralysis, which he had before always observ'd in the side of the body opposite to the injury of the brain.

46. Among those observations that have been hitherto describ'd from him, you have one (g) wherein, although there was a paralysis of that part of the body which was opposite to the injury of the brain, yet certain epileptic convulsions, as it were, sometimes agitated this paralytic side, no less than that which was not paralytic. But you have another (h) also, wherein, although the opposite side was in like manner paralytic, convulsive motions were observ'd in that side which was not paralytic.

Yet you have not one in which the circumstances occur'd in a contrary manner to what they did in that other observation: and this, certainly, agrees perfectly with that "universal theorem" of Salicetus, which I have mention'd in the thirteenth of the *Epistolæ Anatomicae* (i): where, however, I have not even conceal'd the dogmata of those (k), who have not only asserted, that a paralysis, or convulsion, happens promiscuously in one or the other side, but also that, for the most part, the side which corresponds to the wound is seiz'd with a palsy, and the opposite with a convulsion. With whom Bal-lonius so far agreed, that, in his little book upon convulsions, he took upon him to explain this question in particular, which he also has propos'd in the very beginning of his book, "Why those who are wounded in the right side have a convulsion brought on in the sound part," that is, in the part opposite to the wound.

(g) N. 11.

(h) N. 27.

(i) N. 14.

(k) N. 15.

To this supposition they were impell'd by the dogmata of the ancients, particularly of Hippocrates; who repeats the same thing in so many places, that Marcellus Donatus (*l*), when he referr'd to them in particular, being overwhelm'd, as I suppose, with the number of them, forgot that which was quoted by me in the epistle I have mention'd (*m*); in which, however, that very ancient preceptor (*n*) has expressly taught, that those who are wounded in the head "become disabl'd in the left side, if the wound is in the right; "but if the wound is in the left side, in the right:" than which nothing can be more clearly said; although Donatus asserts, "that Hippocrates has "no-where, as far as he remembers, spoken of a paralysis of the opposite "part."

But as to those more ancient authors, and many of their followers, imagining that not the latter, but the former, happens the most generally; I should suppose it to have arisen in great measure from hence, that as they did not dissect the heads of those who died, they argu'd, from the seat of the wound, which they saw in the head, the seat of the injury also that was brought on in the brain: or, if they sometimes saw this injury to lie under the wound, by reason of the cranium being perforated by the blow itself, or by their instruments, during the course of the cure; they, at least, did not at all suspect that the greater and principal wound might be in the opposite part of the brain; contrary to what anatomy has taught us that we are to suppose, as has been demonstrated above (*o*).

47. However, I do not say this because I am ignorant that the side of the body which is opposite to the side of the brain that actually labours under the principal injury, is frequently seiz'd with a convulsion. For I very well remember what was related to the Royal Academy of Sciences at Paris (*p*) by Poupert, from his own anatomical inspection; and, in like manner, from that of Chirac: nor am I ignorant of another certain observation, as it is one which is transferr'd into this section of the Sepulchretum (*q*). But I say it for this reason, that you may perceive what kind of observations I would also have to be attended to here, before it be determin'd by us what happens for the most part.

For they are not to be reckon'd up, but to be consider'd, and not to be admitted, unless the dissection of the head was perform'd. And this was perform'd in that observation of Massa which is mention'd above (*r*); just as in a great number which are either describ'd from Valsalva, or read in the Sepulchretum; as that of Diemerbroeck (*s*), Dodonæus (*t*), Horstius (*u*), and Reifelius (*x*); in all of which you see, that the side of the body which was opposite to the injury of the brain, is describ'd as having been affected with a paralysis, and not with a convulsion. And, indeed, you see that those in which a convulsion of one side, and a resolution of the other, are observ'd,

(*l*) De Hist. Med. Mir. l. 5. c. 4.
 (*m*) N. 14.
 (*n*) Epid. l. 7. n. 19. apud Marinell.
 (*o*) N. 43.
 (*p*) Hist. A. 1700. Obs. Anat. 19.
 (*q*) Obs. 7. § 2.

(*r*) N. 21.
 (*s*) Obs. 3. § 2.
 (*t*) Obs. 4. § 10.
 (*u*) Obs. 8. § 9.
 (*x*) In Addit. ad hanc 3 Sect. Obs. 24.

show this latter to have been in the opposite side, and the former in that which was the subject of the wound : of which observations one is of Salmuthus (*y*), who, moreover, affirms that it generally happen'd thus ; and the other of Ballonius himself (*z*) : although, to speak of no other faults, it is not said in the Sepulchretum, by the carelessness of the printers, what limbs were paralytic. And to this carelessness I wish I could refer a blunder diametrically opposite to this : as when the observation of Fontanus is repeated (*a*) ; or when another, in like manner, of Bartholin (*b*) is repeated, which would relate to the question in hand, if it had been remark'd in which side the limbs (for both sides are mention'd) were first or most affected with palsy.

48. Yet even of those who seem to have attended to nothing but the external seat of the wound, there were not wanting learned men who receded more or less, even before these times, from that dogma of Hippocrates, which is so frequently inculcated. Thus Donatus (*c*) has also taught that the contrary happens. Thus Cæsalpinus (*d*), from a review of those passages of Hippocrates, says, “ Yet in these days we frequently see not only “ a convulsion, but also a paralysis, arise in the same manner ;” that is, in the part opposite to the wound. So Martianus (*e*), after speaking of convulsion in that part, goes on to speak of resolution, and asserts as follows : “ Experience, indeed, has shown us, that the resolution always happens on “ the opposite side.”

And, indeed, before those, Carcanus (*f*) had expressly said these things : “ Not the part corresponding to the wound, but the opposite, is always af- “ fected with a palsy ; as Hippocrates has very justly said, and as experience “ has taught us. It is true, that Hippocrates has said the opposite side is “ affected with a convulsion, and not with a paralysis ; but I say, that it is “ rather affected with a paralysis :” and this assertion of Carcanus is not only confirm'd by many others, but by that remarkable observation of the celebrated Daniel Hoffman (*g*) ; who observ'd, in a boy that had suffer'd “ a “ concussion of the brain, on the left side, with a considerable loss of sub- “ stance,” a very violent convulsive agitation of the left foot, and a para- “ lysis of the right side, which had made it altogether immoveable. And they, indeed, determin'd the seat of the cause of both affections to be in the same side of the brain, which is opposite to the convuls'd or paralytic side of the body ; but have determin'd the cause of one of the affections to be different ; as, for instance, an irritation, or an inflammation, if it be a convulsion ; but a compression, or a rupture, if a paralysis.

In this manner, also, or a similar manner, is to be understood what Valfalva has suppos'd in regard to the young man in question (*h*), that convulsions are, in general, to be referr'd to the same cause that resolutions or paralyfes are in others. But why the effects of this or that cause discover themselves in the opposite part of the body, you will not easily understand, unless

(*y*) Sect. ead. Obs. 3. § 7.

(*z*) Obs. 17. § 1.

(*a*) Obs. 5. § 7, & 8.

(*b*) Obs. 4. § 6, & 7. conferend. cum l. 1. 1.

S. 15. Obs. 27. § 2.

(*c*) C. 4. cit.

(*d*) L. 2. Quæst. Medic. 10.

(*e*) Annot. ad Hippocr. Epid. 1. 7. S. 1. vers. 377.

(*f*) De Vuln. Capit. Serm. 3. lect. 5.

(*g*) Dissert. de hac rarissima sanatione.

(*h*) N. 45.

you suppose some decussation. And this they suppos'd, and long before them others; in regard to which controversy I have already sufficiently shown (*i*) what seems to me the most probable.

Nor, although some do not so well approve of that decussation, which they themselves say was formerly approv'd of by Hippocrates, and do not think that the origin and the effect of the spinal nerves ought to be deriv'd from the medulla oblongata, or higher; can I agree with them, unless they first show how a paralysis of the whole body is the consequence of a considerable injury of the brain only; or how we can give a satisfactory answer to the question propos'd by any other supposition, whether a convulsion or a resolution happen in the opposite side.

Moreover, of those who, with us, suppose the resolution, for the most part, to happen in the opposite side, there are who say that a convulsion happens in the other side; because the muscles on one side being resolv'd, those on the opposite side prevail over them, and contracting themselves, draw the lower jaw, or the trunk of the body, or curve it, to that side on which the contracting muscles are.

But to omit enquiring whether this contraction could properly be taken for a convulsion, or if it could, what it relates to those convulsive motions of which we here principally treat; at least, I will make the same enquiry which Cæsalpinus (*k*) made, from those who were nearly of the same opinion even formerly: "What injury of the opposite muscles can be suppos'd, if "the whole arm is convuls'd, or a leg, from a wound of the head in the "opposite part," or in the corresponding parts? For the muscles of one arm, or leg, are not antagonists to those of the opposite arm or leg; and in the limbs it is that those convulsions whereof we speak at present occur.

This was also observ'd by Thomas Bartholin (*l*), in a boy in whom, from a wound of the right temple, not only the nostrils and mouth were convuls'd on the left side, but also the arm. For he has written those things, such as they are, that are contain'd in the latter end of the scholium affix'd to the second article of the eighth observation in this section of the Sepulchretum; although it does not there appear from what author they are taken. And, certainly, if I may be allow'd to add this, in order to explain paralysses which happen in the opposite side, we are oblig'd to have recourse to the decussation of the nervous origins, still higher than from the medulla oblongata; as has been already shown (*m*) from the resolution of the opposite tunica retina: and this we might now confirm from the observation of Peyronius (*n*), of the sight being lost in the eye of one side, or restor'd, as often as either pus was retain'd in the opposite part of the cerebrum, where there was a deficiency of the substance of this part, whereby the corpus callosum beneath was press'd upon; or was taken out from thence, whereby the pressure was remov'd: and, in like manner, from another of the celebrated Petzcius (*o*), who, when the left hemisphere of the cerebrum was wounded in such a

(*i*) Epist. Anat. 13. n. 17. usq. ad 22.

(*k*) Quæst. cit. 10.

(*l*) Cent. 5. Hist. Anat. 2.

(*m*) Epist. indic. n. 18, 19, 21.

(*n*) Commerc. Litter. A. 1731. Hebd. 30. prope fin.

(*o*) & A. 1730. Hebd. 34. n. 2.

manner, that a great part of its substance was torn away and lost, not only observ'd both limbs, on the right side, to be depriv'd of the power of motion, but also observ'd the sight to be obscur'd on the same right side, and scarcely any power of hearing to remain. Since then we are under a necessity of allowing this decussation, in order to explain a paralysis in the opposite side, why should we not acknowledge it in order to explain a convulsion?

However, Valsalva gives us the reason why, in the young man of whom we spoke last, those very violent, constant, and long-continu'd, convulsive motions ceas'd some hours before death; when he says, that they went off from a defect of bodily strength. So also those extremely violent convulsions, which are describ'd above in a certain man (*p*), had ceas'd to be troublesome in the last hour of life. And there seems to have been the same cause why, in another man (*q*), and, in like manner, in a woman (*r*), the delirium at length degenerated into a fatal lethargy. But now let me give you other observations of the skull being fissur'd.

49. A young man of twenty years of age, was wounded with a cutting instrument, in the left part of the occiput. No symptom was observ'd after the blow; and in the beginning the cure promis'd success. Yet in the progress of a few days the parts about the wound swell'd very considerably. On the twelfth day a fever came on, with a rigor and a delirium; and on the fourteenth day the patient was carried off.

While the body was taken away from the bed after death, a considerable quantity of blood flow'd out from the wound. And as soon as the dissection was begun, the whole part of the head which had swell'd, was found to be turgid with blood. And although the instrument, wherewith the wound was inflicted, had left only a slight incision on the external surface of the bone, yet at the side of this incision was a fissure; and the dura mater which corresponded thereto had a purulent matter strongly adhering to it: at the same time that the part of the cerebrum, which lay beneath, had chang'd its natural colour into black, in some measure. Besides this, there was nothing worthy of observation in the whole remaining part of the cerebrum.

50. A man about thirty years of age, fell from a high place upon the ground. He lost his speech, and all his internal senses. He vomited at first, after which only an endeavour to vomit remain'd: convulsive motions came on: his face was red: his pulse was turgid: blood burst forth from his nostrils and his left ear: he breath'd with difficulty: and within twenty-four hours after his fall he quitted this state of existence.

On the left side of his head the temporal muscle was contus'd, and the branches of the temporal artery were lacerated. When that muscle was taken away, about two inches above the ear, was found a fissure of the cranium, in the form of an arch: and near to this fissure was coagulated blood, to the quantity of two ounces, betwixt the cranium and the dura mater; which membrane was nevertheless found, as the other parts of the brain were also.

In the belly, the stomach was turgid with air; as the lungs were also in the thorax, and especially the right lobe: both of them being red, and not at all adhering to the parietes. The pericardium contain'd little or no serum: the ventricles of the heart contain'd a little frothy and fluid blood.

51. Another man, of fifty years of age, being struck by a horse, which had run loose without his bridle, was thrown on the ground with such a force, that when the hinder part of his head was dash'd against a stone, the crack of a broken bone was plainly heard. At first he lay half dead: a little after he endeavour'd to speak, but his words could scarcely be understood. From his right ear, from his nostrils, and from his mouth, was blood discharg'd; and by the fullness and redness of his face, he seem'd to be almost suffocated. He was also attack'd with a vomiting; which soon after return'd with such a violence, that he was suppos'd to be giving up the ghost. About half an hour after the fall, he no longer show'd any sign of sense, nor yet of motion; except that once or twice he shook his head, and that he still had the natural motion of respiration. His face was sometimes livid, but for the most part pale. Finally, when twelve hours were elaps'd, he began to breathe slowly; so that to have argu'd from what generally happens to others, it might be suppos'd that he was about to die in a few moments of time. Yet he drew his breath in this manner for two hours, and died on the fourteenth hour after receiving the blow on his head.

The middle of the os occipitis, but a little more to the right side, was cleft asunder into a very large and wide fissure; which being produc'd, thro' its basis, to the foramen magnum, and cutting this obliquely, reach'd quite to the petrous process. And a great quantity of extravasated blood was found under the basis of the cerebrum, and in the anterior part of it also, betwixt the dura and pia mater.

52. By what means it could happen in this man, that, although the occiput was fissur'd, a quantity of blood was, nevertheless, found to be extravasated in the anterior part of the head, likewise, betwixt the meninges, you will very well conceive from what I have said above (s): although, as there was a great quantity of blood under the basis of the cerebrum, a part of that might, perhaps, have been carried forwards also, betwixt the meninges.

But if this was not the case, vessels, and these very considerable ones too, are not wanting, which passing from one of these membranes to the other, may be very easily broken in great concussions of this kind; especially if they are very much distended. And at the same time, others may be broken, on the outside of the cavity of the cranium, from whence blood may flow out by the ears, the nostrils, and the mouth. And these circumstances may the more easily happen, if the fissure reaches to the petrous process, as it did in this man; or if the blood, as in the former, be extravasated near the new foramina of the tympanum, betwixt the cranium and the dura mater. For that there is a passage, by these foramina, into the cavity of the tympanum, and from this cavity, through the eustachian tube, into the nostrils, and

fauces, there is no necessity for me to demonstrate here, as I have already written sufficiently on this subject in a former work, and even of the discharge of blood from the cranium by these passages (*t*).

53. A certain man, being wounded with a cutting instrument in the anterior, and, in like manner, in the posterior, and left part of the head, and being receiv'd into the hospital so often mention'd, began, on the fourth day after his wounds, to complain of very severe pains therein; which, within a few days, had even spread over the whole body. On the sixteenth day he was depriv'd of the power of speech; and then, having lost the use of all his internal senses, he at length died on the twenty-fifth day.

The wound, which was receiv'd anteriorly, had reach'd quite to the beginning of the medullary substance of the brain. And the posterior wound had pass'd above the transverse process of the dura mater, and had penetrated into the cerebrum, quite to the cavity of the left ventricle. In that ventricle was contain'd a considerable quantity of serum, which, when laid upon the tongue, left a biting taste for a long time together; so that, from the acrimony thereof, it might seem reasonable to account for the irritation of the genus nervosum; and from this irritation, perhaps, those universal pains of the body.

54. A husband-man, about forty years of age, was wounded by another husband-man, almost at the right side of the sagittal suture, with a bill, the beak of this instrument being driven in so deep as to reach within the cerebrum. His whole body was seiz'd with a trembling immediately upon the blow: his intellectual actions began to be retarded: and in all the parts of the left side the power of motion began to be diminish'd, till about the fourth day it was entirely lost: the sense of feeling still remaining. His face was very red; his internal senses were obscur'd; his respiration became deep, and his pulse weak. Finally, a reddish matter being thrown up from the mouth, he died on the seventh day.

The upper part of the cranium being cut off (which was not only perforated with the wound, but had also a bony scale rais'd up from its usual situation) while the dura mater was cut into, about the beginning of the medulla spinalis, in order to extract the brain, a considerable quantity of blood flow'd out. However, the wound, perforating the longitudinal sinus, reach'd from thence quite into the left ventricle; in which some serum, with a grumous blood, was conceal'd: and in the basis of the same ventricle was seen a sordid ulcer. In the thorax, the left lobe of the lungs was very turgid from stagnating blood.

55. It is natural to suppose it had happen'd to Valsalva, at the time of writing, as frequently is the case, that instead of the right ventricle, which lay under the wound, he set down the left; by reason of no animadversion being added or interpos'd. For he who was wont to find the injury of the brain, in that side which was opposite to the paralytic side of the body; as from the many observations which are describ'd above (*u*), and from what he has expressly added under number forty-five, very evidently appears; if he

(*t*) Epist. Anat. 6. n. 6. & seqq.

(*u*) n. 11. 17. 27. 28. 35. 42. 44.

had now seen the contrary in this husband-man, would certainly not have omitted to make some remark on so unusual an appearance.

Yet this I do not say because I think it impossible for that wound to be turn'd aside, by a slight obliquity, from the right ventricle into the left, especially as it lies so near; or because I myself never dissected bodies which had the injury in the hemisphere of the brain that corresponded to the paralytic side of the body. For in the thirteenth of the *Epistolæ Anatomicæ* (x), I have not only pointed out some observations of this kind, made by others, but have even propos'd my own; although I have not conceal'd (y) what may still be wish'd for in some of them, and in what manner we may explain both mine and the others, without overturning the dogma of Valsalva. And from thence you will, perhaps, be able to collect some things, in order to explain this observation also; not to say if any thing that is advanc'd in the observation under number thirty-five, in regard to the eye-lids, seems not very well to correspond thereto.

56. I will now put the finishing stroke to this letter, by the histories of two wounds, which were both of them inflicted by a sharp-pointed instrument; but are such as deserve the more attention, by reason of the stroke appearing so slight in both of them, and by reason of their seeming to belong to the face rather than to the brain.

57. A man of thirty years of age, of a bilious temperament, being struck, with a sharp-pointed instrument, about the right eye, pass'd over the space of three days without any sensible injury of the animal actions. On the fourth day he came of himself into the hospital so frequently mention'd: and on the same day he died; contrary to the opinion of the physicians; because there appear'd to be no where any mortal wound, but only a simple contusion on that eye.

The skull being open'd, and a small quantity of purulent matter being found betwixt the os frontis and dura mater, and the place being sought for from whence this matter had come, the bone was found, by means of the probe, to be perforated, opposite to the right eye. Therefore the external and internal passage of the whole wound was diligently sought after, and evidently found. That is to say, the instrument had pass'd betwixt the eye and the orbit, without injuring the eye, to the bony arch of the orbit; and after perforating this arch, had penetrated into the substance of the brain, so that the termination of the wound was distant only by the breadth of a finger, from the parietes of the left ventricle.

However, although it was winter, and the body was dissected soon after death, there was such a flaccidity of the viscera and vessels, that they did not bear even to be touch'd without having their texture injur'd; and, at the same time, such a putrid smell in the whole body, that Valsalva affirms he had never met with the like till that time; and ascribes the whole of it to the deprav'd disposition of fluids, which must have preceded the wound.

58. Of all the observations that I remember to have read, of the brain being injur'd through a wound of the orbit, scarcely any seems more surprizing than this, when I consider what pass'd betwixt the wound and the

(x) n. 25.

(y) Ibid. & n. 26.

death of the man. For although others, of whom Horstius (*z*), Ballonius (*a*), Fantonus, the father (*b*), and Jo. Phil. Burggraffius (*c*), have written, did not die till the ninth, the eleventh, the fourteenth, or the twenty-first day; and others, of whom Peter Borelli (*d*), and Schmidius (*e*), have spoken, suspecting no danger, or making merry with their companions on that day, walk'd the length of two leagues, or of a quarter of a mile; yet the latter were either found dead on the day following, or fell down dead soon after; but the others, being either troubled first with a pain of the head, and after that with more violent symptoms, or being afflicted with these symptoms immediately after the accident, dragg'd through all that number of days under the painfulness thereof.

With neither of these have I class'd some others; as him whom Sennertus has describ'd (*f*), that immediately became apoplectic, and died about the ninth hour from thence; because that sharp sword seems to have entered the cavity of the cranium, through the *foramen nervi optici*; or, if you please, through the other neighbouring foramen, which is call'd *lacerum*: and that this might happen in the observation of Diemerbroeck (*g*), which I have look'd for here in the Sepulchretum in vain, you will not deny; the patient being depriv'd "of none of the animal actions" till the tenth day, and being then carried off, in the space of two days, by a "very violent fever" which superven'd.

But the musket ball, which was "driven through the orbit of the right eye, in such a manner that it emerg'd from the left part of the occiput;" as the celebrated Helwich (*h*) has describ'd; does not seem to have been able to pass through without a fracture of the orbit; so that if you would refer this case to the class of those that I have taken notice of in the second place, you are at liberty to do so for me, especially as the woman fell down dead from the wound.

Yet I do not know to which class those belong, that have been said to be kill'd from a wound of the orbit, by Bohn (*i*), by Ruysch (*k*), Jacotius (*l*), and even Dodonæus (*m*), whose name being overlook'd, while this observation was copied into the Sepulchretum from Schenck (*n*), is improperly taken from the preceding. And I am ignorant, because it is by no means certain, from the narration of those authors, as it is from others, and particularly from Valsalva, how many days the wounded pass'd without the appearance of any bad symptom; as, for instance, a sleep, which Dodonæus mentions indeed, but does not say on what day it began: Bohn has only this, that the patient died on the third day after the blow: and Ruysch says nothing else, but that, in a short time after the wound was receiv'd, which, to those who had the care of it, seem'd of very small moment, death had come on. And

(*z*) Sepulchr. l. 1. S. 3. Obs. 38.

(*a*) Ibid. l. 4. S. hac 3. Obs. 17. §. 1.

(*b*) Sect. ead. Obs. 5. §. 10.

(*c*) Act. N. C. Tom. 6. Obs. 130.

(*d*) Sepulchr. Obs. cit. 17. §. 2.

(*e*) Ibid. in Addit. ad hanc Sect. Obs. 9.

(*f*) Obs. cit. 17. §. 4.

(*g*) Anat. l. 3. c. 10.

(*h*) Eph. N. C. Dec. 3. A. 9. & 10. Obs. 120.

(*i*) De Renunc. Vuln. Sect. 2. c. 1.

(*k*) Obs. Anat. Chir. 54.

(*l*) Sepulchr. Obs. cit. 17. §. 5.

(*m*) Medic. Obs. c. 3.

(*n*) Obs. Medic. l. 1. ubi de Vuln. Cerebri.

this author, although other observations of the same kind were already extant, as you might perceive, thought this of his so extraordinary, that he reckon'd in the number of those things, which Bidloo suppos'd could never happen, "a fatal wound of the orbit (*o*)."

Yet this observation ought not to have been omitted among the others which are added to the Sepulchretum; nor yet what Ruysch has added to it; I mean, that the superior part of the orbit is so thin and fragile, as, in many places, not to exceed the thickness of writing-paper, and to admit of a fracture from the finger alone: and, therefore, that wounds inflicted on the orbits are not to be made slight of, (as happen'd in many of them which I have taken notice of) especially if they are inflicted with a sword, or some instrument of a similar nature, or with a piece of wood that is not blunt-pointed, or if the wounded persons are seiz'd with a sleepiness, a nausea, a fever, a vertigo, or a convulsion; to which you may add, from the histories I have pointed out, a considerable pain of the head, a numbness of the limbs, a palsy, a delirium, or any other symptom of that kind.

And as this attention is sometimes of use towards the cure, for instance, by leading us to apply the trepan to the os frontis in proper time, which another observation of Borelli shews (*p*), so it is, for the most part at least, useful in making a prognosis. I have said for the most part: since although the others died, yet this patient of Borelli's escaped, and the celebrated Fantonus, in the scholium to his father's observation (*q*), which does not indeed particularly make mention of a wound of the corpus striatum, but appears to be the same that is refer'd to above from the Sepulchretum (*r*): says, that he knew a soldier, who, being wounded with a very sharp sword, at the internal angle of the orbit, and having fallen into a hemiplegia and weakness of the eye, drag'd on his life for many years in this state of health.

To this, I suppose, you will add that hunter, of whom Elias Camerarius (*s*) speaks, who being wounded, with a sharp instrument, in the same angle, and in the confines of the upper eye-lid, had a paralysis of the whole opposite side succeed to that wound, an amaurosis of the neighbouring eye, and a considerable diminution of memory; the paralysis, nevertheless, being by degrees very much alleviated afterwards, and he continuing to live, so that four months had already pass'd since the infliction of the wound, when the observation was written, and almost nine, as it seems, when it was sent to Augsburg.

Another young man, who is describ'd by Nebelius (*t*), was happier than he; for being wounded thorough the left orbit, and immediately seiz'd with a paralysis of the same side, and convulsive motions on the opposite side, with an aphonia, and soon after with a delirium and loss of memory, had, after the third week, a little sanies discharg'd from the right ear, after a great pain of that part having preceded; which discharge continu'd some days, and about six weeks after receiving the wound, he recover'd his health entirely. But lest you should happen to be surpriz'd that the hemiplegia had seiz'd on the side which lay under the wound, and that convulsions seiz'd on

(*o*) Resp. ad Bibl. Vindic.

(*p*) in Schol. ad cit. § 2, Obs. 17.

(*q*) 35.

(*r*) §. 10. Obs. 5.

(*s*) Eph. N. C. Cent. 3. Obs. 55.

(*t*) Earund. Cent. 6. Obs. 54.

the opposite side, contrary to what more generally happens, as I have said above (*u*); it is necessary you should be inform'd, that the wound had been inflicted with a sharp sword, which "had gone through the lower eye-lid, " under the external canthus of the left eye, and had proceeded upwards " in such a manner, that the point of the sword penetrated obliquely under " the bulb of that eye, through its bony orbit, towards the anterior basis " of the brain."

Add therefore with me, what this oblique passage of the sword, and the great pain of the right ear, and the salutary defluxion of sanies through the same ear, sufficiently show; I mean, that the sword penetrated through the anterior basis " of the right hemisphere " of the brain. By this means you will readily perceive that the left side of the body, and not the right, was opposite to the injury of the brain. And you naturally conceive of yourself, that not only wounds inflicted on the orbits, but even below the orbits, as the history of Egermeierus (*x*) had shown, and this other of our Valsalva's confirms, relate sometimes to the brain.

59. A young man, of twenty years of age, was wounded with the point of a sharp sword, about the lower margin of the orbit of the left eye. On being wounded he fell down: all the functions of the internal senses ceas'd: he became speechless. If you except certain convulsive motions, he scarcely gave any sign of motion; nevertheless he show'd some sense of pain, when the probe was introduc'd into the wound. The motion of respiration was encreas'd every hour. At length the pulse failing, he died about ten hours after receiving the wound.

The brain being taken out from the cranium, and the probe being introduc'd into the external orifice of the wound, it was found that the sword had penetrated into the cavity of the cranium, almost by the side of the os spongiosum superius; which was confirm'd by the bony fragments in that cavity, and by the substance of the cerebrum being wounded in that part. But how far the wound proceeded in the cerebrum, it was in vain to enquire with the probe, as, by reason of the softness of the substance of the brain, it might as easily make new passages, as show one that was already made. Taking away the dura mater therefore, and observing the pia, which, in the sinciput, was turgid with blood, like an inflam'd part; and the lateral ventricles being then open'd, in both of them was seen coagulated blood, which had flow'd out from the vessels that had, without doubt, been ruptur'd by the wound itself. And from these ventricles it seem'd to have overflow'd into the fourth; for in this cavity also a blood of this kind occur'd.

60. Thus I have given you the observations of Valsalva, which are greatly to be commended, even on this very account, that, in all of them in general, the days and the hours are mark'd down, on which the patients were attack'd with the particular symptoms, or with death: circumstances which, although very useful and necessary to be known by physicians and surgeons, are nevertheless wanting in most observations of the kind. As to my observations they bear no proportion to his in number. However, as this letter is already sufficiently prolix, I shall refer you to the next for them. Farewel.

(*u*) n. 47.

(*x*) Sepulchr. Sect. hac 3. Obs. 3. § 13.

LETTER the FIFTY-SECOND

Finishes the Discourse on Wounds and Blows of the Head.

1. **I**N giving you the remaining histories, which relate to the wounds and blows of the head, in this letter, I shall preserve the same order as in the former, and begin with those wherein either the injury of the cranium was very inconsiderable, or there was none at all. For although Celsus (*a*) says, “it rarely happens for the whole bony compages of the cranium to remain entire, and for some vein in the membrane of the brain to be ruptur’d internally from the blow;” yet the frequent dissection of bodies has since shown us, that something of this kind, or even a more violent injury, very frequently happens without any injury of the bone. And this I have not only heard Valsalva assert, from the testimony of his own dissections, but you yourself might also have learn’d from those that are describ’d among the first of the preceding letter. To which you may add, besides so many others that you will find in turning over the Sepulchretum, these also that I shall immediately subjoin.

2. A woman, of fifty years of age, and the mother of many children, being somewhat fatter than country-women (in the number of whom she was) for the most part are, fell into a ditch, and dash’d one side of the sin-ciput against a very hard piece of ice; for it was the middle of the month of December, in the year 1725. The bone which receiv’d the blow was laid bare by this stroke, for two or three inches. On account of this wound she came into the hospital here: in which, without any paralysis, without any convulsion, without any very violent symptom preceding; for she had but just felt a slight inclination to vomit; without being weaken’d in her muscular strength, or that of her pulse, the wound suddenly grew dry and livid, and the day after, which was the eleventh from her fall, she died.

Her body, though the season was extremely cold, and though I dissected it not more than twenty-four hours after death, smelt so strong, that I was oblig’d to finish the dissection within the course of one day. Yet I remark’d many things that related both to a natural and to a diseas’d state. I shall, however, only give you the narration of the latter. In the belly the omentum was contracted, and the stomach was inclin’d obliquely too much to the right side. That part of the intestine colon, which lies under the sto-

(*a*). De Medic. l. 8. c. 4.

mach, did not proceed transversly, but was curv'd downwards; and the same intestine was very much dilated, from the beginning quite to this curvature, and livid. The spleen was longer than it naturally is. The testes were not only white, hard, and unequal, but in one of them lay hid, in the centre, a little body of a white colour, roundish, almost hollow, and cartilaginous. Both the tubes were utterly impervious at two fingers breadths below the larger orifice. The vagina was internally of a black colour, and at the lower and almost anterior part appear'd to be eroded, as if from an acrid humour; an erosion of which kind was also observ'd in one side of the cervix uteri.

In the thorax the lungs were black on the back-part. The heart was lax, and in its ventricles were many polypous concretions. The vessels were fill'd with a great quantity of blood, as they were in other parts of the body likewise.

Finally, in the head the os sincipitis was internally and externally livid, where it had been dash'd against the ice; yet had not the least fissure. The meninges, under which not pus or blood was extravasated, but water, were themselves also livid and greenish, in the part where they corresponded to the livid bone. So in that place only the cerebrum also was affected with a lividness, which did not however descend deeper than to the extent of two inches. The putrid odour which exhal'd from these parts was much more violent than that of the others, though those were exceedingly offensive, as I have already said.

3. The head of a man who had, in like manner, fall'n from a high place, was brought to me in the year 1722. Though the scull was neither fractur'd nor fissur'd, yet was there almost the same state of the meninges, and of the brain itself also.

4. A poor woman, of a habit of body inclining to fatness, having become mad through grief for having lost her husband, she herself being at that time very young, wander'd through the city in such a manner as to hurt nobody, but to be herself troubled with the reproaches and injurious treatment of the rabble. Wherefore, besides that she was said to have brought forth a child some months before, she was at last struck on the head by a profligate young fellow, with an iron pin or bolt, so that she died about the tenth or eleventh day after the blow, not without symptoms of a concussion in the brain.

The body being brought into the college the following day, that I might therefrom finish the anatomical demonstrations of the year 1728, before the end of February, it was scarcely possible to make use of it. For although it seem'd to be a very proper subject, when I order'd the intestines to be taken out; yet on the following day the greater part of the abdominal viscera were already green. I nevertheless observ'd the following things. The whole fundus uteri was very thick: the testes were very much enlarg'd, and rounder than usual in their figures: and the orifice of the tube was perfectly grown into one substance with the testis on one side. But the testes themselves, when dissected, show'd nothing peculiar in their appearance, except that they contain'd a little more fluid than usual.

In both the cavities of the thorax was water contain'd. The posterior surface of the heart had already begun to be green.

But

But the head was in a more distemper'd state than any of the other parts, as was naturally to be expected. For although the cranium was found, yet pus was contain'd betwixt that and the dura mater, and this membrane was moreover affected with a kind of sphacelus.

5. That the bodies of wounded persons very often become foetid, green, and putrid, soon after death, is not to be wonder'd at, when the part which was wounded already began to abound with pus and sanies, and still more when it was seiz'd with a gangrene, as was the case here. For the deprav'd and corrupted particles enter the blood through the ruptur'd venous or lymphatic vessels, and, with this fluid, are carried through the whole body. And that this takes place in wounds of the head also, I have seen more than once, especially in an old woman, whom I have taken notice of when I was writing to you on the subject of barrenness (*b*). For in that season which was so very cold, when the viscera of the belly were taken out, the septum transversum itself was soon after of a green colour.

But these things happen more readily in the carcases of those who, either in other parts, as in the aorta of that old woman, or in the humours themselves only, were dispos'd to putrefaction before the wound was receiv'd. And in the number of these, besides a man who was wounded in the orbit of the eye, of whom I wrote in the preceding letter (*c*), you will recount that country-woman, whose dissection I related to you just now (*d*); for an injury of that kind in the head did not sufficiently account for so great a state of putrefaction: although why this may sometimes seem to be, in part, less than it was before, may not only be gather'd from what has been just now said, but will be more clearly pointed out below (*e*).

6. A woman of the same age, but many years before, that is in the year 1706, had two wounds inflicted upon her head with a short and cutting instrument, which however was not very heavy; with one of these wounds that part of the right temporal muscle was injur'd, which lies behind the angular apophysis of the zygomatic bone, to use the words of the celebrated Winslow; the other was somewhat lower. Yet both the wounds were brought almost to a cicatrix, when the woman, exposing herself to the injuries of the cold air, and agitating the temporal muscle by the mastication of hard food, swell'd very much, soon after, in her whole face, and was shaken with rigors, and convulsive motions in her head: she was now and then also seiz'd with a slight delirium, till having a stertor come upon her, she died in the hospital of St. Mary de Morte at Bologna.

As I dissected not only her head on the following day, which was the twenty-sixth of March; but the other part of this woman also, I first observ'd the following appearances in the genitals, that were preternatural. In one of the testes was a small cyst of a yellow colour, inclining to green, wherein was a globule, as if of concentered blood, which had I know not what of a bright red appearance in the center. The uterus had its parietes much thicken'd, the internal coat being lax, under which were seen through its substance, in some places, bloody drops, perhaps because the menstrual flux had been coming on: or, probably, rather because the uterus was diseas'd. For a

(*b*) Epist 46, n. 26.(*c*) n. 57.(*d*) n. 2.(*e*) n. 9.

white and pretty fluid matter occur'd betwixt the valves of the cervix, as if the woman had labour'd under a uterine fluor: and, indeed, the *osculum uteri* was more lax than the subjected vagina and its orifice requir'd, and, at the same time, somewhat injur'd on its surface, as if from acrid matter.

The skull being open'd, we found the dura mater to be thicken'd and red here and there, as if from drops of blood, which, however, you could not wipe off; and this in more than one place, where it is subjected to the basis of the cerebrum; as, for instance, at the sides of the fella turcica, and under the glandula pituitaria itself, but no where more than under the right anterior lobe of the cerebrum. Under which, and at the external side of the same lobe also, betwixt both the meninges, was a pus of a yellowish colour inclining to cineritious. Yet the substance of the cerebrum, and the other parts that were within the cranium, were unhurt; although the sanguiferous vessels, which run through the pia mater, appear'd to be somewhat more turgid than usual; and under this membrane was a small quantity of water, as there was a small quantity also, and of a reddish colour, in the lateral ventricles of the brain, and a polypous concretion in the superior sinus of the falx.

As we diligently enquir'd after the passage by which pus could enter the cranium from the wound, we found that all the bones which compos'd this cavity were quite free from injury on their internal surface. And then we pass'd on to examine the external parts. Under the upper wound; for the inferior, being less deep, had a different direction; there was a cavity about which, and in which, pus stagnated: and through this cavity a certain surgeon said that he introduc'd a probe into the cavity of the cranium, while the woman was living. And, indeed, there was a passage through the bone, perforated by the wound, for the pus to be carried from this cavity, not into the cranium however, but into the orbit of the eye: and by this slight difference the surgeon had been deceiv'd. But by what passage it was carried from the orbit, where pus was also found, into the cranium, there was not the least testimony to evince; whether we inspected the natural foramina, or examin'd into those which had happen'd to be open'd by the force of disease; especially as the dura mater was seen to be no-where eroded. And that animadversion had this use also; I mean, to prevent us from supposing that pus had pass'd through a certain very small chink which, we, at length, thought we discover'd, after raising up the arch of the orbit, by driving the chissel thereinto.

7. However, in researches of this kind, whether they are made in the living or in the dead body, as it is necessary to take care in the former, lest, where two natural cavities are disjoin'd by a thin septum, we too hastily suppose, that the probe which reaches into one has enter'd into the other; so it is proper, in the latter, to abstain from the use of the mallet and chissel, lest, if any chink should happen to appear, there may be a doubt whether it should be ascrib'd to our violence, or to the blow that had been receiv'd: as there certainly was no fissure, from either cause, in him whom I dissected a few days after in the same place.

8. There was an old man of a lusty habit of body, and of a yellow colour of skin, who had been before under medical courses, as an asthmatic patient.

This man having fall'n from on high, and dash'd the right side of his head against a stone; the cure of the wound which he had got by the fall, seem'd to go on very well, when, about the eleventh day, a difficulty of breathing came on, with a stertor. He had no pain in the thorax. But rather complain'd continually of a kind of troublesome sensation below the right hypochondrium. And applying our hands to this place, we perceiv'd a bubble, as it were, like one of those which the rain excites on the surface of water; and this rais'd itself up and subsided alternately and instantly, soon after returning and going away, and always keeping the same situation.

In the mean while, the head seem'd to be very well; but the man could not sleep, and convulsive startings of the tendons occur'd at the wrists to those who felt the pulse. And this, which had always been frequent, was now also become small. Wherefore, within a day or two after the difficulty of respiration came on, death freed the patient from his disorders.

The abdomen of the carcase was distended: and when this cavity was open'd, the stomach and the intestines appear'd to be distended with air, the small intestines being inflam'd in a certain place, and not without some foetor. The liver was somewhat hard. The spleen was so lax, that it could be torn to pieces very easily by the fingers. The herniæ, and the lacerated flap, as it were, which hung from the ring of the pylorus, in consequence of their being sufficiently describ'd already (*f*), and the eleven ribs on each side also, which I have taken notice of in the *Adversaria* (*g*), I pass by here, as it is sufficient to hint that this is the man in whom these appearances were found. And as to the lower part of one of the lobes of the thyroid gland containing a pretty large globular body, and two others, in like manner, that were full of a ropy humour; I pass over these circumstances for this reason, because I have often taken notice of things of that kind in other bodies.

It will not be improper to add what appear'd in the thorax. The anterior surface of the lungs was connected by membranes to the chest. The lungs themselves were no-where hard; yet, although neither the legs nor the feet had been swell'd, both lobes were surrounded with a great quantity of water; the left with that which was of a red colour, and rather small in quantity; and the right with somewhat more, and that which was of a green and yellowish colour. On the right side, also, the pleura was putrid; so that it was not only very easy to separate it, but pieces thereof had been spontaneously separated, and swam in that water; and adhering to the membrane of the lungs, which was itself sound, belied the appearance of pus. The pericardium contain'd a reddish water; and the heart a frothy blood: the great artery, at its origin from the heart, had within it a polypous concretion.

The bone of the wounded sinciput lay open to the extent of half an inch, being of a livid colour, and comprehended in a kind of circular little furrow, as if the exterior lamina of the cranium had subsided. And the internal surface corresponding to it was of the same colour indeed, but comprehended in no little furrow. Nor, indeed, had the skull any other disorder besides, either there, or in any other part. But the dura mater, which lay under

(*f*) *Epist.* 43. n. 31. & *Epist.* 29. n. 17.

(*g*) *II. Animad.* 32. in fin.

that one place, was moist with a thickish ichor on its superior surface; and had adhering to its inferior surface, yet in such a manner that it could be taken away without any difficulty, a piece of another dura mater, as it were, which, when attentively examin'd, was found to be very similar to those spurious membranes wherewith the lungs and the pleura are frequently cover'd over, in inflammations of the thorax. Under this piece adher'd to the pia mater a kind of pretty large drop of thick and whitish ichor. And betwixt this membrane and the brain, not there only, but in several places, a small quantity of water was interpos'd. And this water was not wanting in the lateral ventricles, in which cavities it was of a reddish colour. However, all the substance of the cerebrum was every where found: the cerebellum was very soft. And, finally, all the muscles of the body were flaccid.

9. As to the sensation of bubbles, as it were, rising up and subsiding, which was troublesome, indeed, but easily to be referr'd to flatulent habits, in which one certain part of the intestines is rais'd up, and not any other; if you, in concert with me, omit this symptom, and consider the others, you will, without doubt, add this observation also to the four which are already describ'd, and to many others given, from Valsalva, in the preceding letter; from which it is understood, that, although the bone is not perforated by any fissure, some part may be injur'd within the cranium by the force of the percussion: and of this injury death may be the consequence.

For as to the preternatural appearances which were found in the thorax of this old man, perhaps, they also add their origin or increase from those that were within the skull; some part of the deprav'd ichor being carried from thence into the thorax, especially as the man was subject to an asthma. And I even remember, that a woman who died of a blow on the forehead, had, contrary to expectation, a dirty-colour'd water in both cavities of the thorax: the history of which woman I shall send to you hereafter, among those that relate to the subject of lameness (*b*).

This suspicion has a colour given to it by the circumstance which I have remark'd in the observation of Valsalva, and others, about the translation of deprav'd matter from an injur'd cranium into the thorax, which is by no means rare (*i*). And although we know that where the question is of the meninges and brain, we are wont to attend no less to the acrimony, than to the quantity, of the injurious humour; yet it is not quite incongruous to suspect, or at least sometimes, that where a very little quantity of this is found within the skull of dead bodies, it is the remainder of a somewhat larger quantity, which, after having injur'd those parts, even more than is apparent, has been presently carried through the vessels into other parts, or dispers'd through the whole body; from whence we have also accounted for, in part, the signs of universal putrefaction, and the very putrid odour in particular (*k*). And how little mortal ichor, or disorder brought on by it, frequently remains within the cranium, or, at least, is found within the cranium, besides many histories of Valsalva (*l*), and the two first of ours, and this last, these others, which our very diligent Mediavia communicated to me, will show you.

(*b*) Epist. 56. n. 26.

(*i*) Epist. præced. 51. n. 17. & seqq.

(*k*) Supra, n. 5.

(*l*) Epist. præced.

10. An old man was struck with a stone on one side of the scaput, when he was drunk, and had a wound inflicted thereby : yet he neither fell down, nor vomited, in consequence thereof. The wound being dilated, some days after, by the surgeon, the bone beneath was found to be somewhat livid, not very far from the angle which is intercepted by the sagittal and lambdoid sutures ; for which reason it was scrap'd with an instrument proper for that purpose. Nor was the physician wanting in making use of every thing which it is customary in these cases to make use of. But the wound was almost dry, and not of a good colour : a fever attended it : the pulse was weak : the patient rose up out of bed in the night, complaining of the violence of the heat ; and, indeed, it was the month of June, in the year 1739 ; but this seem'd to be done with some degree of delirium.

At length, the fever went away ; the pulse became better ; and now the patient declar'd that he could bear to abstain from food no longer. However, he was guilty of no irregularity, although the fever return'd after some days, with a sense of heaviness in the head, with a kind of torpor of the senses, a slight delirium, and a redness of the face and eyes. The physician, therefore, endeavour'd once more to alleviate the symptoms, but to no purpose ; and in a short time after, the old man died ; that is, about the twentieth day after receiving the blow.

The cranium was very thick ; and the dura mater thick in proportion. In the former was no-where any mark of disorder ; because, even in that part where it had been scrap'd, it was of a natural colour both internally and externally. The dura mater was likewise sound. But not so the pia mater ; to the external surface of which, where it corresponded with the place of percussion, a little mucus adher'd ; which was of a yellow colour inclining to green, and of a very filthy odour. That part of the cerebrum which lay beneath this mucus, began to become blackish, for as large a space as two fingers breadths would cover, in every direction ; yet not to a greater depth than that of the cortical substance of the brain. However, the other parts were in a sound and proper state, except that a considerable quantity of reddish serum was found in the lateral ventricles, but more in that which lay under the wound. In both of these cavities the plexus choroides were of a pale colour.

11. A woman, who had been for a long time subject to an epileptic disorder, receiv'd a blow upon her head. In the beginning there was no symptom worth attention ; so that, if she were ask'd about her complaints, she answer'd that they were all very slight, or none at all. But at the end of some days, the symptoms began to show themselves, and to increase ; the fever was augmented ; and a certain state of inactivity, which was very much like a constant sleep, came on, though without sleep ; for if you attended to it, you heard her murmuring with a low and small voice. And in this manner, neither the first remedies, nor the latter, being of any advantage, she died.

The skull not only show'd no fissure, but had scarcely any change of colour, in the part where the blow had been receiv'd. Only under that place was a purulent mucus, as we have said in the old man, though in a rather larger quantity. Besides, from the internal surface of the cranium, where

it hung over the falciform sinus, stood forth a bony prominence, which was small indeed, and short; but of such a kind, that if you drew your finger over from the posterior part forwards, your finger was prick'd thereby. But this probably related to the epilepsy; to the blow it certainly did not relate.

12. And Mediavia related that, in the same year 1739, it had happen'd, almost in the same manner, to some as to the old man, to others as to the woman, from blows of the head; and he had observ'd, if at any time the violent symptoms of disorder which had been in the beginning, were almost obliterated, and after that the fever, from a slight one, suddenly became violent, beginning with a coldness and perturbation of mind; if this came on in the eleventh day, that death follow'd on the fourteenth; but if the exacerbation of fever came on in the fourteenth day, that death came on in the seventeenth.

In reading these observations, and still more in reading the great number left us by Valsalva (*m*), I do not doubt but you are, and have been, much surpriz'd that no mention is made of the cranium being perforated by the trepan; especially in those cities wherein very eminent professors of the chirurgical art have flourish'd, who were accusom'd formerly, as we learn even from their writings, to afford this assistance with the greatest readiness to those who were wounded in the head.

Yet you will cease to wonder, when you consider the different fortune of so many remedies in different ages, and not only in different nations and climates, but in the same; and especially those remedies which are of a cruel nature, and at the same time of an uncertain event, as this is. The surgeons did not want readiness, dexterity, or courage: but courage was rather wanting to the patients, or their relations, or others who were concern'd; as they consider'd, on one hand, an operation which was cruel in its appearance, and, on the other, the event, which was often so unhappy, that to the common-people, and persons ignorant of the medical art, those patients who died might seem to have been kill'd by the method which was us'd in order to save them: which consideration, I suppose, led them to with-hold their consent from the operation. And so many, so various, and so difficult to conjecture, are the causes for which the perforation of the cranium, although skilfully and innocently perform'd, may, nevertheless, become useless; that it might easily happen, among many who were trepann'd in those years, that very few only escap'd.

Nor would I have you wonder, that I said it might so happen, since Tronus testifies, in the work of Bohn (*n*), that in the hospital of a large city in Italy, all who were wounded in the head, and underwent the operation of trepanning, actually "perished," not one excepted. And what will you say to this? that in a hospital, in a foreign nation, which is much larger, not before the end of the sixteenth century, but in this our age, not under any rash operator, but under the most experienced surgeons, the same, or almost the same thing happens, as has been committed to writing;

(*m*) Epist. 51.

(*n*) Dissert. de Trepanat. Difficult.

and in neither place can we lay all the blame upon the air, although infected with unwholesome effluvia of a great number of sick persons; since it is certain, that, in both of them, wounds of the head, even when considerable, have been cur'd by being treated in a different method, and are still cur'd.

Take care how you suppose, that I here wish for greater diligence, or skill, in these very celebrated men. There are causes enough for us to accuse, as I had begun to say. Thus suppose, for instance, that blood is sometimes extravasated within the ventricles of the brain, or under the basis of it; at other times it may be extravasated externally indeed, and at the upper-part, but under the dura mater; or if above this, yet in a place directly opposite to which the surgeon dare not trepan; for instance, under the muscles of the temples, or opposite to the pituitary sinusses of the forehead.

Nor will you interrupt me by replying, that the cranium may sometimes be perforated, even opposite to the seat of these sinusses, and under those muscles; and the dura mater be cut into above that blood. For I know, that the frontal sinusses are wanting in some persons, which I think I have sometimes observ'd, where the lower part of the forehead was not at all prominent about the eye-brows, but flat. Nor does it escape me, that, in order to draw out the matter which is confin'd under that membrane, the incision thereof has been propos'd by the most excellent surgeons; among whom our country-men, Gabriel Falloppius (*o*), Cæsar Magatus (*p*), Peter de Marchettis (*q*), were not the last; nor that the temporal muscle has been “cut many times with success,” by the same Magatus (*r*); nor that, before Magatus, five successful instances of the same muscle being cut, were, in like manner, publish'd by Carcanus (*s*); no convulsion being the consequence, even when the whole of it was cut through transversely: and I myself saw here, in the year 1734, a young man, who, having had a dagger forc'd through that muscle, from the upper and anterior part of it, quite into the concha of the external ear, behind the tragus, was troubled with a great hæmorrhage indeed, but with no fever, much less with any convulsion, and recover'd very happily.

I know then, that these things were propos'd, or done, by the Italians, others being even at that time afraid of them. But, at the same time, I know, that these things were done in consequence of the most extreme necessity, and not without very great danger, which they themselves do not dissemble, and particularly of convulsions, which not Hippocrates (*t*) only, but even Marchetti (*u*) himself, saw to be the consequence thereof; so that, for this very reason, he would not recommend the cutting of this muscle; not to say that he has expressly said, it ought “never” to be undertaken.

Whether, therefore, the surgeons, at that time in which the perforation of the cranium began to be not well spoken of in some cities, perform'd this operation in any very safe place, and as far as they suppos'd it to be

(*o*) Comm. in Hipp. de Vuln. Cap. c. 43.

(*p*) De rara Medic. Vuln. l. 2. c. 38.

(*q*) Syllog. Obs. Med. Chir. 14.

(*r*) l. 2. cit. c. 27.

(*s*) De Vuln. Cap. Serm. 1. Lect. 8.

(*t*) in Coac. juxta Dureti interpret. l. 3. tr. 2. c. 1. n. 1.

(*u*) Syllog. cit. in addit. ad Obs. 15.

proper, not daring to imitate the above-mention'd authors in the other proceedings, and the patients nevertheless perish'd; or whether they did dare to imitate them; and convulsions, suppose, or other evils following the imitation, the patients perish'd in so much a more miserable manner (for our enquiry is, not what necessarily happen'd, but what might happen, in order to make a remedy of this kind become deserted); you see into what fear the people might have been thrown, and how naturally their opinion might, from either of the events, become averse to the practice.

13. But besides those reasons that have been mention'd, it might happen for many others, that the perforation of the cranium, at that time, might be perform'd without any utility, and even not without manifest detriment; which is a circumstance that would render the minds of the people still more averse to the remedy in question: as, for instance, if a surgeon, who happen'd to be ignorant how often dents or cavities are impress'd upon the internal surface of the cranium, which cavities I have already spoken of to you (x), and which sometimes receive so very deeply the tubercles, as they formerly call'd them, of the dura mater, that you will have only one, and that a very thin external lamina of the bone, remaining, especially in the ossa sincipitis, and sometimes in the os frontis; through the ignorance of which circumstances, I fear, lest some observers have consider'd them as disorders of the cranium, and dura mater; if he then, I say, had by chance borne down the trepan against any one of these cavities, for they have no certain situations, he would, without doubt, first have injur'd the dura mater, and the parts whereby it is rais'd up, before he could have suppos'd the whole of the first lamina to have been pierc'd through by him: or if another, having laid bare the same membrane by the trepan, and supposing pus to be confin'd under it, (for there sometimes is pus, as we learn from many observations, and among these, from two that are publish'd by Murray (y), and confirm'd by anatomy) had cut into it; but being deceiv'd by the signs (amongst which, whether "the most certain of all can be the " cessation of the pulsatile motion, impress'd thereon by the arteries of " the cerebrum," others must determine), had carried the point of the instrument not against the pus, which did not exist at all, but against the pia mater and the brain; or if not deceiv'd, had wounded the branches of the artery that creep through the dura mater.

I omit to enumerate other errors, many of which might happen in an operation that is not very easy and clear, and that to the great detriment of the patients: and I return to the remaining causes which might render this operation useless.

To take notice of some of these only; at least though the blood was extravasated betwixt the dura mater and the cranium, and in those places even which nothing forbids us to perforate; yet if, being coagulated, it had adher'd so closely and tenaciously to that membrane, as not to be separated therefrom without violence, as it has happen'd to many others, and to Valsalva himself, more than once, to find it; for we particularly refer to nothing, as you may even have observ'd above, but you have examples of almost every circum-

(x) Epist. 8. n. 3.

(y) Quæst. Paris. A. 1736. proposita n. 5.

stance,

stance in the preceding or in the present letter; of what advantage would it have been to perforate the cranium?

You will perhaps say: But if it had adher'd in this manner, even before death, a skilful surgeon would have been able to apply such things as might dissolve, and set it loose. Let us suppose it. Yet what if some part of the coagulated blood lay in such a place as the infus'd fluid could have no access to; for you are not ignorant that this membrane adheres very closely to the cranium; and that it follows from hence, that one place, wherein it is separated from the cranium, cannot communicate with another, though very near, in which it is likewise separated, or at least so expeditiously, as would be necessary for it both to enter and to be discharg'd.

Nor am I ignorant by what instruments surgeons can separate some neighbouring part of the dura mater from the scull; and that the patient, by holding his breath at intervals, may urge the cohering matter, and procure it a more easy discharge from its recesses.

But, on the other hand, I also see the danger, lest, by tearing away the dura mater, the surgeon should hurt this membrane; or lest some vessel of these pretty large ones which I have before mention'd, should be injur'd thereby; as you know very well that they are prominent through the external surface of this membrane, and are receiv'd within those ramifying furrows of the scull: and indeed I am not without fear of those exertions in the patient, if he can really hear, and do what is commanded him, and does not lie in an apoplectic state, without sense or motion.

For when respiration is restrain'd, and men exert themselves in this state, it is evident that a greater quantity of blood is retain'd in the head, even by observing their faces, which are at that time tumid and red; either because the return of the blood is then less easy on all sides, in consequence of the lungs being at rest, or even for that reason which Santorini (z) suppos'd, or for some other cause of that kind peculiar to the head. Wherefore the vessels of the brain being turgid, the pia mater is every where forc'd against the dura; and if there happens to be any fluid betwixt this and the cranium, that is squeez'd out through the foramen which is open'd in the cranium, where there is the least resistance, if the progress of it this way be not wholly obstructed. But even the distension of the vessels, in general, may give rise to a fresh eruption of blood through the injur'd vessels; and the too violent and too frequently-repeated compression of the dura mater, may occasion an inflammation therein. And you see that neither of these circumstances can contribute much to the recovery of the patient.

Besides, there is sometimes blood in a fluxile state, so that it might escape at this foramen; but it is in such a quantity, that before it can be taken out, it must have press'd upon the brain, in such a manner as to kill the patient; an example almost similar to which you have in one of our *Epistolæ Anatomicæ* (a). Add to this, that it might already have brought, by its corruption, a fatal disorder upon the meninges.

Moreover, suppose every thing that I have said of blood to be said of pus also, or, if you please, of sanies and ichor.

(z) Obs. Anat. c. 3. in fin.

(a) XIII. n. 16.

And what if there be none of these circumstances, but the concussion of the cerebrum is so great as to have considerably destroy'd its internal structure? Read over again, I beg of you, the observation taken from the man who died of a violent blow on his head, which I have describ'd to you in the eighth letter (*b*), and compare it with that of the criminal which I then took notice of from Littre (*c*), and to which, when spoken of in the preceding letter (*d*), we added another of Hænelius. In none of those three was blood extravasated; yet the two first died immediately after the blow receiv'd, and the third within twelve hours. Suppose that any one of them, in consequence of the concussion being somewhat less, could have liv'd some little time, and that the cranium had been perforated, as if the brain were compress'd from an internal extravasation of blood; could the blood have been discharg'd which never was extravasated?

And to this supposition relate those words of Ballonius (*e*): " Sometimes the brain suffers an internal concussion when the cranium is unhurt, and the flesh only slightly contus'd:" and a little lower, " It has been observ'd, by experience, that innumerable persons have died of disorders of the brain, after convulsions and concussions; in the brain of whom nothing could be found, by means of dissection, that might seem to have been the cause of so terrible symptoms. And this has deceiv'd most persons, who have suppos'd that they could find something worthy of attention in the brain of those who died, after having labour'd under these disorders. So occult frequently is the cause of convulsion." There is, on the other hand, when there is a great and conspicuous injury in the brain, or a great quantity of blood extravasated within the cranium: and yet when this is perforated, none can be drawn out from the brain, or the blood is discharg'd to no purpose.

See an instance of the first case, in the observation of Elias Camerarius (*f*), who relates that the cranium was perforated in vain for this reason, that a suppuration, which had follow'd the blow of the head, lay hid within the brain, which was every where found and entire externally. And examples of the second case you may draw from the observations of those who have found the sanguiferous vessels, and the arteries in particular, ruptur'd within the skull after concussion. It is sufficient for you to turn to Bohn (*g*), who saw it three times. Suppose that the arteries either were not in the number of the largest, or were not altogether ruptur'd; for in this case there would not be time to apply the trepan. Yet of what effect would it be to perforate the cranium, in order to draw out the extravasated blood, if still fresh and fresh extravasations were made, and added to the first, by the arteries, though of the smaller size, which were not altogether ruptur'd? I omit other causes, even those which are not to be imputed so much to the carelessness and errors of the surgeons, as of the patients and those who are about them, which are not always known to the common people; and I go on to that from which I suppose it has more frequently happen'd, than from others, that the perforation of the cranium might, to the populace, seem of no effect.

(*b*) n. 15.(*c*) n. 18.(*f*) Aët. N. C. Tom. 2. Obs. 149.(*d*) n. 10.(*e*) l. de Convulsione.(*g*) De Renunc. Vuln. S. 2. c. 1.

14. For although there are signs from which we may suspect that blood is effus'd within the scull; who can, for a certainty, say, whether there is really such an extravasation; and if he knew this, how could he know in what part the extravasation was made, and consequently where the bone ought to be pierc'd through? It very often happens that nobody is present when a man falls from a considerable height, or when he is struck by an enemy; and he himself frequently cannot speak: and sometimes many places appear to have been struck, and sometimes none; and in those many places, when examin'd by the eyes and the hands, even after applying emollient plaisters and resolvent facculi, some redness, tumour, or softness, can but just be perceiv'd. And indeed Rouhault (*b*) has seen that a spontaneous tumour sometimes appears in the part of the head which had not been struck; and has even shown in what manner it might happen.

Nor are the other signs, which have been propos'd by the ancient or the modern physicians, of sufficient avail; as, for instance, if the patient who can neither speak nor understand, apply his hand now and then to a certain part of his head; or the physicians, by chance, observing one side of the body to be paralytic, conjecture the injury to have been in the opposite side of the head. For besides one place, which perhaps gives greater pain externally, there may be other places, under which the greater internal disorder may really lie hid; nor is it necessary that some paralysis should be always the consequence of this; or if it is the consequence, we do not, of course, know the part of the side which is principally diseas'd, because we know the affected side.

Yet this it would be necessary to know, in order to make the foramen, which is to be open'd, correspond to the diseas'd part; and to convince every one that this opening was not made in vain. But how deceitful our conjectures on this subject frequently are, appears even from hence, that although the very part which was struck be pointed out by the patient, and even evidently show itself by an ecchymosis and tumour; yet cases frequently happen, wherein one part is contus'd, and yet another has the extravasation made in it. And this you will understand, not only from some of the observations describ'd in the former letter, and others; but in particular from this which I shall immediately subjoin, and which, being communicated to me by our Mediavia, deserves the more to be transcrib'd here, because, in the case of which it gives the history, the cranium was perforated.

15. A robust country-lad, having fall'n from a high place, had hurt his head. Not the least bad symptom was observ'd to be the consequence, either then, or soon after, on the following days. He therefore continu'd, for the space of three days, to live as usual, and to follow the businesses of life in the country, according to custom. After this, an evident tumour appear'd in the place which had been hurt; which was about the part of one of the bones of the sinciput, that is nearest to the lambdoid suture; and a fever being added thereto, he was compell'd to come into the hospital.

Being plied by the physician and surgeon with every remedy their art could

(*b*) *Traité des playes de tête* ch. 10.

supply, he now seem'd to be almost recover'd; especially as, through the whole of that time, no peculiar symptom of a latent disorder had discover'd itself. About the seventeenth day from his fall, when he could bear hunger on longer, he was presumptuous enough to eat very plentifully. Presently the fever return'd in a more violent manner, with a pain which oppress'd the whole head, and a vomiting. Yet even then did he not confess his irregularity, which he had been guilty of privily to every body.

When other remedies had been tried in vain, mention was made of one which every body here refuses, but he himself did not at all fear. In the place, therefore, where it was certain that the head had receiv'd a blow, the bone, which show'd no disorder at all, was perforated by a bold and eminent surgeon, with such diligence and art, that the perforation could do no harm, if it were of no advantage. Nothing was discharg'd then, or afterwards. The dura mater appear'd to be very sound, and was preserv'd so. And in the mean while the patient seem'd to be a little better: nor did he any longer conceal the previous irregularity of his conduct; when, of a sudden, he was seiz'd with a pleurisy, at the lower and left part of the thorax; and no remedies being of service to him, he died within a few days, although he had even thrown up a kind of matter from his lungs, which was somewhat tinctur'd with blood, but not a great quantity; and no symptom of the head being affected had come on, besides those which I have already mention'd.

The carcase, from the mouth of which a filthy matter was discharg'd, was livid below the throat, on the left side only, and that to a small extent merely; but was so exceedingly putrid and ill-smelling, that even in this very cold season, for it was the beginning of January, in the year 1742, it could not be borne. No part therefore, except the cranium, which was very thick, was open'd. Yet in the cranium was found not the least mark of disease; nor yet in any of its contents, if you except a very little yellow kind of jelly, which was found to be extended, in every direction, under the dura mater, for the space of three or four inches; not under the contus'd part of the head, where the trepan had been applied, but more to the fore-part.

16. If you compare this history with those animadversions which I made above (*i*), you will readily suspect the cause from whence a pleurisy had arisen in this young man; and that the very small quantity of matter which was found under the dura mater, was the remains of some which had existed there in much larger quantity, the other part of it having been translated into the thorax in particular, and into the whole body in general; as the universal state of putrefaction show'd. And if this was the just idea of the case, it were to be wish'd, that before the matter could have been carried to these parts, it might have been extracted by a perforation of the cranium.

Yet who could possibly know that it was necessary to perforate the cranium, not under the contus'd part, but more anteriorly, where there was no peculiar mark of matter being collected? But even suppose this could have been divin'd; tell me, I beg of you, at what time the cranium should have

been perforated? Should it have been done before the seventeenth day? Yet there was no sign of any fluid being extravasated. Should it have been done as soon as any bad symptoms appear'd? Although the most experienc'd surgeon Carcanus (*k*) has expressly inculcated, "that when the bad symptoms appear," not in the first days, but "in process of time," when "they are wont to proceed from a corruption which is already made, or which is beginning to come on, we can very seldom have any hope of an infirm constitution; nay, that the fate of it is almost always determin'd;" yet they would not be backward to make use of this doubtful remedy, in the case of a patient, who, by way of a rare instance in this country, chose to undergo it; since Carcanus himself did not deny, that a person might be sav'd; and even did not conceal the testimony of Falloppius, who affirms, that one man was preserv'd by him, in consequence of the cranium being perforated, about the thirtieth or fortieth day, and the sanies being discharg'd therefrom; though Carcanus was not very forward to give credit to it, and would, certainly, with more difficulty have given his credit, if other rare, but not less certain, observations of this kind had been publish'd; and in particular, of Scultetus (*l*), who, "after the twenty-eighth week from the injury's being receiv'd," affirm'd, that he had done the same thing as Falloppius, naming the man, and pointing out the time and place wherein the case happen'd. In this young man, therefore, all that could be done, was done. But that cause, on account of which I have propos'd this history, prevented a happy success attending the endeavours that were made use of.

17. And I wish this were the only history of the kind, and that others, very similar to this, were not extant among different authors, which moreover, together with many others, that, for several reasons, likewise show the use of the trepan to be of no advantage, and that, very frequently, have induc'd eminent physicians, both ancient and modern, to assert not only that this operation was "often of no effect," but even that it was very frequently of no advantage.

The minds of practitioners, however, and of the people in general, have been much more terrified by those who formerly, and even in our times, have asserted, that there was "a considerable danger" therefrom; or that "the danger was more certain;" and that trepanning "could not be made use of without very great danger." Will you then ask, whether it could be dangerous, when made use of by an excellent surgeon? Without doubt, it is to be suppos'd, that the physicians who were sent for to Ptolemy, that king of Egypt who was "violently wounded on the head," and of whom mention is made in the epitome (*m*) of Titus Livy, were not wanting in eminence or skill. Yet the king "expir'd in the midst of the operation, while the physicians endeavour'd to pierce through the bones."

And who does not know how excellent a physician and surgeon Falloppius was? yet he, with such a simple confession of his error as is worthy of the greatest men, on account of a certain circumstance observ'd by him,

(*k*) De Vuln. Cap. Serm. 3. Lect. 5.(*l*) Obs. 13.(*m*) l. 52.

very late, in perforating the cranium, has said the following things (*n*): “Observe, I beseech you; I have been the occasion of death, in some measure, to a hundred men, being ignorant of this cause.” And these several things that I have mention’d, neither could then, nor can now, be conceal’d: as they have been said in so many books of so many writers, of different ages and countries.

There is no occasion, therefore, to wonder that the people of this country began to refuse the assistance of this remedy, being deterr’d from it by experiments of its being useless in particular, or injurious; and this not only in one or two cities, but in most of the cities of Italy; and, besides our countrymen, by others also, amongst whom Wepfer (*o*) hints, that his countrymen were, at a time when the use of the trepan even flourish’d among us: his words are, “The Italians, and other inhabitants of the more warm regions, would have determin’d to make use of the trepan immediately; and the very experienc’d D. D. Burgouverus would have done the same thing, if the patient, and those who were about him, had not entertain’d a dreadful idea of a remedy which they were unus’d to in these places, and which is terrible to most persons, even by its name alone; and had not, in consequence thereof, resisted his endeavours.”

And can you suppose, that courage was given to those persons, who refus’d to suffer this operation by the declaration of John Bohn, an eminent professor at Leipzig, in the dissertation which he publish’d, *de Trepanationis Difficultatibus*? For before he particularly explains these difficulties, he does not hesitate to affirm, “that this operation, certainly, is attended with much danger; and that it is often found of no effect, or improper.” As I have taken notice of the greatest part of these difficulties sufficiently above; I shall rather add something of that one, which was taken from the last-roduc’d observation; I mean, of that difficulty which very frequently occurs, in determining the time that is proper for applying the trepan. And this I have it in my power to confirm, by another example which was seen by me in this city.

There was a young woman, of no mean parentage, slender in her make, and of a weak constitution, but healthy, so as never to have had any disorder, but very severe convulsions; which she had been afflicted with some years before, in the whole of her body, though not more than once. Being, therefore, in good health, and sitting upon a very low seat, it accidentally happen’d, that being surpriz’d with an unforeseen thing, and a noise, she drew her head back hastily, as is frequently the case, and struck one side of the occiput, with violence, against a marble slab, which was prominent, behind her, from the wall. It was the last day but one of March, in the year 1739; nor did she feel any inconvenience then, nor for some days. After that, there was a little pain in the place which had receiv’d the blow; and to this succeeded, in the side of the neck below that part, a kind of rigidity of the muscles that lie there, attended with considerable pain. Yet all these symptoms were so slight, that the patient did all the same kinds of business

(*n*) Comment. supra ad n. 12. cit. c. 17.

(*o*) Historiar. Apopl. Auctar. in Schol. ad Hist. 6.

she had been us'd to do before, both at home and abroad. Who then would, at this time, have presum'd to order the cranium to be trepan'd? or if any could have been so presumptuous; do you think, that others would have permitted it, or that a delicate woman would have suffer'd it? Now take the remainder of the history.

The woman having gone on, quite to the month of August, in the manner I have told you, that is, having felt no other inconvenience, besides what has been taken notice of, I was sent for to her on the sixteenth day of the same month; having had, from her physician, the relation which I have given you: he farther added, that for some days past, the patient was feverish, and that to a considerable degree; that her pulse was hard; that those muscles of the neck were somewhat swell'd, rigid, and affected with pain; that there was a pain also which descended in the course of the spine, and that it was with difficulty the lower jaw could be drawn down from the upper: that the patient herself was almost stupid, and answered slowly; and indeed, that she was sometimes a little delirious: that she did not see very well; and that her eyes seem'd to be convuls'd as it were: but that these last symptoms were then gone off; yet that the others had now remain'd for several days.

He moreover told me, that the pain had, within these few days, return'd to the place which was formerly struck; although, to the judgment of the touch, and of the sight, no disorder appear'd in the part. On seeing the patient, soon after, I perceiv'd that what he had related was but too true, and that there was now no room for remedies. Having, therefore, propos'd some things of little importance, on which no calumny could fall, merely to comply with custom; I call'd aside one of the elder of her relations, and told him how much I apprehended from the patient's case: after which I took my leave, thinking it unnecessary to return any more. And, in fact, two or three hours after I was gone, her speech left her: and within two or three days she died.

If we had been permitted to examine the internal parts of the scull, I do not doubt, but as our Marchetti (*p*) found pus upon the membranes and brain, in a man, who, having been slightly wounded in the head, so that not even the bone was laid bare, was, after three months, seiz'd with a fever, and after that with a pain which return'd into the wounded part, where was no appearance of disease, and in this manner died; I do not doubt, I say, but I should have found it so much the more in this woman, as she had not, like that man, been without any symptom of a wound in the head, either in the fever, or before it; but had been already troubled with several symptoms, for four months and more before the fever, and with as many after the time of being attack'd with the fever.

Thus you very plainly perceive, that cases may happen, wherein either no symptoms of blood being extravasated in the cranium, offer themselves in the beginning, or they are very slight; but after a long interval, so many and so violent symptoms crowd upon and attack the patient, that

neither in the first part of the disease, which is convenient for trepanning, the patient can be struck with such a fear as to make him admit of that operation; nor in the latter part can the physicians hope to be of any use to the patient thereby; as you cannot suppose, after so long a space of time, and after the existence of so many destructive symptoms, that a corruption of the parts was not brought on, though it was absent, almost beyond belief, in that very rare observation of Scultetus (*q*).

18. But what, you will say, can make patients of this kind, or their relations, and others who are concern'd for them, so averse to this remedy, even at a time when violent symptoms are immediately present? Read over again all that has been said above (*r*) of the causes for which it is to be suppos'd that this remedy has been deserted in some cities, and to those also add that which is gather'd from the following history of Mediavia.

19. A boy, of fourteen years of age, was struck on one side of the sciput with a pole, about the middle of August, in the year 1739. At the same time an old man had been struck on the head also. Both of them had fall'n down after the blow; both had vomited; and soon after been seiz'd with a fever. Both of them were receiv'd into the same hospital; and both of them attended to with equal diligence by the physician and surgeon. Thus far the cases were in every respect similar. But now I will tell you the dissimilar fate, of the boy first, and then of the old man. The fever having left the boy about the fourth day, attack'd him again on the eleventh, being always attended with a torpor, sometimes with a delirium, or convulsions, or an eruption of blood from the nostrils; though a sufficient quantity of this fluid had already been taken away in the beginning. No remedies, therefore, being of any advantage, he died within a very few days.

The cranium, when inspected by means of a bright and opposite light, was found not only not to be fissur'd, but scarcely to show any difference, when the part which had been struck was compar'd with the other part. But betwixt the part which had been struck and the dura mater, something similar to mucus occur'd, and under this mucus the dura mater was alter'd from its natural colour. But betwixt this membrane and the pia mater, where it invested almost the whole upper surface of that hemisphere, was a great quantity of pus of a yellow and green colour, and very foetid in its smell: and all that part of this membrane which had been cover'd with pus, was increas'd beyond its natural thickness in a triple or quadruple proportion; its surface being in a manner granulated. Besides this nothing was observ'd, not even in the ventricles, no water being found therein. Thus far of the boy. But as to the old man, he escap'd quite safe and sound.

20. Now, if you tell the common people, that this boy might certainly have escap'd, if the bone had been perforated, and the blood which was extravasated beneath had been extracted; without doubt, the people would immediately reply, But the old man, who had likewise been seiz'd with the same symptoms in the beginning, recover'd totally without that remedy. It is true, you would not want wherewith to rejoin to those who should argue in

(*q*) Cit. *supra* in fin. n. 16.

(*r*) N. 12, & seq.

this manner. But what are these reasonings to the people, who are always taking new arguments from all the cures which have happily succeeded without the use of the trepan in wounds of the head, to make themselves still more averse to it? And this does not, I suppose, happen among us only, but in other places likewise; for in others, examples of cures of this kind, also, frequently occur. What the symptoms are which show violent injuries to exist within the cranium, and such as would seem to require trepanning, you will learn from several books, and in particular from those which belong to the *Commercium Litterarium* (s).

Where you may look for other examples, appears not only from the *Acta Eruditorum Lipsiensia* (t), but from the dissertation of Jo. Andr. Conradus (u), and others, whom, for the sake of brevity, I purposely omit; as I also do the observation of Grimmerus (x), and two of Burgouverus (y), one of which is that wherein he himself would have perforated the cranium, if the persons about the patient had not been against it; as that surgeon also would of whom Rouhault (z) makes mention, if Mery had not dissented. Yet all the patients that I have referr'd to were perfectly cur'd without the assistance of the trepan, and some of them even very soon.

But that you may the more clearly perceive with how much propriety I have said it happens, in cases of this kind, that persons are more and more averse to perforations by the trepan, I will tell you what happen'd here in the year 1729. The coachman of a noble matron not being able to keep his horses in with the reins, she threw herself out of the chariot, as it mov'd along with great velocity, and had the same thing happen to her that happens to others, in general, in the same case; that is, she fell headlong on the ground, which was, from the nature of the place, and the severe season of the year, cover'd with stones and very hard ice. She, therefore, hurt her head so grievously, that she was carried home for dead.

The physicians, having done all that ought to be done, and is customary to be done, with the utmost diligence, hop'd what Marchetti, as has been said in the former letter also (a), had seen in some persons after a fall, or an injury on the head from a blow, "that losing their internal senses, and " being depriv'd of feeling and motion," yet not being seiz'd with the other symptoms that are taken notice of by Hippocrates, they should, in the same manner, see the woman "entirely freed from her disorder on the following "day." But as in this hope they were disappointed, I was call'd to the patient.

From the appearance of her head we could not argue in what part, particularly, it had been struck; nor could her sensation, or voice, of which she was entirely bereft, make this known to us. I, therefore, gave it as my opinion, that, when the other things were done which contributed to re-

(s) Vid. A. 1739. Hebd. 52. n. 1. & A. 1741. H. 16. n. 3. & A. 1743. H. 35. n. 2. H. 47, n. 1. ad 194. & 193. & 714.

(t) A. 1693. M. Nov. in relat. novæ Edit. Barbett.

(u) De Vuln. Front. in Resolut ad n. 2.

(x) Eph. N. C. Dec. 3. A. 9, & 10. Obs. 87.

(y) 6, & 7. in Auctar. supra ad n. 17 cit.

(z) Tr. supra ad n. 14. cit. c. 7.

(a) N. 10.

vulsion and reabsorption, if it should happen that any blood was extravasated within the skull, to the whole of the head should be immediately applied such things as, by moderately attenuating and corroborating, might assist that absorption: that Cornelius Celsus (*b*) had ascrib'd a great deal to external remedies, even where the cranium was manifestly fissur'd: that what Galen had done afterwards, and many others formerly, may be understood from Magatus (*c*), who had also himself begun the cure in this manner.

What the authors more modern than Magatus thought, I had learn'd even from the reading of my anatomists with whom I was so frequently conversing; and particularly of Bartholin (*d*), Wepfer (*e*), and Ruysch (*f*). That we, indeed, were in Italy, a region much warmer than theirs; but that Magatus, to omit others, was in this region also: and that, at this time of the year, the cold was often more intense than in other times of the year among them; and that, therefore, our matron, like the woman spoken of by Ruysch, was hurt from this cause, that "she had fall'n from the chariot upon the ground when harden'd with the frost." That, therefore, I would make use of the same fomentation which he had frequently made use of with success, and not contrary to the cautious admonitions of Magatus, but having in it some of the ingredients that he had recommended.

The physicians came into this opinion: nor had they reason to repent it; as, by the continu'd use of this remedy, the patient first became a little better, and then came quite to herself; and, finally, so far recover'd, without any remaining inconvenience, that she liv'd more than twenty years in a good state of health, till she was at last carried off by mere old age.

But this instance of success made men still more averse to the perforation of the cranium, and caus'd the fomentation I have spoken of to be recommended from that very time both by the physicians and surgeons; but to be particularly desir'd by the patients and their relations, and to be in very frequent use here; and this to such a great degree, that I was sometimes afraid, lest, being improperly made use of, it should be as injurious to some persons as it had been profitable to others. For I have seen it applied in the hottest seasons that we have in this country, as it was in that case which the present recalls to my mind, and which I will mention to you in a few words, though not on account of this animadversion only, but on account of some others also.

21. A noble count, happening to sit on a pretty high bench, which gave way under him, fell backwards, and dash'd the hinder part of his head against the wall, with so much the more violence as it was bald, and he himself of a tall stature. He perceiv'd no disorder at that time, except that a great number of sparks seem'd to be flying about before his eyes. But afterwards he had a very troublesome pain about the forehead and the eyes, watchings, fever, and a flux of the intestines. The fever went off. Soon after it return'd with the same symptoms. I was call'd into consultation.

Some of the physicians were particularly displeas'd with the intestinal flux.

(*b*) De Medic. l. 8. c. 4.

(*c*) L. 2. supra ad n. 12. cit. c. 38. 41. 49.

(*d*) Cent. 2. Hist. Anat. 41.

(*e*) Exerc. de loco aff. in Apopl. & in Auctar. Schol. ad Hist. 6.

(*f*) Obs. Anat. Chir. 60.

For they had read this in Marchetti (g): “ Besides the signs propos’d by Hippocrates, it is to be observ’d, that a flux of the belly coming on in wounds of the head, notwithstanding the absence of other symptoms, is a sign of the brain’s being injur’d: - - - and that almost all these persons die, on account of the brain being injur’d in the internal part, where it is stretch’d out into the medulla spinalis, and where is the origin of the nerves,” and among the others of those that go to the stomach. I, however, having enquir’d into all things accurately; and, as it was the month of July, in the year 1739, having found that a greater quantity of water might easily have been taken than the stomach of an old man would bear; for water had been prescrib’d as his common drink; spoke to the following effect:

I will omit to discuss this question here, whether Marchetti, when he said that the other symptoms were absent, meant also to except those which he says were propos’d by Hippocrates, and which certainly are absent in this case. I will only say this, if the patient had fall’n down at a time when his stomach was fill’d with meat and drink, especially such as did not agree with him, and had immediately thrown them up; certainly, there would be no occasion to be terrified by this vomiting. Now, then, as there seems to be another reason why the belly should be relax’d, we need not be under any great fear about this. Let a somewhat smaller quantity of water be drunk, and let it be a little medicated, so as to prevent it from relaxing the stomach. And as to the fomentation, (for I had heard that this was made use of) I make no doubt but it may be properly applied by you, provided it be somewhat more dilute than usual, and us’d more moderately; nor applied by means of flannels, nor on a great number of cloths. And it was not long after this that all the symptoms went off, and the patient recover’d; being still alive at the time of writing this letter, and in good health, though fourscore and six years of age.

But before I cease to speak of this fomentation, I would have you to observe, that almost all those persons that I said (b) had been sav’d without the trepan, which otherwise seem’d necessary, and others of the same kind, have been sav’d by means of this fomentation; or, at least, by something very similar to it; as, for instance, those whom Slevogtius (i) refers to in these words: “ By such remedies the most violent injuries of the head, that formerly had occasion for cuttings, burnings, scalpings, trepannings, and other dreadful operations, are every day cur’d by our surgeons:” and sometimes by these remedies “ alone;” so that by a French surgeon nam’d Pincon (k), a rustic was cur’d “ who lay speechless ten days, and was consider’d as desperate;” a young man by Grimmer (l), who had been seiz’d “ with a delirium, a vomiting, a fever, &c.” a boy by Trew (m), who was “ depriv’d of all his senses, paralytic” in the side opposite to the blow, and in the other “ perpetually agitated with convulsive motions.”

Yet frequently other remedies are join’d to it; and among these, when

(g) In addit. ad Obs. 15.

(b) N. 20.

(i) Dissert. de Carie Cran. § 20.

(k) Vid. Dan. Hoffman. Dissert. de sanat. cerebri quass.

(l) Obs. 87. supra. ad. n. 20. cit.

(m) Commenc. Litter. A. 1741. ibid. cit.

it was allowable, venæsections, that “the veins may be render’d hungry, “as it were, by having some quantity of their blood taken away,” as Wepfer (*n*) speaks, “and may more greedily drink up the extravasated blood;” which that remedy I have spoken of, externally applied, and certainly penetrating by its efficacy where trepanning cannot reach and bring it out, (whatever its efficacy or mode of acting may be) “so disposes, as to make it fit “to enter the blood-vessels again.” For thus he explains both his own observations, and those of others; as he even says above (*o*), “that he remembers the dissipation” of extravasated blood “to have been brought “about very frequently in his country, with great success, by proper fomentations; without the use of the trepan, and without any detriment to the “patient.”

As to this reabsorption, however, I have written to you formerly (*p*) what has been observ’d in the brain after apoplexies that had formerly preceded, and even after an old wound of the head, without a perforation of the cranium, and have said whence I suppose this reabsorption to happen; for which reason I shall add no more. Nor shall I say any thing of another use of trepanning; I mean, that the bones of the skull, when depress’d, may be rais’d up, the sharp fragments extracted, and the prominent needle-like points of the internal lamina which has happen’d to be fissur’d: for how long, and in how great a degree, these may be injurious, the excellent observation of Platner (*q*), among others, shows by dissection: I shall not, I say, add any thing on this subject, lest, if I should say that some objection may be also made even to this remedy sometimes, which, certainly, other remedies, and nature itself, are less able to supply the place of; I should seem to give more credit to vulgar prejudices, than to the dictates of reason and of prudent practitioners.

22. For now, as I have spoken above merely of perforating the cranium, not only as much as is necessary to make the discourse that I had begun complete; but also (which I would not wish) to create a false and unjust suspicion that I am on the side of the people in this question, and have an immoderate aversion to this kind of remedy, which, when cautiously and properly applied, I readily confess to be very useful and even necessary: let us return to dissections. And as two of our Mediavia’s remain, I will give you them before my own. The first belongs to those that have been already propos’d; I mean those in which, if there was any disorder of the cranium, it did not reach to the internal parts. And the second, to those in which the disorder did reach thereto.

23. A certain man, falling upon his face, dash’d his forehead against the ground on the right side, about the middle of the bone. No vomiting, nor any other symptom, happen’d immediately after the fall, except some slight disorder of the stomach. But soon after, he was seiz’d with a considerable fever, and a sleepiness. About the fourth day, both of these symptoms went off: and he was well. He remain’d in the hospital, however, for the cure of his wound, which was of a good colour, together with the bone

(*n*) Schol. supra ad n. 17. cit.

(*o*) Exercit. supra ad n. 20. cit.

(*p*) Epist. 2. n. 16.

(*q*) Institut. Chirurg. § 532. not. d.

that was laid bare. About the seventeenth day a violent fever came on again, and a heavy sleep. The colour of the wound and of the bone became brown. The bone was scrap'd, and appear'd to be white beneath. Yet the man died with the same, and no other symptoms, about the twentieth day, which was the twelfth of April, in the year 1740.

Upon opening the skull, a fissure was indeed observ'd therein, which pass'd transversly a little above the eye-brow, that lay under the wound. But this did not reach to the internal parts. However, where the bone had receiv'd the blow, there, betwixt itself and the dura mater, lay a little of a kind of jelly as it were. And the corresponding hemisphere of the cerebrum was of a black colour, inclining to green; nor yet in that place only, but every where; and had a very putrid smell. This colour descended quite to the lateral ventricle itself, infecting all the parietes thereof, the basis excepted. Moreover, the anterior part of that ventricle was not lacerated; but dilated to such a degree, as to contain a quantity of coagulated blood, equal to the size of a man's fist. The remaining part of the ventricle contain'd a bloody serum, as the left did also.

24. The blood which was found within the ventricle, was certainly effus'd from some ruptur'd vessel, either of the plexus choroides, or of those that pass through the surface of the parietes of the ventricle. But shall we suppose that vessel to have been slightly ruptur'd, at the time when the head receiv'd the blow, and that the blood had begun to be distill'd slowly, and by degrees, from that time? or shall we only suppose it to have been weaken'd then; and, finally, that a gangrene of that hemisphere coming on, it was ruptur'd, and pour'd out its blood hastily? If you should choose to suppose the latter, you will, in my opinion, less easily explain why the man did not then die much sooner, and with other symptoms, almost like an apoplectic person; and how, without any laceration of the substance, the ventricle was so dilated; so that it is most probable the blood was discharg'd gradually and slowly, till it increas'd to so great a quantity; and that the ventricle gave way gradually in proportion.

Nor let it be any objection with you to this hypothesis, that the man seem'd to be very well from the fourth day to the seventeenth, without a fever, or any symptom whatever. For it is not only to be suppos'd, that to a gangrene so widely diffus'd, a deprav'd disposition in the brain must have preceded; but even in the most considerable diseases of this organ, it does not very rarely happen, that either some slight symptoms thereof, or none at all, are observ'd, even for a much longer space of time.

Call to mind, I beg of you, those things that are produc'd above (*r*), from our observation, or at least from the observation of Marchetti. Read, not so much the ninth observation of Fantonus the father, as the scholium of his celebrated son to the twenty-fifth. And to omit that of Avignon (*s*), which is an extremely rare observation, as therein, though so great an injury of the cranium, the meninges, and the brain, had taken place; as the course of the cure demonstrated; yet no symptom existed, from the beginning to

(*r*) n. 17.(*s*) *Commerc. Litter. A.* 1731. Specim. 21.

the perfect completion of the cure, that is, to the seventy and sixth day; there is a history in Bohn (*t*), from Lamzwerdus, of symptoms not succeeding to two fissures of the sciniput, till the thirty-sixth day: and there are others from Montanus in Rouhault (*u*), wherein the symptoms did not come on till the seventeenth, twentieth, or twenty-first day, when they generally prov'd mortal; and this happen'd at Antwerp, for the space of a whole year, to the greater part of those who had, in this period, receiv'd blows upon the head.

Read those observations, moreover, which Poupart, and particularly Vacher, have communicated to the Royal Academy of Sciences at Paris (*x*). From these, and from others that I designedly pass over, you will cease to wonder if at any time, as in one just now propos'd by us, so in some others that are given either in this or the former letter, you shall see that considerable disorders lay hid in the brain some days, without any bad symptoms, and in particular without any fever. There are a great number of things in this organ, not only in a natural state, but in a preternatural state, of which we know not how to conceive.

And that our ancestors also were properly and justly surpriz'd thereat, you will understand even from what is added to the observation of Salmuthus, in this section of the Sepulchretum (*y*); which observation relates to the present subject in almost every view: this addition is taken from Berengarius, or, if you please, from Carpenfis, as they more frequently call him from his country: and this is a circumstance, the want of attention to which has deceiv'd a very modern, and, in other respects, not unlearned surgeon, who, having said that Berengarius had sometimes perforated the cranium upon the very futures with success; immediately says, that Carpenfis had done the same, as if Carpenfis had been quite another person.

But from a lingering death, after a blow of this kind, let us come to a very speedy one, as in the second observation that I have promis'd you.

25. A country-woman falling headlong down stairs, hurt her head in so great a degree, that having lost the power of speech, and of motion, but especially in her lower limbs, and discharging blood from her nostrils, and one of her ears, she died within an hour.

The basis of the cranium, which contain'd a large quantity of extravasated blood, was broken transversely, the fracture passing from one side to the other, before the ossa petrosa, through the posterior parts of the sphenoidal sinusses; the bony part of the meatus auditorius being also ruptur'd, together with the membrana tympani in that ear which had discharg'd blood. The lateral sinusses of the dura mater were also ruptur'd: and, besides the other injuries, the cerebellum itself was somewhat injur'd.

26. If besides this injury of the cerebellum, whatever it was, there had not been other very violent ones, such as a very great concussion of the cerebrum, and a very great compression both of cerebrum and cerebellum, in proportion to the quantity of blood extravasated within the cranium, and

(*t*) De Renunc. Vulner. Sect. 1.

(*u*) Tr. supra ad n. 14. cit. c. 11.

(*x*) Hist. de l'A. 1700. Obs. Anat. 19. & de l'A. 1743. Obs. Anat. 12.

(*y*) § 8. Obs. 10.

particularly from the rupture of the lateral sinusses; do you think death would have come on so soon? I confess I should not readily believe it; notwithstanding I know that considerable and sudden injuries of the cerebellum are, for the most part, wont to be more speedily and suddenly destructive, than equal injuries of the cerebrum; at least in the more perfect, as they call them, and adult animals, and those that approach the nearest to the structure of man.

In this controversy therefore, which I have fall'n upon by chance, and of which I remember that you have formerly ask'd my opinion, do not, in concert with men in other respects very learned, take notice not only of insects, but not even of birds, or fœtusses, or newly-born animals of any kind. For Aristotle (z) himself has even observ'd formerly, "that this evidently happens in insects, as in wasps and bees;" that is to say, when the part "which is call'd the head is taken off, they still live." And it is so long since as when I was a very young man, that Valsalva affirm'd to me he had irritated, to a very great degree, the cerebellum of birds, and yet that they had not died immediately.

And, indeed, I myself can relate what I saw of this kind in two cats, which were two days old, when I open'd the heads of them while living, and in the summer time. For one hemisphere of the brain being laid open in each of them, and the use of the pia mater, in confining the brain, being observ'd; for where it had happen'd that a small part of this membrane was lacerated, there a small part of the brain extruded itself, and became prominent; I took away the whole of that hemisphere piece-meal: and yet the power of feeling and moving did not seem to be lost, or even in the least diminish'd, in the corresponding and opposite limbs. Nor indeed were these faculties lost when I had soon after wounded the cerebellum of the other cat.

But they were immediately lost upon cutting deeply into, and tearing asunder, the cerebellum of the other, and the beginning of the spinal marrow; they were lost, I say, in the limbs, and the whole body, as much of it as then presented itself to my eyes; if, however, you except the heart, and its auricles; for the motions of these cavities, and of that viscus, still continu'd lively and vigorous: and even when, some little time after, I cut off the head from the trunk, this motion nevertheless continu'd the same, as if I had not cut it off. Cutting off the great vessels therefore, soon after that, I took away, together with them, the heart; which then finally soon grew quiet: although not long after this I perceiv'd, by compressing it betwixt the fingers, that it was acting even then by a powerful exertion.

I know therefore that they say truly, who have asserted, that cats hold out the longest of almost any animals, in anatomical experiments. Yet I understand, at the same time, that if we attend to those things which we observe in this kind of animals, especially when newly-born, and still more to what is observ'd in insects, birds, and human fœtusses themselves; as, for instance, those that are sometimes born not only without the cerebrum and cerebellum, but also without the medulla oblongata and spinalis; I say, if we attend to these things, it will, I see, of course happen, that many consequences seem

(z) De Juvent. & Senect. c. 1.

to arise therefrom, which argue against the uses of both these medullæ and cerebrum; not to say against the uses of the cerebellum itself.

I likewise would not have you here attribute too much to certain disorders of the cerebellum, which are generated in a longer or shorter space of time, but certainly not suddenly. Of the former kind are these: from Mauchart (*a*), and from Littre (*b*), of the cerebellum being indurated in two hydrocephalous children, or scirrhus; yet in such a degree only that in the latter, two, although very small, places remain'd, wherein the cerebellum was in a natural state: and in the former, one of the lobes was less enlarg'd, as well as less indurated: from Brissæus (*c*) also, a hard tumour, but one that had form'd itself in the middle of the cerebellum: from the celebrated Lieutaud (*d*), a bone of no small size within one of its lobes: from Peyron (*e*), the whole cerebellum converted into a membrane, which involv'd in it a body of the bigness of a hen's egg, made up of many and hard glands; into which body some will perhaps suspect that the cerebellum had been chang'd; as seems to have happen'd formerly in regard to the cerebrum; rather than into that membrane: and to have been conceal'd under that appearance, just as they would of some parts of the cerebellum itself, in which Harderus (*f*) found three small globules; for the largest was in the beginning of the medulla spinalis: or of Wurffbainius (*g*), who found several small glandular bodies in the cerebellum, which was yellow and foetid indeed, but not putrefied; or of Flascus in Lancisi (*h*) (for Lancisi did not see it) who found a body made up of many globules.

Nor indeed did that scirrhus belong to the whole of the cerebellum; as some seem to hint, and as others expressly affirm; which the celebrated Haller found in a beggar girl, as this gentleman asserts (*i*) that it had occupied "the middle part of the cerebellum," that is, "the left lobe;" so that it certainly did not equal that which I found in the cerebellum of a man in the beginning of the year 1754, as this, though less hard, and less compact, besides occupying the same lobe almost wholly, occupied the middle part also, and the nearest portion of the right lobe, as you will learn from the history which I shall send you on a future occasion (*k*).

And to the second kind of disorders in the cerebellum belong, if you readily set aside the observation which Peyron (*l*) has also produc'd among some of those above, as others likewise have done since, from Fantonus the father, since the very eminent son (*m*) thinks, that instead of the cerebellum being "corrupted," we are to understand only, that it was soft, and not of the natural colour; to this second class, I say, belongs, first, that observation which is made by Massa (*n*), of an abscess in the cerebellum, after a wound of the sinciput "being suppurated with a laudable pus:" and in the next

(*a*) Eph. N. C. Dec. 3. A. 4. Obs. 59.

(*b*) Hist. de l'Acad. R. des Sc. A. 1705.
Obs. Anat. 13.

(*c*) apud Platner. Inst. Chir. adnot. ad § 548.

(*d*) Hist. de l'Acad. R. des Sc. A. 1737.
Obs. Anat. 8.

(*e*) Mem. de la même Acad. A. 1741.

(*f*) Apian. Obs. 53.

(*g*) Eph. N. C. Dec. 2. A. 9. Obs. 237.

(*h*) De nox. Palud. Eff. 1. 2. Epid. 2. c. 6.

(*i*) Opusc. Pathol. Obs. 1.

(*k*) Epist. 62. n. 15.

(*l*) loco indicato.

(*m*) Schol. in Edit. ult. ad eam Obs. quæ
9. est.

(*n*) l. Introd. Anat. c. 28.

place, one written to me by a friend in the year 1735, of the right lobe of the cerebellum being penetrated, universally, by a green and foetid sanies, after having affected the neighbouring temple-bone here and there with a caries, and corroded the dura mater: and again one of mine, which, if you consider the cause, is not unlike this, and which I have sent to you formerly (*o*); but unlike in this circumstance, that the sanies had vitiated the same lobe of the cerebellum superficially, and that only in some measure: and, finally, a fourth of the celebrated Plancus (*p*), of an abscess which occupied two third parts of that lobe.

Nobody, certainly, has ever been carried off immediately and by a sudden death, in consequence of one or the other kind of disease, when he seem'd to be in health; nor has the disorder even been form'd suddenly: and to those disorders that are generated by degrees, the nature of the body accustoms itself in some measure, and supplies, from some other part, as far as lies in its power, what is wanting in the diseas'd part.

An example of this kind I will produce in the nerves themselves. For what do you suppose could be the reason that a dog, whose recurrent nerve, both on the left and right side, was cut by the celebrated Emmet (*q*), recover'd in some measure, the following day, the voice that he had lost immediately on the incision, and continu'd to recover it more and more every day?

The third recurrent nerve, you will say, as it lies behind the aspera arteria, could not be divided. But this unusual nerve had certainly existed the day before; and other small branches, I suppose, had existed, that arose from the par vagum, above the section of these nerves, when perform'd by Valsalva (*), or from some other nerves that went to the larynx, in a whelp, which, though she strove before in vain, could at length bark on the ninth day.

That is to say, either I am deceiv'd, or the spirits, which could no longer pass through those larger nerves that were cut asunder, had, by this time, sufficiently dilated, for themselves, the passages through the lesser nerves, which were before not sufficiently open, and which communicate, higher up, with those larger ones, either on the outside or the inside of the brain, and go to the same place. I say sufficiently dilated; for in men that are affected with increasing disorders of the cerebellum, to whom you will transfer these remarks, it is scarcely probable, that, after these disorders have wholly occupied the cerebellum, the motion of the heart and the lungs should have been so vigorous and strong as before: nay, indeed it is asserted by some of them, as in the boy spoken of by Littre, that the respiration was weak, and that the pulse was very small: and, in the observation which I have said was written to me, a languor was taken notice of: and in that also which I have sent to you, it appears, that the strength of the pulse had been quite sunk and diminish'd.

It would be much more difficult to satisfy the objection which I remember to have read in the work of some grave author; for who he was I can-

(*o*) Epist. 14. n. 3.

(*p*) in Append. ad Epist. de Monstr.

(*q*) Tentam. de Cur. Morb. Cephal. n. 30.

(*) Epist. Anat. 13. n. 37.

not remember ; I mean, that in a thief, whose memory was very weak, no trace of the cerebellum was found by Benivenius : if Benivenius (*r*) had not written the following words only, “ that the posterior part of the head, “ where the seat of the memory is, was so short in this thief, as to contain a very small portion of brain ;” so that if any one, by reason of that ancient credulity of the seat of the memory, should be willing to understand this of the cerebellum, rather than of the cerebrum ; he, nevertheless, does not acknowledge, that the cerebellum was entirely wanting.

This then being the state of the question ; let us set these things aside, and returning to that point from whence the controversy took its rise, and by which it may be more easily decided ; let us compare considerable and sudden injuries of the cerebellum, with considerable injuries of the cerebrum, and even, if you will, with very violent and sudden injuries, such as happen from wounds.

27. That there are some wounds of the cerebrum which bring on a very speedy death, we are so far from having it in our power to deny, that it is rather to be wonder’d at, that two observations, and no more, should be pointed out, to this effect, by some very learned men, in neither of which death immediately follow’d ; whereas, on the other hand, no body can be ignorant, from the experiments of many of the most excellent authors, that wounds inflicted on the cerebellum are wont, for the most part, to take life away, either immediately, or in a very little time. For that they do not always kill with the same celerity, I have readily confess’d. But I enquire how many times, at length, and how slowly this has happen’d. Franciscus Antonius Cattus, professor of anatomy amongst the Neapolitans, has said, in a little work (*s*), which was printed at Naples in the year 1557, “ that he can easily prove by experiment,” a circumstance which he does not seem to have prov’d without a wound of the cerebellum. His words are, “ though all the other parts of the brain are wounded, death is not a “ natural consequence thereof ; yet when the posterior ventricle is wounded, “ I have seen that the animal immediately falls down and dies.”

But if, besides the cerebellum, which ; although it does not every where comprehend this fourth ventricle, as if proper to itself, as the cerebrum does its ventricles ; nevertheless compleats it, and immediately covers it ; you should choose to suspect, that with it he had also wounded the medulla oblongata, which lies beneath ; experiments would not be wanting (*t*), from whence you might understand, that sudden death does not necessarily, and of course, follow on account of this wound in particular.

It were to be wish’d, that Coiterus, in those anatomical observations, which he publish’d sixteen years after Cattus, had touch’d upon something in relation to the cerebellum ; since he also, as to what relates to the cerebrum of lambs, kids, and living dogs, outstrips the more modern authors, by making the following assertions : “ And what is a circumstance, that deserves the highest admiration ; I have laid open the brains of living

(*r*) De abdit. nonnull. ac mirand. morbor. &c. causis, c. 89.

(*s*) Hædog. Anat. c. 25. in fin.

(*t*) Vid. apud Teubeler Dissert. de Vulnere. cerebi non semper lethalib. §. 43. & seq.

“ brutes ; I have wounded them, and without touching the nerves, or their
 “ origins, and without wounding the ventricles that lie in the middle, I
 “ have taken them out, but have not found any sign of the voice, respira-
 “ tion, or sense being injur’d in these animals. Birds live some time with-
 “ out the cerebrum, as any one may experience in hens, or pullets, if he
 “ cuts off the upper part of the beak with half of the head, and takes out
 “ the greater part of the brain.”

But in the preceding, and the present century, curious and enquiring men have not omitted even to take out the cerebellum of birds. Thus the celebrated Zimmermann (*u*), having drawn out the cerebrum and cerebellum of a pigeon, the creature died suddenly and entirely : and that you may not be at a loss to determine from whence this chiefly happen’d ; he took away the cerebrum from another pigeon, which, nevertheless, liv’d some time ; yet, when the cerebellum was taken out, “ it perish’d suddenly.”

But not to recede, however, from the more perfect animals, as has been propos’d above ; when I first sent this letter to you, one dog of Chirac was made mention of in this controversy ; which, amongst a great number that died immediately, or not long after, had surviv’d twenty-four hours after making the experiment. But I now see that in the dissertation publish’d by the celebrated Zinnius, in which he has also given the experiment made by himself on the cerebellum (*x*), a dog is taken notice of, which liv’d as many hours after the perforation of that viscus ; and even another is mention’d, from which Petit had cut away a part of the left lobe of the cerebellum ; and yet this animal liv’d six days.

However, it is certain that these are very rare examples, and only a few in all, if they be compar’d with the great number of other instances, of dogs that we know to have died immediately upon the experiment ; or those which he himself confesses, from his own observations, and from the select observations of others, have but just dragg’d on their lives “ after the fourth or
 “ fifth minute ;” or “ almost for an hour,” as two or three did ; or “ for
 “ three hours,” as one did ; or at most “ for twelve hours,” as another dog did.

And if we enquire after instances of very violent wounds of the cerebellum, in the human species, which have not been very speedily fatal, I believe there will be scarcely more than two ; one of these is quoted by Peyron (*y*) from Petit, of a soldier who liv’d three-and-forty hours. The other you will read in the Sepulchretum (*z*), from Binningerus, of a Dutchman, who, unless some error has crept into the impression of the numbers, seems to have liv’d more than four days after the wound.

As to another example, of a servant-man from Borelli (*a*), I do not think it can be added hereto ; for I do not see, how the sword could pass through the orbit, and reach to the cerebellum, without wounding that part of the cerebrum which lies between ; and I think, certainly, that we ought

(*u*) Differt. de Irritabil. §. 27. Exp. 7. & 8.

(*z*) Sect. hac Obs. 8. §. 8.

(*x*) in Schol. ad eam Differt. partem §. 1.

(*a*) Cent. 2. Obs. 19.

(*y*) Mem. supra ad n. 26. cit.

to read cerebrum there, instead of cerebellum; yet this servant-man, wheresoever the wound did penetrate, was found dead the next morning. And why I think that other examples, which I have equally attended to, ought not to be recounted among the more considerable wounds of the cerebellum, I will show presently when I take notice of them.

But the left lobe of the cerebellum had certainly been pass'd through by a leaden bullet in that soldier: and in the Dutchman, "the beginning of the left lobe of the cerebellum appear'd black and corrupted; and from the internal parts of its substance, a little piece of the bone of the cranium, of a conic figure, and acute at its point, was by accident extracted;" and on the same left side the limbs had been paralytic: and this I mention, though in a transitory manner, because in the observation of Plancus, also referr'd to above (*b*), a hemiplegia seiz'd not upon the opposite limbs, but those which lay under the injur'd lobe of the cerebellum; so that a doubt which has sometimes arisen equally to Cæsalpinus (*c*) and myself (*d*), may seem to be removable, if it constantly appear, by many other observations similar to these, that the seat of the cause producing an hemiplegia, is wont, for the most part, to be found differently in the cerebellum from what it is in the cerebrum.

And when the cerebrum and cerebellum are diseas'd both together, any one might suppose, that the disease of the former was less capable of producing a paralysis in the opposite side, than the latter in the subjected side; if the same thing were observ'd in others also that is observ'd by Forestus (*e*) in a lethargic boy, who had the whole right side of his body quite paralytic, sense and motion being entirely lost; for not within the left part of the cranium, but within the right, an abscess was found; not in the cerebrum only, but also in the cerebellum.

But to return to the point in question: although there are so few instances of life being protracted even for a short time after a considerable wound has been inflicted on the human cerebellum; yet what learned and experienc'd surgeon, on the other hand, is there, who, though he may not have seen innumerable examples, has not himself seen some even considerable wounds of the cerebrum wherewith life has been long protracted?

And since it does not seem possible that there should be any doubt on this head, and as all must confess that death is generally brought on more speedily by wounds of the one than of the other; let us now see whether more certainly. All those persons certainly died in whom I have taken notice of the cerebellum being injur'd, not to say wounded. But to insist chiefly upon wounds: how many of these are, at length, said to have escap'd, in whom the cerebellum was not slightly but deeply wounded?

You certainly see that the person, of whom it was related to Platner (*f*), that he had been "cur'd after a considerable part of the occiput, together with a remarkable portion of the cortex cerebelli, had been taken away by a sword," does not relate to this question. Nor will you see that the

(*b*) N. 26.

(*c*) L. 2. Quæst. Med. 10. in fin.

(*a*) Epist. Anat. 13 n. 23.

(*e*) L. 10. Obs. Medic. 11.

(*f*) Adnot. supra ad n. 26. cit.

Abissinian cur'd by our Veslingius (*g*) related thereto any more. For although some authors, as I have lately observ'd, speak of him as a man "who, being already far advanc'd in age, had a wound inflicted on his cerebellum to the breadth of two inches;" yet, if you read Veslingius attentively, you will easily perceive (I omit that he was more than fifty years of age, "but still a vigorous man") "that a broad wound had been inflicted" on his occiput indeed; and that this wound, "penetrating through both the meninges, had slightly touch'd upon the cerebellum to the breadth of two inches;" that is, had graz'd its surface: for in this manner Nonius Marcellus (*b*) explains that passage of Virgil in the eighth book of the *Æneid* (*i*), *stringentem ripas*; and therefore *stringo*, being the word here us'd by Veslingius, must signify to wound slightly; as Servius says, in regard to another passage of Virgil where *strinxit* is made use of (*k*), that "it gives the idea of a slight wound."

Nor will you here fail to recollect that Veslingius has been taken notice of by Riolanus (*l*), as writing "in a very elegant and classical stile, yet sometimes obscurely, because he has not made use of the words and terms which are common among physicians."

But if they had also taken notice of another wound, whereby our Fallopius (*m*) has said, "that first a quantity of the cerebellum, not thicker than a vetch, had been taken away; and, in the second place, that when he had extracted the small bony pieces from the substance of the same, another still thicker part than the former had come away;" it would have been very natural to answer to those who reckon'd this wound, moreover, in the number of the former, that not only the man was not perfectly cur'd, when these things were written, but that he was no more than "almost recover'd;" and this also in particular, that if the wound had been deep, and if those bony fragments had been extracted "from the internal parts of the substance" of the cerebellum; as in the Dutchman of whom I spoke just now; the author, after writing of that wound which he now thought almost heal'd, and of others of the cerebrum which were perfectly heal'd, would not have immediately concluded his discourse in this manner: "Wherefore, not all wounds of the cerebrum, but deep wounds only, are mortal."

And this being the just state of the question, you will suppose that John Bohn (*n*) has done properly, who, as he had seen many wounds, and had read a great deal, if any other man had, upon this subject, asserted as follows: "If we consult experience, we shall, perhaps, be scarcely able to observe one who has escap'd after a laceration of the cerebellum; though many instances are to be met with here and there, wherein it is said that very large wounds of the cerebrum have been heal'd."

Observations of this kind of cure he himself points out (*o*) in great number, and Donatus (*p*) also, and Schenck (*q*), had gather'd together; among which

(*g*) Observ. Anat. & Epist. Medic. 13.

(*b*) De Propriet. Serm. sub litt. S.

(*i*) Vers. 63.

(*k*) *Æneid*. l. 10. vers. 478.

(*l*) In ipso initio animadvers. in Synt. Vesling.

(*m*) De Vulnerib. c. 6.

(*n*) De Renunc. Vuln. S. 2. c. 1.

(*o*) S. 1.

(*p*) De Medic. Hist. Mirab. l. 5. c. 4.

(*q*) Obs. Medic. l. 1. ubi de Cerebri Vuln.

are even some of wounds penetrating quite into the ventricles of the brain, Augenius (*r*), and even Galen himself (*s*), testifying that they had seen them: so that I cannot help wondering that, in a certain scholium of the Sepulchretum (*t*), it is remark'd as "probable, that some wonderful wounds of the head, with an evident injury of the brain, some small parts of which have even been taken away without destroying life, were not mortal, because they were found to have affected the surface only, the medullary substance being unhurt; for where this substance is touch'd, death must be the consequence."

For if those observations had been read, it would have been known, from many of them, not only whether the injury had reach'd to the medullary substance, but also whether a portion of the cortical substance only was taken away, as in that wound of the cerebellum in Platner. But you may, besides those, read some others that are really wonderful in Martianus (*u*), from whom nobody, that I remember, has yet quoted them; and others, in like manner, in Wepfer (*x*) and Saltzmann (*y*); to omit others at present: the latter of which authors, however, like Bohn, after having recounted many cures of large wounds of the cerebrum, has expressly excepted wounds of the cerebellum (*z*), "as what experience proves to be always and absolutely fatal;" and Wepfer finishes his in such a manner, that after having mention'd a leaden bullet's having pass'd through the cerebrum in one person, and in another through the cerebellum and cerebrum, he declares the first to have died "soon after," but the latter "instantly."

How much more speedily and more certainly, then, wounds of the cerebellum are generally mortal, than those of the cerebrum, has been sufficiently confirm'd by us. Now let us go on to our observations of the cranium being fissur'd or fractur'd.

28. A virgin, of seventeen years of age, of a pallid colour, happen'd to be talking with a lover of hers, with whom her father had forbiddeh her to talk, when on a sudden her father surpriz'd them together. As he was a fierce and savage kind of man, and not quite sober, he snatch'd up a thick club, wherewith he struck the arm, but particularly the head, of his daughter, with such violence that the club was broken.

In this wounded condition the poor girl was carried, four hours after, into the hospital of St. Mary de Morte, at Bologna. She made no answer to any question that was ask'd her; and her pulse was so low, that they did not dare to take away blood. In the arm was one slight wound; but in the head were many and considerable wounds; and, amongst these, one in particular that was extremely large, and seem'd to give her the most pain, lay behind the left ear, from which a perfect sanies afterwards flow'd out: and with this the wounds were a little moist.

Within about four days the patient began to make answers to the questions which were ask'd her, but very little, for the most part; as, for instance,

(*r*) L. 9. Epist. 2. quæ esse deberet 3.

(*s*) De Us. Part. 1. 8. c. 10.

(*t*) Ad § 8. Obs. 5. hujus Sect.

(*u*) Annot. ad Hippocr. Epid. 1. 7. S. 1.

vers. 377 prope fin.

(*x*) Exerc. de loco aff. in Apopl.

(*y*) Dissert. de mira Cran. Fract. § 10. & seqq.

(*z*) § 12.

either to affirm or deny. In the mean while, the pulse became vehement and frequent; and the fever was observ'd to increase every day in the evening. Then the menstrual purgation came on in its proper time, nor ceas'd to flow till the time of her death; which follow'd a few days after, in a gradual and placid manner, after the fever had come on once only, and that three days before death, with a short and slight coldness.

The body of this virgin was very useful to me in the year 1704, together with other bodies, when I was very busy in examining the genital parts both of virgins and women; in order to investigate those things that I have spoken of in the first *Adversaria* in regard to the hymen, the valves of the cervix uteri, the sources of the menstrual blood, and other circumstances of that kind. Though the menstrual blood did not cease to flow quite to the time of death, as I have said; yet, as it flow'd much more slowly in the latter part of her life, it had coagulated into the form of a thick cylinder, within the vagina and the cervix uteri; just as the blood which is receiv'd into a glass-vessel from a vein is wont to do; and seem'd to have dilated the os-culum uteri and cervix: unless you chuse to attribute this to the natural laxity of the parts at such a time. Nor was the whitish part entirely wanting in that sanguineous concretion.

But it is more worth while to remark, in a few words, what I observ'd particular in the fundus uteri and the testes. The anterior surface of this fundus was unequal with three or four little furrows, drawn in a longitudinal direction. And the membrane which invests the testes show'd some small cicatrices, as it were; amongst which, in one of the testes, appear'd something similar to a little ulcer, being unequal in its surface, and of a yellow colour inclining to blackness. Through a foramen which was manifest therein, a thin probe was pass'd down by me into a cell that was not very small, but empty. And the vesicles, which in these testes were not wanting, but were full of serum, being cut into after boiling, show'd not the least of a coagulated humour; and only contain'd, within a thickish coat, a sinus that was perfectly empty. All these things, however, were seen last in order.

But as to the head, which had been already dissected, all the wounds appear'd of a cineritious and ill-looking colour; and while the integuments were taken off from it, many disagreeable colours appear'd; and among these a black colour. The cranium, when laid bare, show'd the lambdoidal future to be somewhat open'd; and at that place behind the ear, in which I have said that the wound was the most considerable, a large part of the bone was broken; and so disjoin'd from the other parts, that it easily follow'd the hand which drew it away.

The skull being cut through round about, and examin'd both internally and externally, show'd two fissures, that penetrated through both tables; the longest of which fissures began from that place where the large fracture was. And the inferior part of the left hemisphere of the cerebrum, which answer'd to this place, was corrupted to as great an extent as a small apple would have occupied. The other parts we found to be sound, if you except the dura mater only, which had a kind of slight ecchymosis where it lay under that longest fissure.

29. Besides this, and perhaps others, I also made, in the same hospital,
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that dissection belonging to this class, which is already sufficiently describ'd in the *Epistolæ Anatomicae* (a). From which, besides other things that I have hinted at, in this and the former letter, you will see this circumstance confirm'd in particular; that blood is sometimes effus'd, not where the scull has receiv'd a blow, and been fissur'd, but within the part opposite thereto.

Now let us go on to some dissections perform'd at Padua, beginning with that in which, like the former, we saw the scull to be fissur'd by the blow of a stick.

30. A certain man, who was a native of Genoa, blind of one eye, and liv'd by begging, being drunk, and quarrelling with other drunken beggars, receiv'd two blows by their sticks; one on his hand, which was slight, and another violent one at the left temple; so that blood came out of the left ear. Yet soon after, the quarrel being made up, he sat down at the fire with them in the same place; and again fill'd himself with a great quantity of wine, by way of pledge of friendship being renew'd: and not long after, on the very same night, he died.

The body was warm even on the day following, although it was in the latter end of January, in the year 1746, when it was brought into the college before night. And as I was teaching anatomy at that time, it was dissected on the following days; for it was a proper body for the purposes of demonstration; although there was an ulcer at the lower part of the left tibia, and the scrotum was tumid, as if from an ecchymosis; being, at the same time, of a red and violet colour, and the belly in particular distended.

For when the abdomen was open'd, it was found that the tumour was from the stomach, which had been so distended with wine and air, that I never remember to have seen it more so; whereas the intestines, and especially the small ones, were almost empty; so that some persons hop'd in vain, as in a man who died soon after having drunk so much wine, that they should see some chyliferous vessels in the intestine and mesentery; although in the beginning, while the stomach, which was even then full, was rais'd up with the hand towards the left side, we most of us were impos'd upon by the appearance of a chyliferous vessel, that ran parallel to the gastro-epiploic vessels, on the external surface of the stomach; yet it was immediately perceiv'd, that this was either a nerve, or something else of that kind, as it had no appearance of valves, and when dissected and compress'd, gave out not the least moisture.

The abdomen, the mesentery, and the omentum, which we found to be drawn upwards, were fill'd with a yellow fat. The spleen was one of the largest I have seen, in every dimension; but especially in its breadth and length: and in its longitudinal direction it was wrapp'd up into itself on its flat surface. Internally it was of a dilute and pale red; but no where hard. Nor was the liver hard: large indeed it was, but within natural bounds: and the gall-bladder was full of yellow bile. The urinary bladder also was full of urine; so as to be prominent above the ossa pubis by three inches.

The urethra was without our canaliculi, at least as far as appear'd to the eyes; though perhaps from a foregoing disease. For the glans could not be

disengag'd from the prepuce, in the whole of it, without dissection. Nor was the part which could be disengag'd, that wherein the extremity of the urethra opens. Within the scrotum was no disorder. Nor within the thorax: nor any thing worthy of remark therein; except that, in the cavities of the heart, and great vessels, the blood was free from all polypous concretion, as it also was in all the remaining vessels of this body.

But the head offer'd many things worthy of remark. The muscles of the face, the membranes which lay betwixt them, and the parotid glands, were ting'd with a kind of bright red colour degenerating into brown. These glands were large; and perhaps from the same cause, that is, from the blood having stagnated there: for the thyroid gland also, and particularly the internal maxillary, were enlarg'd: could this have happen'd because in gluttons of this kind, they grow large in consequence of being more frequently and more violently agitated? The left temporal muscle, I mean that which had receiv'd the blow, was black in the whole of it, except in that part which is nearest to the forehead, from the stagnating blood that was effus'd betwixt the fibres of the muscle in such a degree, as to be discharg'd to the quantity of some spoonfuls during the dissection.

The cranium being saw'd open; in which, instead of the frontal pituitary sinusses, the substance of the bone was found to be spongy; betwixt that and the dura mater, where it lay beneath the part which had receiv'd the blow, we found blood half-coagulated, to the quantity of two or three ounces; extending from the posterior part forwards, to the space of four or five inches, and from the basis of the cranium upwards, almost as much. From the compression of this blood, the dura mater, and the brain, had very evidently subsided for as great a space as I have said was occupied thereby.

Moreover, the sanguiferous vessels in that membrane, and still more those in the pia mater, were so distended, that even the smallest ramifications were every where beautifully red, yet most on the right side; perhaps because the man, when dying, had lain on that side in consequence of its being less affected with pain. Or perhaps, as to what relates to the dura mater, because the vessels of this membrane could not be equally full on the left side, as they were on the right, by reason of so much blood having been effus'd: although, even at the basis of the right hemisphere of the cerebrum, betwixt that and the pia mater, we observ'd blood to be extravasated to some extent; but in so small a quantity, that it seem'd rather to be a livid appearance, as if from contusion, than a real extravasation.

That there was a like plenitude of the vessels, in proportion, in the medullary substance of the cerebrum, and not only there, but in the substance of the cerebellum also, we perceiv'd by the pretty large bloody points, that were seen here and there throughout each of these substances; and throughout the parietes of the lateral ventricles we saw the vessels themselves to be distended: although the choroid plexusses were pale, in consequence of a little and somewhat turbid water which was contain'd in those ventricles.

Having seen these things in the manner describ'd, we turn'd our eyes to the cranium, which was cut out; and, in the left temple-bone, we observ'd almost a capillary fissure, but such a one as penetrated from the external to the internal parts. This fissure began at the breadth of a little finger, above

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that place where the scull had been cut into, as it usually is. It was continu'd to the basis of the cranium, and extended itself quite to the common superior terminations of the internal meatus auditorius and tympanum; for which reason the membrane that disjoin'd the one from the other, was broken through: the latter cavity being full of blood, and the former of a bloody appearance.

Having thus found out the causes which had ruptur'd the internal and external vessels, and consequently the causes of blood being effus'd within the cranium, and discharg'd from the ear; it remain'd in a man who, as I have said, was blind of one eye, to examine this eye. It was the right eye. The tunica adnata of which was distinguish'd with a great number of vessels, going to the circumference of the cornea, and particularly in one part.

The cornea was not only opaque, but also much less than it ought to be, and not of its usual figure. The eye being then taken out of the orbit, the globe itself appear'd to be considerably less than is natural: and indeed did not strictly resemble a sphere, but rather one of those bodies, which, amongst us, we call *bottoni* or *buttons*; I mean, those that we make use of to keep our clothes together; being depress'd on one surface, and on the other, protuberating in the manner of a low cone. Yet, as of these surfaces the former was here anterior, and the latter posterior, the diameter of the anterior surface was much longer than the axis, or a right line drawn from the middle of this surface to the middle of the posterior surface.

And having divided this eye, which was hard, into two parts in the direction of that line, and nothing having been discharg'd but a humour, which, if it had not been of a blackish colour, you would have call'd aqueous, I in vain sought for the remains of the chrystalline or vitreous humour; for not the least trace of them remain'd. But under the contracted tunica sclerotica was the choroides, betwixt the brown colour of which, a bloody one, as there generally is, pretty evidently appear'd here and there; and the uvea also was annex'd to the choroides, but not found an entire like the choroides; so that we could not distinguish the iris and the corpus ciliare.

Under the choroides universally, instead of the retina was a thin bony lamella, which; proceeding from the insertion of the optic nerve, being every where entire, preserving that figure of the eye which I have describ'd, and comprehending the aqueous humour whereof I spoke; extended itself quite to the circumference of the cornea, where it adher'd to the uvea more closely than in any other part, as I again observ'd, even after having macerated the dissected eye six days in water. The pieces of this lamella, which was really bony, I still preserve carefully by me; some of which, being pretty large, may, by their figure, and the adhering portions of the uvea and choroides, gain credit to a circumstance so extremely rare; if not hitherto unseen by any one; with those who were not present at that time.

Those who were then present, however, both doctors in medicine, and students, having sufficiently examin'd these things, and it having appear'd, even from inspection, that the blindness had been of long standing; whatever the cause of it might be, which could neither have been enquir'd from the man himself, nor yet from others, as they were ignorant of the life of a beggar, who had been born in another country, and had spent the greater

part of his life there; it did not seem proper to omit enquiring into the state of the optic nerve of that eye, and comparing it with the other which went to the left, that is the sound eye.

The difference then, betwixt one and the other nerve, was immediately evident to all, even without dissection. For the left was in the state that the most sound optic nerve generally is. But the other was more depress'd, thin, and of a faint flesh-colour; and in this state it appear'd from that place where it had been join'd with the other, within the cranium, quite to its insertion into the eye. And indeed in the whole of this tract, in which it was invested with the dura mater, when it was cut transversely, it seem'd to be the section of some artery or other, rather than of a nerve; in consequence of the dura mater being contracted into itself, and become thicken'd: and of the tubulus form'd thereby, having its cavity fill'd with a mucous substance, of the very same colour that I just now describ'd.

But what appearance it had in the point of conjunction, we could not enquire; as that part had been accidentally injur'd before, in the dissection of the cerebrum. From that place, however, inwards, to the extent of two inches, not the least difference could be observ'd, by any one, betwixt the right and left nerve; for neither of them, like the right below, was softer than usual, of a mucous nature in its substance, reddish in its colour, or extenuated; but both of them show'd an equal firmness, thickness, and whiteness.

31. Although this history was pretty long, yet it will be sufficient to tack a short annotation thereto. I would have you, therefore, compare what I have said of the optic nerve of this blind eye, with those remarks that you have in the thirteenth letter (*b*): and you will perceive that all my observations of these things agree very well with each other; but that this last, as far as it relates to the eye itself, contains something more remarkable and rare, than the others; I mean, the change of the tunica retina, in every part of it, from a very soft and nervous substance, into a hard and bony plate.

For how rare an appearance this is, you may imagine from hence, that the very learned anatomist Haller (*c*) having since lit on a circumstance similar to this of ours, says, "I have read of some little stony particles being found in the chrySTALLINE humour; but whether a disorder of this kind in the retina has ever been seen, I do not know." The changes in the other parts of the eye itself, into a bony or a stony nature, are also rare; though not so rare as the former. For do not too readily believe that so many have been seen as are recounted in a certain collection; unless you first find them in books, which are, in my opinion, too hastily pointed out therein.

To me, at least, it happen'd, contrary to my expectation, when I examin'd four or five of those which are in my hands, that I found nothing, or at least nothing to the purpose, in the places which are pointed out; except one, which however was improperly referr'd to: and this you will observe moreover to belong to the tunica sclerotica, which was not "found bony" indeed, as is there said, but was found to have a bony scale inherent in it; as you will see if you inspect Blasius, not in book the sixth, chapter

(*b*) n. 7. & seqq.

(*c*) Opusc. Pathol. Obs. 53.

the eighth; but in part the sixth, medical observation the eighth; whereas, in the eighth table, figure the thirteenth, Gunzius (*d*) has said what kind of bony lamella he had afterwards seen “betwixt the laminæ of the choroides.”

But the celebrated Morand (*e*) had produc'd an example long before; so that it ought not to have been omitted in that collection, especially as it was rare, and, as he himself says, “perhaps the only example” of an ossification within the globe of the eye. For, besides the chrystalline humour, which was of the consistence of a very hard stone, he found a pretty thick little bone betwixt the choroides and the tunica retina, convex posteriorly, and anteriorly concave. Finally, not to add any thing more of indurations of this kind in the parts of the eye; you will remember what kind of a small bone we found, in the place of the chrystalline humour, in a woman of whom I have written to you before (*f*).

The other circumstances in the history last propos'd, which relate to the blow on the head, you see it is needless to explain again in this place; after what we have so often hinted in this and the former letter. But as to the discharge of blood from the ear, by what way, and in what manner, it happen'd in this man; you will, of yourself, sufficiently remember, even without my giving any hint, that the same thing had happen'd in others likewise: that is to say, in those whom this letter (*g*), and the thirteenth, in like manner (*h*), make mention of.

32. A porter, who was not yet forty years of age, and of an excellent habit of body, being drunk, fell down as he was walking, and hurt his forehead very much; from whence a considerable lividness appear'd in that part. He also vomited at the time of falling, but no symptom appear'd afterwards, beside one, which was a very considerable symptom; I mean, that he lay torpid, without taking any thing, and without speaking, except that when the surgeons gave him pain by their applications, he then complain'd vehemently, and sent forth a great cry. In this state, being brought into the hospital, he died within the fourth day after the fall, at the time when I was giving anatomical demonstrations to the students there; that is, about the beginning of December in the year 1741.

The os frontis, in the part where it had receiv'd the violence, I saw to be cleft asunder with a very long fissure, both externally and internally; under which fissure was grumous blood within the cranium, but not a great quantity; nor did I find any other appearance, besides this, which related to the blow. For as to the little bone which I found not very far from the fissure, betwixt the dura and pia mater of this man; that this had been form'd there long before that time, you will understand from the description thereof, which I have inserted in the twenty-fifth letter to you (*i*); and that it could by no means be consider'd as a scale, which, having been shaken from the internal surface of the bone, by the violence of the blow, had in-

(*d*) Progr. de Ozæna Maxill. prope fin.

(*e*) Mem. de l'Acad. R. des Sc. A. 1730.

(*f*) Epist. 13. n. 10.

(*g*) n. 25.

(*h*) n. 16.

(*i*) n. 8. initio.

sinuated itself within the meninges, as it had happen'd in that mason, whose dissection you have in the celebrated Fantonus (*k*).

33. In the same hospital of Padua, I demonstrated to my very numerous auditors, among whom was remarkable for his ingenuity, his study, and his diligence, that eminent man Jacobus de Scopulo; he, who a few years after was transferr'd into the number of the public professors, and who is a very prudent, experienc'd, and eloquent physician, if any other is; I say, I there demonstrated what parts had been fractur'd, by falling from on high, in a certain man, about the beginning of April in the year 1740, and in a young man, in like manner, before the end of November, in the year 1742. And although these histories relate to the thorax also, yet because the head had been very much hurt, I shall subjoin them here.

34. A man who was employ'd in pruning a high vine, fell headlong upon the ground, which was spread over with stones. He immediately lost the power of speech. Some cordial liquor having been pour'd into his mouth, as he lay half-dead, he vomited: and although his pulse, which had been contracted, discover'd itself again; yet all the other circumstances growing worse, and the excrements both of the intestines and bladder being spontaneously discharg'd, death follow'd within four hours after the fall.

The body, from the mouth and nostrils of which blood was discharg'd, was quite rigid; even at the thirtieth hour after death: and not flexible without the greatest violence. The sinciput was black from contusion, in more than one place; but most of all in that part where the common boundaries of this region and the forehead are. And indeed we presently found the os frontis to be fissur'd, almost through the middle of it; the fissure reaching from the external to the internal surface, and descending, in a direct line, from the sinciput: after which going through the arch of the orbit of the right eye, not far from the os ethmoides, and having pervaded the whole os frontis in that manner, it at length pass'd over into that part of the os sphenoides, through which the optic nerve goes into the orbit: and as you perceive, from this progress of the fissure, that it could not but go through the pituitary sinus; you likewise perceive how the blood could be discharg'd from the nostrils, as has been said, and from the mouth also, by communication thereof with the fauces.

Under the dura mater anteriorly, we found a fluid blood, though not in great quantity; and we also found a small quantity of the same kind of blood, and indeed, to appearance, mix'd with water in some measure, in both the lateral ventricles: and as this was fluid, it was less to be wonder'd at, that it was found in the third, and even in the passage to the fourth ventricle; as it might easily flow thither, especially while the body was mov'd.

The thorax being laid open, and the lungs; which (if you except the upper part of the left lobe, that was connected, by a very thin membranous little band, with the pleura) were every where free and unconnected; being soft, and found to be collaps'd into themselves, and altogether sound; al-

(*k*) De Observ. Med. & Anat. Epist. 1.

though where they were turn'd towards the back, they were of a red colour, as if from inflammation, as it was to be expected in a man who had died in a supine posture; when they were lifted up with the hands, we saw that as much fluid blood was effus'd into both cavities of the thorax, though in somewhat larger quantity into the right than the left, as exceeded six pints.

In the pericardium was limpid serum in very small quantity. We found the trunks of the pulmonary artery and the aorta, and even the heart itself, to be almost universally cover'd with fat; although the man himself was not fat: in the ventricles of the heart was but little of a black, and in some measure grumous, blood; except that at the venous orifice of the right ventricle there was a small polypous concretion. And from hence even the students could perceive, that what I had so often admonish'd against the vulgar error in regard to the origin of these concretions, was true; as it was certain that in a man who had been in very good health, a hydrocele excepted, this coalition could not have been form'd by the stagnation of the thicker and more viscid particles of the blood among the fibrillæ of the valvulæ tricuspidæ, till after death, or a little before.

These viscera being then taken away, and the blood I have spoken of being exhausted, we endeavour'd to find out from what vessels it was that this fluid had been effus'd into the thorax, and perceiv'd that it was from the intercostals; some of the upper ribs, on both sides, being broken not far from the spine, in such a manner, that their unequal extremities had pierc'd through the pleura, and were somewhat prominent within the thorax. And there was at and about those parts a large blackness, as if from contusion, by reason of the blood stagnating under the pleura.

When the carcase was turn'd upon its belly, and the muscles of the back remov'd, I not only found blood, which had stagnated under these muscles equally, and even in somewhat larger quantity, about the same ribs, but I also shew'd a circumstance which, in one who by falling down had broken the os frontis, was not very easily to be understood; that is to say, besides the ribs, six of the upper vertebræ were so broken, that considerable pieces of them were wholly divided from their bodies. But what I conjecture upon this affair you will see below (*l*). Now, then, you see, from the very great injury done to the vertebræ, and consequently from the injury of the included spinal marrow, why the excrements could not be retain'd.

In the belly was no extravasated fluid; nor did we find any thing of a preternatural appearance, if you except some little part of the liver being blackish, and a double hydrocele in the scrotum also: but as I have already sent you (*m*) a description of this hydrocele, there is no occasion to repeat it here. And this is the history of the man.

35. As to the young man; he was about four-and-twenty years of age, of a fat habit of body, and by trade a wool-comber. This young man, like the former, having fall'n from a high place, died within four hours from the fall. Yet this patient could speak a little to those who first ran to him on his falling, and ask'd him questions: after that he immediately ceas'd to speak.

(*l*) N. 36.

(*m*) Epist. 43. n. 25.

The limbs of the carcase were rigid at the end of two days after death ; but after the third they became flexile. The sinciput, on the left side, together with a part of the temporal muscle, had a livid appearance, as if from contusion. While the cranium was cut open, a considerable quantity of blood flow'd out. And yet we soon after saw, that as much of the same fluid remain'd betwixt the cranium and the dura mater, as might be equal to the weight of three or four ounces. This blood was black, and form'd into coagula ; but in no other place than in the left side, below the os sincipitis, and at the basis of the cranium. Therefore, although a considerable quantity of serum was found in the lateral ventricles, I saw some of it to be turbid indeed, but not at all bloody. Nor were the plexus choroides very red : yet the vessels in the meninges were very turgid. Having observ'd these things ; nor was there any thing else preternatural within the cranium ; upon inspecting the cranium itself, and tracing on the fissure, which I had seen beginning in the left os sincipitis, I perceiv'd it to go through the subjected os temporum quite to the petrous process : and from thence we perceiv'd the same, or if another, join'd with the former, to be carried through that part of the os sphenoides which lies betwixt the os temporum and os frontis ; being produc'd from hence, where the percussion had been given, into that last region of the os frontis which makes the extreme part of the arch of the orbit of the eye. And this very long fissure was carried through the whole thickness of the bones ; so that, if with one hand you laid hold of the anterior part, and with the other the posterior part, of those bones that I have mention'd, and drew them asunder, you would evidently perceive that they gave way, and were moveable.

The bony parietes of the thorax also were not free from fractures. For, besides that the left clavicle was broken, we observ'd a lividness in the back, which lay near to the spine, on the left side in like manner, taking up in some places a more narrow, and in other places a more extensive, tract : and upon opening the chest, and exhausting the blood, which was found to be extravasated to the quantity of two or three ounces in the cavity of the same left side, we saw a large ecchymosis under the pleura ; and in this tumour one, at least, of the ribs which are about the middle of the length of the thorax, so evidently broken, in the part where they begin to be curv'd posteriorly, that the adhering intercostal vessels, together with the pleura, could not but be lacerated, and pour out their blood, both internally and externally. However, the lungs, which we seldom see in wool-combers, were entirely free from the pleura ; except that the upper and anterior part of the right lobe, only, was connected therewith by a small membrane. In the pericardium was no great quantity of serum : in the heart no polypous concretions were observ'd.

The abdomen being open'd, nothing was found to be in a diseas'd state but the ureters, which were not only preternaturally widen'd in other parts, but even at their very entrance into the bladder ; so that it was less surprising that the bladder, which we had taken care to fill with air, should show an almost equal distention in the upper and in the lower part.

36. For frequently, as has been already shown (*n*), a distended state of the

(*n*) Epist. 42. n. 23.

ureters is the consequence of a great quantity of urine being long confin'd in the bladder; from whence it easily happens that this receptacle is relax'd, and that the figure of it is alter'd in consequence of this relaxation.

But to return to the bones which were fractur'd in this young man: as all the fractures appear'd to be on the left side, it is very easily conceiv'd, in respect to this patient, though with difficulty in the man (*o*), how the bones of the head and thorax were broken at the same time; as the body of this young man fell on its left side; whereas we must suppose that the man had met with some hard body in falling, whereby his head being fractur'd in the anterior part, and the direction of his body being chang'd, he might at length dash his back against the ground.

However, among other fissures of the cranium, this last, in particular, was found to be of such a length, and in such a situation, that you may compare it with those which are describ'd by Ruyfch (*p*), by Poupart (*q*), by Mauchartus (*r*), by Schreiberus (*s*), and by others; so that it always appears, more and more, that the sutures and commissures of the skull were not made particularly for the purpose of restraining the progress of fissures, and preventing them from being produc'd into more than one bone.

And this I remember was first observ'd by me at Bologna, in the year 1702, in a body publicly dissected; the cranium of which had, in consequence of a blow upon one side, a fissure parallel to the coronal suture, but much larger than that; as it ran behind it through almost the whole cranium, except the basis, and pervaded both the tables. And this observation, if I had then written down the other circumstances, I certainly should not have omitted among those above.

37. Before we cease to speak of blows of the skull, I must not omit to say, that, when both of its tables are altogether unhurt, and the vessels of the meninges below are unhurt also, it sometimes happens, that the small vessels which go to the medulla, betwixt those tables, are broken, and pour out their blood; which, in process of time, being corrupted, and become more acrid; for this reason, that the "medullary juice," as is observ'd by the celebrated Nicolaus Rosen (*t*), is mix'd with it, and at that time, "by its stagnation and heat, degenerates into the worst kind of rancidity;" affects the internal table with a caries: and while the man has now forgotten the blow, and fears nothing of this kind, flows internally, vitiates the meninges, and brings on death.

More than one example of this kind is known to me and to others, and was known to the authors quoted by Bohn (*u*); as, for instance, to Jo. Peter Passerius, and to him, in particular, from whose commentaries on Hippocrates *De Capitis Vulneribus* I wonder that no dissection of the head is transferr'd into this part of the Sepulchretum; I mean Peter Paaw. And it even sometimes happens that both the tables are destroy'd from that cause; as was,

(*o*) N. 34.

(*p*) Obs. Anat. Chir. 47.

(*q*) Hist. de l'Acad. R. des Sc. A. 1700. Obs. Anat. 19.

(*r*) Eph. N. C. Cent. 5. Obs. 32. & Cent. 9. Obs. 39. in Sutore.

(*s*) Nov. Comm. Imp. Acad. Sc. Petropol. Tom. 3. in Phys. Obs. 3.

(*t*) Dissert. de Ossib. Calvar. P. 1. § 1. not. f.

(*u*) Dissert. de Trepanat. Difficult. prope finem.

in particular, seen by the chevalier whom I have already spoken of, Pius Nicolaus Garellius, one of the physicians to the Imperial court. The case is, at least, worthy of your attention, when couch'd in a few words; for which reason, I will in some measure contract it, from the account he sent to me by letter, and give it you here.

38. A woman, falling backwards upon stone stairs, receiv'd a violent blow upon the hinder part of her head; but, besides a short and slight stupor, which did not prevent her from returning home soon after by herself, and a small blackness in the contus'd part, which soon disappear'd, she seem'd to suffer no inconvenience from her fall at that time. At length, after some months, a tumour, not bigger than a filbert, appear'd in the part of her head which had receiv'd the blow: but this tumour, as it gave her no pain, was neglected by the woman, and grew larger by degrees, till, at the expiration of the third year, or thereabout, it became very large: at which time it was mistaken, by certain surgeons, for an encysted subcutaneous tumour, as it had neither chang'd the colour of the skin, nor gave any pain when it was press'd; and would have been cut out by them as such, if the woman had not refus'd to suffer the operation.

A little after, the patient began to have excruciating pains, which, beginning from the seat of the tumour, were so extended through almost the whole cranium, that to herself it seem'd to be bound hard with cords. These pains, indeed, were not continual, nor always equally violent; yet sometimes to such a degree as to bring on a slight delirium: and the longer they continu'd, the more frequent and violent they became. In this manner she went on to the sixth year. And no sooner was this year elaps'd, but behold! an apoplexy suddenly came on, and within a few hours kill'd the woman: this happen'd at Vienna in the year 1735.

The tumour being open'd, the cavity of it was found almost full of black blood; and not only concreted, but so dense, that being laid hold of with the fingers, the whole of it immediately follow'd; some portion of fluid blood being discharg'd at last. This disease, when the integuments were taken off, was found to begin from the part which had been formerly struck; that is, from the upper part of the os occipitis at the left side, and to be continu'd through the os sincipitis of the same side, so far as to be no more than three inches distant from the coronal suture.

It occupied, moreover, a part of the right sinciput; so that the whole of the caries extended itself six inches in breadth, and more than seven in length. Where the bones were not entirely pierc'd through, the substance of the bone appear'd reticular; and from the external surface of this reticular substance bony lamellæ were rais'd up here and there, most of them being thin like paper, but all of them very hard and acute: and hereby was form'd a beautiful appearance, as they resembl'd a kind of foliated fungusses, of different sizes, which had arisen by a kind of bony vegetation.

The dura mater was become very thick in the whole of that space where it lay beneath the diseas'd cranium, and adher'd much more closely than usual to the part of it which had formerly receiv'd the blow. The vessels that crept through this membrane preserv'd their natural bounds on the right side, but on the left were very turgid, and much dilated; and the traces of them

were

were seen to be much larger and deeper (in the sound part of the skull which remain'd) on the same side, than on the right side. As to what remains, the vessels of the plexus choroides were also much distended with blood: and some portion of serum was found to be effus'd under the basis of the cerebrum.

39. However, Garellius was of opinion, that the small arteries, not only betwixt the tables of the cranium, but also betwixt other bones, are, by the injury and compression occasion'd from blows, dilated and distended into aneurisms: and that these aneurisms produce a caries even before they are ruptur'd, as other aneurisms which lie near to bones do; or that they produce this caries sometimes after they are ruptur'd. And he had been brought into this opinion by observing three thigh-bones, which he preserv'd together with the cranium describ'd. One of which thigh-bones shew'd a tumour that it had been dilated into, of the bigness of a man's fist, corroded and perforated with a caries in several places, and sending forth three bony productions, the largest of which was equal to a finger in length and thickness; and it shew'd, at the same time, the foramen through which the artery enter'd the bone, and which is very narrow in other bones, to be so much enlarg'd in that as very easily to admit the little finger.

The two other bones, besides the fracture which had formerly preceded, and was consolidated, had a tumour affected with a caries, and the foramen, which was hollow'd out in the bone for the artery, in like manner dilated. He, therefore, thought that this species of disease was not yet illustrated and explain'd as much as it deserv'd.

Thus far from his letters to me. But you may compare, in some measure, the tumour which he saw in that woman; on account of its situation, its very long-continu'd and violent pains, by reason of the included blood, and the part of the cranium beneath being rough with sharp bony prominences; with that which is made mention of from the English Philosophical Transactions, in that dissertation (x) which I have already commended, and which was publish'd under the auspices of the celebrated Kulmus in the year 1732.

In regard, however, to the external cause, and the slow beginning of the tumour after the blow; and in regard to no pain being felt for a long time, but afterwards a very severe one, though not continual; and in regard to the caries of the cranium, and the considerable hiatus; you may, in great part, compare it with that which we find taken notice of, in another woman, by Jo. Saltzmann (y).

40. As those wounds which are inflicted on the face belong also to the head, when taken in a general sense; I thought it would be proper to add something in this place upon wounds of the eyes, nose, lips, and orbits. And of those which are not so much wounds of the eyes, as of the orbits and of the cerebrum, we have treated in the preceeding letter.

To which you may also add those that, after passing through the whole cavity of the orbit, have sometimes in men gone through the foramina and ultimate parietes of this cavity to the brain, and always in those sheep which

(x) De Exost. Stat. Clavic. c. 2. § 22.

(y) Act. N. C. Tom. 2. Obs. 100.

Wepfer (*z*) saw, at Rome, to be universally depriv'd of all sense and motion as soon as ever the butcher had plung'd his knife, quite up to the handle, into one of their eyes: which Wepfer "suppos'd, without doubt, to have "happen'd in consequence of the carotid arteries being cut through near to "the infundibulum, all the ventricles remaining sound:" although, if he had dissected the heads of the creatures slain in this manner, as it was natural to do, he would, perhaps, have found one of the ventricles wounded in some of them.

And as to wounds of the eye itself by which the humours are discharg'd, if the aqueous only be effus'd indeed, and no part is prick'd or incis'd but the cornea tunica; Aristotle (*a*), Celsus (*b*), and Pliny (*c*), had declar'd that there was reason to hope for a happy cure, from the examples of swallows, of pigeons, of doves, of green lizards, and of weazels likewise, before the followers of Galen confirm'd it in men, and in other animals also, after the observation of Galen (*d*) on a boy.

But when the vitreous humour, and still more when the chrystalline, is effus'd, can the eye see properly as before? This is what those believe with difficulty who, extracting these humours through the cornea, have observ'd that the iris and corpus ciliare are injur'd; though the entire state of both these parts is necessary to make vision perfect; not to say any thing of the retina, without which we cannot see at all, and which, when the vitreous humour is taken away, collapses into itself, or at least is corrugated.

Yet suppose that the aqueous humour, being again collected in its proper situation, is also collected in some of the remaining cells of the vitreous humour, and that thereby these cells, and any thing that was compress'd within them, are distended, and the retina consequently unfolded to its full extent; will the chrystalline humour, which had fall'n out by a wound improperly made, together with the vitreous, be generated afresh? this humour, the want of which is never supplied after being depress'd by a skilful surgeon, and which is so extremely necessary to vision, as they who have had it depress'd very well know?

And, indeed, it appears from that scholium of Elsenerus (*e*), that those who made no doubt of the vitreous humour being restor'd, unanimously despair'd of the restitution of the chrystalline: yet in this scholium he takes notice of one who was suppos'd to have restor'd all the humours of the eye, after being press'd out, and vision itself to its perfect and natural state; and produces a certain testimony of Thomas Bartholin, of the same experiment of Burrhus; which he would not have produc'd if he could then have read what the same author Bartholin (*f*) said a few years afterwards; not in private letters, or in a brief manner, but in a public writing and at large; of the success of one experiment of this kind, and no more, which he had seen; and that a doubtful and imperfect success.

Nor, indeed, has the surgeon Scriverius (*g*); he who, in writing to Bartholin of the humours of the eye being press'd out by Burrhus, and by him-

(*z*) Exerc. de loc. aff. in Apopl.
 (*a*) Hist. Animal. l. 6. c. 5.
 (*b*) De Medic. l. 6. c. 6. n. 39.
 (*c*) Nat. Hist. l. 29. c. ult.

(*d*) De Sympt. Caus. l. 1. c. 2.
 (*e*) Ad Obs. 12. Dec. 1. A. 1. Eph. N. C.
 (*f*) Act. Med. Hafn. A. 1672. Obs. 132.
 (*g*) Ibid Obs. 133.

self also, in a goose, and restor'd, denied "that it was doubtful to him whether the same thing happen'd in all other flying creatures;" affirm'd that sight was perfectly restor'd, but "in part, and not with equal success," either in the goose, or in the cock and the hen on which he made the experiment.

Yet, in the last-mention'd creature, he says that the chrystalline humour had been regenerated within eight weeks; but that it had not then come to its proper size: and notwithstanding he adds, "If the creature had been still preserv'd for some weeks longer, there is no doubt but it might have been perfectly restor'd," yet he leaves the readers in doubt; as he did not afterwards repeat the experiment, which was of so easy a kind, in order to continue it for a longer time.

And even Zambecarius (*b*), having formerly affirm'd, that as the regeneration of the aqueous humour is (which he confesses) the mere work of nature, so "the regeneration and restitution of the vitreous and chrystalline humour" is the work of the same nature also; "but what happen'd from a regeneration of this kind he would tell us at another time;" never publish'd any thing afterwards upon this subject, that I know of, although he liv'd for a very long time.

And I even know that he answer'd the enquiries of Sancassanus, who wrote to him on that subject in the year 1724, by saying that, since the time he had written these things, he had not found opportunity to make the experiment: yet he believ'd that these two humours may be generated afresh, but more slowly than the aqueous: and he believ'd this, not only because it was certain from Benevoli, that where the chrystalline humour had been depress'd with a needle, on account of its opacity, in them the vitreous humour came forwards to supply its place; but also because these two humours are nourish'd, and nutrition is generation; wherefore, as they were nourish'd, so they may again be generated. And this I have quoted, that you may perceive what might have been expected from him.

Finally, Theodorus Kerckringius (*i*) having expressly affirm'd, that he "would make an incision into the eye of any animal whatever that should be offer'd to him, press out all the humours, and even give them to the spectators to be taken away, and in a little time restore the sight entirely: and that this he had done sometimes so far, for the sake of experiment, that in one and the same dog he cut into one and the same eye three times, and three times made a cure of it:" I ask of you, if, when *all* the humours were really press'd out, the sight was really *entirely* restor'd; I ask, I say, of you, what you suppose the reason to be, why, although other transactions of that industrious anatomist are still taken notice of, this one very great thing alone has been so buried in silence for a long time past, that the memory of it has been in a measure lost, and no mention made of it now, even by the most learned men, in recounting the experiments of others that relate to this subject?

41. But to wounds of the nose belong some of those surprizing cases which are suppos'd to have related to the brain; as that which it is said in Wepfer (*k*), was inflicted upon a Polish knight, by an arrow being driven

(*b*) Experim. circa diversa e viv. erect. Viscera.

(*i*) Spicileg. Anat. Obs. 100.

(*k*) Exercit. supra ad n. 40. cit.

from one side of the head to the other in such a manner, as to stand out equally on both sides. For as it was forc'd in "below the temple bones, "towards the prominence of the ossa jugalia on each side;" and as the knight, "besides the symptomatic fever, had scarcely any more violent "symptoms, than what generally attend wounded patients of every kind;" to me, I confess, the arrow seems to have pass'd not only below the basis of the cranium, but through the cavities of the maxillary sinusses, and of the nose.

And I suppose that wound also, which Freind (*l*) gives the account of from Procopius, to have related to the sinusses which belong to the cavity of the nose, in like manner; though to different sinusses from the former. For "the iron point of the arrow, entering above the right eye, near to the "nasal bone, however large and long it was, sunk in so deep as to be quite "out of sight," and continu'd there many years without creating any pain or uneasiness; I suppose of such a kind as shew'd the arrow's point to have been situated in a more noble part.

For the frontal sinus excepted, and the neighbouring ethmoidæal and sphenoidæal sinusses, it might have room enough, especially in a large head, where it could lie hid, without any injury to the more noble parts; although it equal'd the little finger in length, and indeed almost in thickness. So also when Hildanus (*m*) very properly explain'd how it happen'd, that a wound beginning under the eye, and ending in the opposite and upper region of the neck was not mortal; and suppos'd the first part of the passage of the wounding instrument, to have been through the maxillary sinus; this wound in like manner, in that respect at least, belong'd to the nose.

And I even saw a wound of this kind at Bologna, which was of itself large, but to appearance extremely large: as therein were concern'd not only both these sinusses, the external nose, and the bones which lay beneath, but it had even laid open their cavities, and smear'd them over with blood; so that the natural deepness of these cavities, being added to the great opening of the wound thus inflicted, offer'd a horrible spectacle to the eye.

For an iron tube, which in our language we call *archibuso* (a little musquet or hand-gun) having burst into pieces, in consequence of being overcharg'd with powder, it took away from the face of a boy his nose, and so much of both the maxillary bones, that both the maxillary sinusses, together with the cavities of the nose, were laid open; which appear'd so much the larger also, for this reason, that part of both those bones, which are interpos'd betwixt the nose and the mouth, was partly consum'd anteriorly, and hung down partly, in consequence of being broken; so that it was necessary to put a tube of lead betwixt them and the lower jaw, by which the boy might breathe and be nourish'd, till the broken part became whole, and the several dressings could be wholly remov'd from the cavities of the nose.

This boy was preserv'd by the diligence of Paul Piella, a very experienc'd physician and surgeon: whom I saw to be at first struck with horror, as well as the others who stood around him, and to turn away from so unusual and miserable a spectacle, when his bloody face was uncover'd on being

(*l*) Hist. Medic. ad A. 560.(*m*) Cent. 4. Obs. Chir. 2.

brought into the hospital, immediately after receiving the wound; so large and so deep did it appear at first sight; though soon after, by examining it more attentively, and by comparing it with the natural structure and disposition of the parts, as known from anatomy, we perceiv'd it to be very considerable indeed, and large, but to be much less deep in reality, than it was in appearance.

42. And I remember this of a wounded lip. Another boy of almost the same age; that is to say, of twelve years of age, but of a most noble family; having fall'n on his face in running, and broken one of his upper dentes incisorii transversely against the marble pavement, his upper lip was cut through by that part of the tooth which had been broken off. And now, by the attention and care of the surgeons, that part of the lip which lay about the wound had decreas'd in its swelling, and become softer: yet neither orifice of the wound inclin'd to agglutination; nay, a very flaccid and moist flesh, which lay in the wound, was an absolute bar to such a disposition.

We suspected that something extraneous was lodg'd within: but what really did lodge therein never enter'd into any one's thoughts, since not only the patient, but all the domestics, had believ'd, themselves, for a certainty, and had affirm'd it to me and to the surgeons, from the very beginning of our attendance, that the part of the tooth which had been broken off, as it had made the external orifice of the wound, had also fall'n out at that orifice.

Yet that very part of the tooth was, in fact, buried within the wound: and this being easily extracted, the wound was in a little time, and without any difficulty, brought to a cicatrix. And from hence you will learn, that, in examinations of this kind, we must not pay a regard to the narration of any one, (even when the most probable) unless of those who assert that they clearly saw the circumstance with their own eyes.

43. And I could wish, that as this boy afterwards grew to be a young man, and now flourishes among the nobles of his famous city; so another also, born in a place not inferior, had not, after having recover'd from his wound also, been snatch'd from a very noble family, by a much more grievous kind of disorder. This boy was three years old, when, being at play, he fell down, and dashing his chin against a marble step, so compress'd his tongue (which happen'd at that time to be thrust out) betwixt his teeth, as to cut it; and with an oblique wound, at least an inch in length: nor at a much less distance from the lower point of the apex, divided that anterior part of the tongue from the other entirely, for as large a tract as from the edge laterally to the middle line.

The parents of the child, and all the relations, were very much affected with the misfortune, and enquir'd of me by letter; but particularly a great-uncle of the child, who was a man eminent for his learning; not by what kind of remedy he could now be cur'd; for by reason of his age he was obstinately repugnant to all kinds of remedies, and shut his teeth against every thing; and to compel him, by violence, to submit to any method of cure was improper, by reason of the fever, and the tumour of the tongue, both of which had come on: but this one thing they enquir'd, which was the only one that remain'd for their comfort, whether there was any hope that, if he were left to the care of nature alone, he might speak properly and expeditiously.

I imme-

I immediately wrote back that they need not despair ; and produc'd many examples to that effect : especially a case very similar thereto, which is extant in Hildanus (*n*). The event also, by the blessing of God, was very similar : so that I heard, when I happen'd to be at Venice in the following year, that “ the speech ” of the child, to use the very words of Hildanus, “ was not “ at all deprav'd ; ” nor was it injur'd through the whole of his life-time, which was but short ; for he was soon after carried off by a malignant kind of small-pox.

And what you will think still more surprizing, although he spoke properly and expeditiously, yet those parts of the tongue which had been disjoin'd by the wound, were not coalesc'd to each other, but each of them had its own proper cicatrix : for which reason that anterior part was seen, even at this time, just as immediately after the wound, to be disjoin'd from the other, and pendulous. Thus far of wounds of the head. Farewel.

LETTER the FIFTY-THIRD

Treats of Wounds and Blows of the Neck, Breast, and Back.

1. **A**LTHOUGH in this third section (*a*), in which alone the author of the Sepulchretum would have blows and wounds of all the parts comprehended, some things are now and then repeated ; as, for instance, the first article of the twentieth observation, in the first article of the twenty-second ; and the fourth article of the twenty-first, in the eighth article of the same, and in the fifth article betwixt the seventh and eighth ; and what is in the scholium to article the first of the twenty-fourth observation, in the scholium to article the fourth of the same observation ; and although you will now and then think the disposition and order of the matters is somewhat deficient ; yet there is much more irregularity in the additamenta which are join'd to this section. For besides that the twenty-sixth observation, which has no relation to blows or wounds, is thrust in here, and takes up, together with its scholia, ten large pages ; and besides that under article the first of the tenth observation, and in observations the twentieth and twenty-first, the same histories of Parey and Bartholin are again produc'd, which had been already given above in this very section, under observation the twenty-third, article the seventeenth, and fourth, and under observation the twenty-sixth, article the eighth ; besides these things, I say, without any the least

(*n*) Cent. 1. Obs. Chir. 28.

(*a*) l. 4.

regard being had to order, they pass over from a wound of the breast to a wound of the tibia; and among the wounds of the breast, both wounds of the head and belly are indiscriminately interpos'd.

I, however, am determin'd not to repeat any thing in these letters, and to preserve order and regularity. Wherefore, as I wrote last of wounds, and blows of the head, I shall now treat of the wounds of the neighbouring parts, neck, breast, and back. And because the observations made by Valsalva, and by me, are not so numerous as to exceed the bounds of one letter; I will, according to my custom, propose both of them in the present, and begin with his observations.

2. A woman, of fifty years of age, being wounded, with a cutting instrument, in the neck, fell down; and could no longer move her hands or feet. After some days, she mov'd her hands again, but not with their former vigour. A slight delirium came on; and, finally, before the seventh day she died.

As the body was buried privately, the opinion, of the spinal marrow being injur'd, could not be confirm'd by dissection. Yet this seem'd so probable from the paralysis of the limbs, from the seat of the wound, and from the small fragments of bone which had come out therefrom, that I did not think this observation ought to be entirely omitted here.

3. A man, of five-and-thirty years of age, of a bilious temperament, being, in the month of November, in the year 1688, wounded, with a knife, at the middle of the sternum, betwixt the fifth and sixth rib, was immediately seiz'd with a great loss of strength; so that, as the pulse could scarcely be perceiv'd, the physicians thought he would die in a very short time. Yet, after three hours had pass'd, his strength began to return by degrees: he was therefore brought into the hospital of St. Mary de Vita. On the following day he was troubled with a terrible cough, and with a diarrhæa also. But the latter was very urgent, although scarcely any thing besides a little viscid matter, was discharg'd thereby: and on the sixth day it ceas'd.

Yet the cough was so encreas'd every day, that it could scarcely be borne. From the first days also, there was a sense of a very great weight in the belly, which, in the progress of the disorder, extended itself through the whole abdomen: there was none, however, in the thorax. On the first days, also, the pulse was something turgid, and moderately quick; which quickness it even preserv'd afterwards: but growing smaller and smaller every day, it at length fail'd gradually on the eighth day, together with life.

In the body, at the first incision on the right side of the sternum, the blood, wherewith that cavity of the thorax was fill'd, rush'd forth with great impetus. And when the sternum was taken away, and the blood exhausted with sponges, fresh blood again flow'd through the diaphragm, which was wounded, from the belly, into the same cavity of the thorax.

For this reason, it was necessary to open the belly also immediately, and to exhaust the blood, which was extravasated into that cavity: the concreted fibres of which blood, being dispos'd throughout the external coat of the intestines, in the form of a net, adher'd to this coat in such a manner, that they could be separated by the knife only. Wherefore, when all the blood

was

was remov'd, and the viscera brought into view, we return'd to examine the wound. The mediastinum, which was the first part that corresponded to the wound, was wounded: after that the pericardium: and, finally, the paries of the right ventricle of the heart, so that the fissure of the wound open'd within that ventricle; and when the ventricle was compress'd, a little blood was discharg'd from it through the fissure. But the next to the wound of the mediastinum was the wound of the diaphragm; through which blood, as has been said above, flow'd out of one cavity into the other.

4. Since the time in which Galen (*b*) said, that if a wound penetrates to the ventricle of the heart, "the man must immediatly die;" and if it did not penetrate, "that some might not only live through the day, on which they were wounded, but also through the following night;" dissections of dead bodies have shewn, that the contrary frequently happens: many of which, indeed, you have in the Sepulchretum, but not all. For there are some extant which may be added, and not only from books that have been publish'd since; as, for instance, those that are produc'd in more than one volume of the Royal Academy of Sciences at Paris (*c*); but also much more ancient ones, as that which was made by our Falloppius (*d*): from whence it appears, that whether a wound, as in this observation of Falloppius, does not penetrate through the parietes of the ventricle, or, as in the former, reaches quite into that cavity, life may be sometimes prolong'd to a greater length of time than the more ancient authors suppos'd.

The observation of Valsalva, when compar'd with the others, is not in the number of those, wherein life was dragg'd on to the greatest length of time; nor yet in the number of those, wherein it continu'd the shortest time. But it contains, in respect to the wound of the diaphragm, where-with the other was complicated, some things worthy of remark; from whence physicians may draw some advantage in forming a diagnosis.

For when there are signs of the heart being wounded, and of the blood being pour'd out therefrom, if there be no sense of weight in the thorax, and there not only is such a sensation in the belly, but it is increas'd every day, there will be room for a conjecture of the diaphragm being so wounded, as to transmit blood from the thorax into the belly; especially, where some one of the symptoms which confirm this septum to be wounded, is not wanting: of which kind was that very troublesome cough in the patient in question, that was so violent as scarcely to be borne. Which symptom, although omitted by some, is at least not pass'd over by that excellent surgeon Falloppius (*e*).

Do not, however, be surpris'd, that it is not taken notice of in the next observation. For all the symptoms of any disorder do not always occur; on which account, that will have other things, which we do not read of in this observation. Besides, observers frequently make remarks only upon the principal symptoms.

(*b*) De Loc. aff. l. 5. c. 2.

(*d*) Tract. de Vulnerib. c. 28.

(*c*) Hist. A. 1735. Obs. Anat. 9. & A. 1744.
Obs. Anat. 9. & c.

(*e*) eod. c. 28.

Finally, in proportion to the various state, or situation, of the wound in the same part, different symptoms will offer themselves at different times. And although in this, and the following observation, we may, in some measure, conjecture what was the seat of the wound, from the other circumstances that are added; yet it were to be wish'd, that in describing this seat, and even the whole passage of the wound, nothing had been pass'd over by Valsalva, which could be wish'd for by any one: and even that, in the beginning of this first history, he had expressly said what he seems to have intended; I mean, that the knife was so drawn in betwixt the fifth and sixth rib, as to ascend towards the middle of the sternum.

5. An old man, of seventy years of age, who had been blind about twenty years, fell down, and dash'd the left side of his chest against a flint with such violence as to break his ribs. He was receiv'd into the same hospital. His pulse was hard; he had an oppressive and pricking pain in the wounded part; his respiration was very difficult. And although this difficulty began to remit a little about the fourth day; yet, on the beginning of the sixth day, it again became more violent; and with it a delirium came on. All those symptoms continuing, the patient died about the ninth day.

The left cavity of the thorax was full of extravasated blood: and the true ribs, of the same side, except the uppermost, were all broken in such a manner, that the seventh had wounded the diaphragm by its rough and unequal fracture; and this muscle was universally inflam'd round about the wound.

As to the blindness; in what manner Valsalva found both the chrystalline humours to be affected, I have written in the eighteenth of the *Epistolæ Anatomicæ* (f).

6. Here you have another example of the diaphragm being wounded, and of blood being effus'd internally. But there is no mention made of a cough, or of a weight in the belly; only of an oppressive and pricking pain in the thorax, of a very difficult respiration, and a delirium. Suppose the wound, in this case, not to have been in the tendinous part of the diaphragm, but, as is most probable, in the fleshy; and that it did not open into the belly, so as to be capable of transmitting thither the blood effus'd from the intercostal vessels, which were broken asunder, together with the ribs, but to have consisted in the upper fleshy fasciculi being prick'd and lacerated, every now and then, by the rough points of the broken rib, and for that reason to have been inflam'd; and you will readily conceive from whence all the differences betwixt this and the former observations arose.

And although, in the six broken ribs on the left side, and in the blood which fill'd that cavity of the thorax, there are sufficient causes of a difficult respiration; yet if you observe that this respiration became more difficult when a delirium was added to it; that is, according to the opinion of the ancient masters, when to a wound of the diaphragm an inflammation was added; you will enumerate among those causes, and on this account, an injury of the diaphragm also.

For we are not to suppose, that they were always deceiv'd, when they allow'd of a paraphrenitis in the inflammation of this part; although I have shown you formerly (g), that these two disorders are not necessarily join'd together. Nor does the risus sardonius always arise from a wound of the diaphragm: which is not only demonstrated by other observations, but by the two just now propos'd. And yet that this was not falsly asserted in Aristotle (b), may be understood from Hippocrates (i), from whom Vallesius suppos'd him to have taken it (k). And this is confirm'd by Pliny (l), from "the shows of the gladiators," which were very frequent at Rome. In looking over a passage of which author at any time, I have not been so much surpriz'd, that, following Celsus (m), he has asserted the diaphragm to be a membrane, which "has no flesh, but a slender nervous substance;" as that a note has been hastily added by Dalechampius, and, as I suppose, not read over again, wherein he says: "Anatomy shows this to be false; the circumference of the septum, indeed, is nervous and membranous, yet the middle part of it is fleshy."

But I return to my subject. Whether you consider that similitude of laughing in the convulsive concussions of the diaphragm, as Hippocrates seems to have done, who call'd this laugh *tumultuous*; or even in the face, as most persons generally do; and amongst these Bartholin (n), who confirms the thing by an example which he refers to in his *Saxon*, and explains it by the phrenic nerves, with less perspicuity than that very exact anatomist Meckel (o) has done lately; the small branches of the cervical, from whence they arise, being produc'd through the face; whether you consider it, therefore, in one or the other way, or in both of them, as this laughter is not a mere supposition; because it does not occur in all wounds of the diaphragm; so neither is the delirium a mere figment, though it does not attend all inflammations of the diaphragm.

Yet, if you chuse to have no regard to ancient observation, you, nevertheless, cannot deny that the diaphragm, which is the principal instrument we use in respiration, when it is not only wounded, but inflam'd also, and depriv'd in part of its support, by reason of the fracture of the seventh rib, is chiefly to be reckon'd among the causes of that very difficult respiration.

7. A man, about forty years of age, who had labour'd a long time under a lues venerea, with very violent pains in his joints, and a difficulty of breathing, particularly when ascending any height, having fall'n upon the ground from a very high place; that is to say, a place to which he had ascended by a ladder of forty rounds; at first, indeed, cried out for assistance, but soon after could speak no more, and was carried off by a sudden death.

In the belly, and the head, was nothing worthy of remark, or preternatural. But when the thorax was open'd, all the cavity of the pericardium

(g) Epist. 7. n. 14.

(b) De Part. Animal. l. 3. c. 10.

(i) Epid. l. 5. n. 34. apud Marinell.

(k) Comment. in hunc locum n. ipst 94.

(l) Nat. Hist. l. 11. c. 37.

(m) De Medic. l. 4. c. 1.

(n) Anat. quart. renov. l. 2. c. 3.

(o) Hist. de l'Acad. R. des Sc. de Berlin. A. 1752.

was found to be full of concremented blood; which seem'd to have burst forth from the great artery near to the heart. For the probe being pass'd thither from without, was seen to come within the cavity thereof.

8. Valsalva himself knew a vein to have been ruptur'd in the belly by a fall from on high, as I shall write to you hereafter (*p*). Why then, in this man, if a vessel must have been ruptur'd in the thorax from a similar cause, did not this rupture happen rather to a vein than to a vessel furnish'd with very thick coats, such as the trunk of the great artery is, especially near the heart? Let us suppose that the man had been, from the lues venerea, subject to a difficulty of breathing, and that the great artery was not found to be ruptur'd, but pierc'd through, as it seems to have been, with a small, and perhaps oblique foramen.

Thus you, who bear in mind what I have said (when treating of sudden death from the disease of the blood-vessels (*q*)) of the disorders of that artery perforating the coats by degrees, and opening a discharge for the blood, even within the pericardium; thus you, I say, will easily imagine what might have preceded in this man, from whence the trunk of the artery, being injur'd in that part, not only brought on a difficulty of breathing, by not sufficiently propelling the blood; but, finally, by pouring out the blood, in consequence of a fall of this kind having broken through any barrier that might still remain in the external coat, brought on a sudden death. And this injury would have been observ'd without difficulty, in my opinion, if Valsalva had inspected the internal surface of the artery.

But be this as it will, it is certain that the disorder which he found in the heart of that old man whose history I shall immediately describe to you, had existed for a long time before; as is evident from the nature of the disorder itself.

9. An old man, of seventy years of age, fell from a high place, and dash'd the right side of his thorax against the ground. Being brought into the same hospital which I have mention'd above, he was seiz'd with so great a difficulty of respiration, and so acute a fever, that he died on the seventh day.

In the right cavity of the thorax, the lungs had grown somewhat hard; the lobe being universally affected with a great inflammation; especially at the upper part, where it also adher'd closely to the pleura, and contain'd an abscess. The left lobe of the lungs was likewise of a red colour, but more on the back-part, so as to seem somewhat inflam'd; and had black spots, lying at a distance from each other, through its substance. The pericardium contain'd a great quantity of water, and so large a heart as almost to equal that of an ox in its size. In the ventricles of the heart were polypous concretions of a white colour, and pretty soft, one in each; but that which was in the right ventricle was the largest.

10. I do not doubt but, if it had been enquir'd to what disagreeable symptoms this old man had been subject before his fall, there would have been some found which might have been ascrib'd to that very increas'd size

(*p*) Epist. 54. n. 18.

(*q*) Epist. 26.

of the heart. And although there was sufficient cause, in the violent injury from the fall, why the right lobe of the lungs should contract an inflammation and an abscess from the degeneracy thereof into suppuration; yet it is not altogether improbable, that this inflammation was the sooner contracted, because the lungs had been before compress'd by a heart of that kind, and relax'd by reason of the less quick passage of the blood through the heart, and consequently through themselves also; and were dispos'd, upon the accession of any new cause whatever, to retain this blood, and less fit to prevent the effects that follow'd therefrom.

11. Now, as we have given you histories of blows and wounds which relate to the neck, the breast, and the sides, from the papers of Valsalva; let us subjoin four observations of his which relate to wounds of the back.

12. A man, about five-and-forty years of age, was wounded with a sharp-pointed instrument in the back, about the fifth and sixth rib, at the distance of two inches from the spine. On the first days only a small quantity of blood distill'd from the wound; but afterwards, about four or five ounces were discharg'd every day. This hæmorrhage being restrain'd about the tenth day, by means of various remedies, the wound swell'd, and began to discharge a great quantity of sanies; the quantity of which was increas'd every day. The sanies was viscid and tenacious, so as to suffer itself to be drawn out into a long extent. This excretion continu'd a long time, and was join'd with a slow fever; so that the patient sank gradually, and death came on at the forty-second day from the infliction of the wound.

On dissecting the body, it was found that neither the wound nor the sanies had penetrated into the cavity of the thorax: and although the sanies had form'd, to itself, many sinusses and winding communications; yet that all the mischief had been confin'd to the external parts.

13. How much better it is to moderate and check gently, than restrain, not only other hæmorrhages, but those of wounds also, is confirm'd to you by this history. And you will be able to gather some useful admonition from the following.

14. A husbandman, about thirty years of age, of a bilious temperament, being wounded with a cutting instrument in the left scapula, and quite to the second rib, so as to make a large wound, was receiv'd into the same hospital that has been mention'd above. Being there under the care of Paul Piella, a very excellent physician and surgeon, he was seiz'd with a spitting of blood, a cough, a difficult respiration, had a weak and frequent pulse, being often attended with swoonings; and as all these symptoms grew stronger and stronger upon him, it seem'd that he was very likely to die about the ninth day.

But this day being pass'd over, and the symptoms remitting in some degree, the wound itself also inclin'd to be in a better state; when, near the seven-teenth day, the wound swell'd on a sudden, although without inflammation, and a fever came on in a violent degree, with a languid pulse, and a rigor diffus'd through the whole body, a sense of weight in the thorax, a laborious respiration, and purulent urine; and death at length succeeded twenty-six days after the patient had receiv'd the wound.

The dissection of the thorax was perform'd in conjunction with Peter Molinelli,

linelli, and Francesco Guiccardini, assistant-physician of this hospital. The knife, in cutting out the sternum, having necessarily penetrated into the right cavity of the thorax, a great quantity of fluid rush'd out, not very much unlike the serum of milk; and in this fluid the lungs swam. This fluid being exhausted, a sinuous cavity was found in this lobe, full of purulent matter, and communicating with that cavity of the thorax by a large aperture.

But the other, that is, the left cavity of the thorax, which, as has been already hinted, corresponded to the wound, contain'd no purulent matter, and had its lungs entirely uninjur'd and sound. That part of the pleura, indeed, which was nearest to the wound, was of a livid hue; but had not the least foramen: nor was the wound, though examin'd to the bottom, and with the utmost care, found to have reach'd beyond that second rib in its direction inwards.

15. The symptoms which, while you were reading the history of the disease, you would suppose to have been from the wound penetrating into the cavity of the thorax, you perceive, by reading the dissection, were from the inflammation of the lungs, their suppuration, and an empyema which had follow'd this suppuration. Wherefore, as in other patients, so in wounded patients also, all the symptoms are not always to be imputed to the first and evident disease; but we are to suppose that another may be join'd thereto, which does not depend thereon: and even when the symptoms seem to be from the first disease, we must suspect, and enquire with diligence, whether they may not rather be from some other disorder join'd to the original one, as, in this case, from the marks of inflammation, which, perhaps, did exist in some degree; and these not such as related to the left lobe of the lungs, which was the side whereon the wound had been receiv'd, but to the right lobe.

16. A young man, of twenty years of age, was wounded with a knife almost in the middle of the back; yet with this circumstance, that the wound, inclining somewhat to the left side, tended towards the beginning of the sixth and seventh rib. Not long after the wound was inflicted, a fever came on; and to this was added, after some days, a slight difficulty of breathing; a slight, also, and dry cough; but a great pain about the stomach, and a considerable tumour of the whole abdomen. At length, the respiration growing more difficult, the patient died near the sixteenth day, the whole body having an icteric appearance.

When the belly was open'd, the intestines were seen to be turgid with air; but the liver was in a natural state.

On opening the thorax, a little serum was found in the lower part of both its cavities. And as the left lobe of the lungs adher'd strongly to the pleura, the membranous productions, whereby they were tied with the upper and anterior part of this membrane, seem'd to be moist, as it were, with sanies: and that seem'd, in like manner, to be a peculiar adhesion, where the same lobe of the lungs was join'd to the pleura, in the part corresponding to the wound, in such a manner, that it could not be separated without laceration.

But the wound, although it reach'd quite to the pleura itself, after having pass'd

pass'd betwixt the muscles that lie near the spine, did not, however, appear to have perforated this membrane. As to the lungs, they abounded with tubercles in many places, some of which were larger, and some smaller: and many of them were already suppurated, and when cut into discharg'd a sanies; but others still preserv'd the similitude of a sound and uninjur'd gland. In the pericardium was a little serum. In each of the ventricles of the heart was a polypous concretion, which were both of them produc'd from thence into the auricles and annex'd veins; that in the right being pretty large, and that in the left but small.

17. This young man, also; if some internal convulsion, to which the pain about the stomach, the distension of the intestines from retain'd air, and the icteric colour of the whole body may be imputed, had not happen'd to be added to the other bad symptoms, and to have brought on a more speedy death; would, certainly, have expectorated blood and pus, upon the rupture of these tubercles in the lungs: and it would have been thought, that this expectoration must be owing to the wound penetrating into the cavity of the thorax. But whether pus, taken up from the deep wound into the sanguiferous vessels, (as I have said, lately (*r*), happen'd from wounds of the cerebrum) and carried into the lungs, excited those tubercles; or whether they had begun to exist of themselves before the wound was inflicted; I leave entirely undetermin'd.

18. Another young man receiv'd a wound in the left part of his back; which passing downwards obliquely, and to the right side, and grazing upon the vertebræ, at length enter'd the right cavity of the thorax betwixt the sixth and seventh rib. For some days after receiving the wound, the patient suffer'd a slight difficulty of breathing, and a kind of pain, which corresponded thereto, in the anterior part of the body: he felt a pain, likewise, when he turn'd himself from one side to the other. He was also troubled with a kind of itching, sometimes in one place, and sometimes in another. To these symptoms was added, on the fifth day, a cough, with a spitting of blood; and after that a kind of stupor in the lower limbs. This stupor was succeeded by a paralysis, from the middle of the body quite to the extremities of the feet; so that the power of moving and feeling remain'd only in the thorax and the parts above. He was at the same time attack'd with a tumour and tension of the abdomen, and a suppression both of the urine and the intestinal fæces. After the coming on of this palsy, the patient seem'd to himself to be something better. Yet he was sometimes seiz'd with swoonings; in one of which he died on the beginning of the eighth day.

While the body was mov'd, a great quantity of blood burst forth from the wound: which enter'd the cavity of the thorax on the right side, betwixt the two ribs that I have mention'd, near to the vertebræ; so as to make it seem natural to suppose, that this great quantity of blood must have proceeded from a laceration of the intercostal vessels. The right lobe of the lungs shew'd no peculiar mark of injury in the part which corresponded to the wound; or, at least, none that came under the cognizance of the senses, ex-

cept that the external coat was eroded in some places: yet the whole of this lobe was of a red colour, and tumid. The pericardium was full of serum. From the heart, when cut into, a frothy and fluid blood burst out; and in the right ventricle thereof was found a polypous concretion.

When the belly was open'd, all the intestines were turgid with air; and in them was a certain fluid ting'd with a black colour. The bladder was fill'd with urine. In the cavity of the belly were some pints of stagnant serum.

19. As Valsalva has, with propriety, accounted for that effusion of blood, from the intercostal vessels being lacerated, or eroded; so you, perhaps, would not err, if you were to ascribe the paralysis to a pricking or irritation of their attendant nerve from acrid sanies. For from the former a convulsion would arise, and from the latter a constriction: and from hence, as I have already explain'd (s), so much more considerable a resolution might happen, as every costal nerve is connected to that very long nerve which they call the intercostal. And you have a proof of the costal nerve being punctur'd, from that corresponding pain in the anterior part of the body, to which this nerve goes. However, notwithstanding upon these suppositions it is not difficult to explain this history; yet, if any better mode of explication occurs to your mind, I shall with chearfulness assent thereto.

20. Thus far go the observations of Valsalva; now take mine: which I shall adjoin in the same order; although in regard to the two which relate to wounds of the neck, as one has been already sent to you in a former letter (t), there is no reason to repeat it again here; and the other is extremely short.

21. A man had his neck pierc'd through, in the inferior and anterior part, in such a manner that the foramen which had been made by the entrance of the sword, was scarcely more than an inch distant from the foramen which the sword had made on coming out. This man died very soon, like a suffocated person.

The body, although I dissected it at Venice, with a view to demonstrate to my entreating friends, many and various things which relate to the natural structure of the parts; yet at the same time confirm'd this supposition, that the man had died of suffocation. For one ring of the aspera arteria, having been divided from the other, had laid open a passage for the blood to be discharg'd, from the incis'd vessels, into this tube, and consequently into the lungs.

22. I remember that two enquiries were particularly made of me in regard to deep wounds of the neck. First, if any trunk or branch of the sanguiferous vessels, which is too large to be sufficiently constring'd by introducing arm'd dossils, or the like, be wounded, by what method can surgeons restrain the flux of blood? I answer'd, that it might be restrain'd by many methods, if the question was of preserving the patient for some time only; but if the question was of preserving him for a very long time, by scarcely any. For by generating a crust upon the internal jugular vein

(s) Epist. 11. n. 18. 20.

(t) Epist. 44. n. 7.

itself, by means of a red-hot iron, this restraint was brought about, till the crust fell off; as you have it in Bohn (*u*): from whom not only this, but many other observations, which relate peculiarly to the bodies of those who died of wounds, might be added to the Sepulchretum.

And the experiments which I have related to you in the nineteenth letter; and which show, that if the carotid arteries, or internal jugular veins, are tied up with a ligature, what they formerly fear'd did not soon happen; may encourage the surgeon to tie up one, or the other, of these vessels in one side, that the flux of blood may be restrain'd for some time. But it is evident, that the vessels cannot be constricted, and stopp'd up, for a very long time, by other methods, any more than by those which bring on a crust; nor can we, with any good grounds, hope, that after the ligature's being applied, those bad symptoms will not sooner or later come on; which, at length, of themselves bring on death: although, in applying these ligatures, no error or omission whatever was made by the surgeon.

For as both these trunks of vessels are wrapp'd up within a kind of membranous, or, if you please, rather within a kind of cellular sheath, together with the nerves from the par vagum, and intercostals; it is very difficult, in a deep place, and one that is cover'd by the flowing blood, to tie up either of them in such a manner, that one, or other, or both, of those nerves may not be tied up at the same time, or may not be hurt by passing the needle beneath the vessels.

Nor; if the artery is to be tied up; is it sufficient to constrict the artery, by putting a ligature below the wound, as those experiments which I just now took notice of show; but there is a necessity for applying another above the wound. Nor can the compression which is made use of in the limbs, by means of a bandage call'd *torcular*, or tourniquet, take place in the neck; either to diminish the impetus of the blood into the constricted artery, or to intercept the flux while the surgeon is acting his part. For we are not only forbid to apply this compression to the neck by the *aspera arteria*, but also by the other vessels, which must not, by any means, be compress'd.

And although you should think of any thing to interpose betwixt that bandage and other certain parts of the neck, and particularly the part which is to be compress'd, so that their prominence may prevent the bandage from touching those parts which are not to be compress'd; yet how can that which is most to be press'd upon, be compress'd so as to prevent the vein also, and nerves; which we have said are carried together with the artery that is to be compress'd; from being compress'd therewith.

From these things, therefore, you perceive the very great difficulty of the affair. And from what has been said above, you sufficiently perceive, if it is difficult to tie up a trunk in such a manner, as not to injure any part that lies near it, while the business is to be transacted in a deep place, which is, at the same time, overflowing with blood; you sufficiently, I say, perceive, how much more difficult it is to tie up any neighbouring branch,

without that danger; as, to the other difficulties, the slenderness of the vessel is added: which, if it does nothing else, at least greatly diminishes the power of distinguishing which of the many neighbouring branches is wounded, or in what part it is wounded.

And although this seems to be the natural state of the circumstances; yet as I am not ignorant that those methods may sometimes succeed, which we scarcely dare hope will succeed; I, for this reason, contracted my answer, so as to say, that this end could be scarcely brought about "by any means." Nor had I any reason to be sorry I had answer'd thus, when, some time after, I lit on the cure of a wound inflicted in the internal jugular vein, as related by the celebrated Schlutingius (x); whose success I wish all could attain to, as easily as they can imitate his hope.

23. But these things pass'd in private conferences. Another enquiry was made of me, by letters, in the year 1735. A young man, of twenty-four years of age, and of a good habit of body, receiv'd a wound from a quadrangular and sharp dagger, which pass'd obliquely downwards, from the left side of the neck, at three fingers breadths below the external ear, towards the beginning of the spinal marrow. Although scarcely any blood was discharg'd from the wound, yet the young man immediately fell down; being, in such a manner, depriv'd of the power of motion and feeling in all the parts which are below the head, that it was necessary to carry him home, and put him to bed: and there, having, among the few words which he spoke with a great difficulty of respiration, said, that he was cold, a warming-pan was immediately applied, with great indiscretion, to his thighs, his legs, and his feet, whereby he was very much burnt; though he himself did not at all feel these burnings, which at length degenerated into foul ulcers. At first he neither discharg'd urine nor stool; but after some days, he discharg'd his urine, not only in an involuntary manner, but even without his knowledge.

As he was diligently attended by a physician and surgeon; after the completion of the seventeenth day, the left side of his body first began to feel a little: and on the twentieth day, the fingers of the upper limb, and the toes of the lower limb, on the left side, both began to be mov'd in some measure: and betwixt that and the thirtieth day, both the powers were, by degrees, more and more encreas'd in the left side. As to the right side, however, which was the side opposite to the wound, sensation did not begin to return there till the thirty-second day; and soon after that, motion return'd also, and went on to encrease, by degrees, in the same manner.

And although, on the fortieth day, the whole body had pretty well recover'd its sense and motion; I say, pretty well, for he could not yet stand, and much less walk; and even although, on the twenty-sixth of May; whereas the wound had been inflicted on the second of February; the young man went out of his chamber, and with both his legs extenuated, and in a manner wither'd, walk'd slowly and gradually, just like a child who was learning to walk; yet even then, he us'd the right side of his body

(x) Aët. N. C. Tom. 8. Obs. 29.

with a more infirm motion than the left ; and the latter had its sensation also the most perfect.

The cause of this difference then being ask'd of me ; I hinted, that we must suppose it to consist in those medullary fibres, which, passing betwixt the right and left side of the beginning of the spinal marrow itself (*y*), may sometimes wholly, and, at other times, in great part, transfer the effect of the injury which had been done to this side, to the opposite. And although this explication has nothing peculiar in it ; as it depends upon the explications of others, of a hemiplegia brought on by an injury of the brain in the opposite hemisphere ; yet, as this history shows, how much lower still the seat of an injury, which produces the same effect, may be ; it seem'd to me to be no despicable observation, and therefore worthy to be propos'd to you, among other wounds of the neck. But now let us go on to the wounds of the thorax itself.

24. A man had been wounded in one of his clavicles almost a month before, and the cure of the wound indeed seem'd to go on very well ; when, at length, he began to be seiz'd with a stupor of the senses, and with rigors ; to which there was by no means a corresponding heat. As he died with these symptoms, his body was brought into the college, that I might begin to teach anatomy from thence ; it being now near the end of January, in the year 1732 ; till I should be furnish'd with a more proper subject.

The wound did not reach into the cavity of the thorax. But as I saw that the side opposite to the wound was green externally within two days after death, and no cause of this greenness appear'd within the thorax ; I thought it was proper to look for it in the parietes : and pus was found betwixt the muscles of the sides and of the back. But there were abscesses also in other places ; as, for instance, about the pyramidal muscles of the abdomen.

Yet was there no pus within the belly ; only some part of the omentum, and intestines, were of a green colour. The liver indeed, the spleen, the stomach, and the bladder, were larger than their natural state requires. But there was no other appearance of disease besides this, either in these, or in the other viscera. Those parts where the pus had insinuated itself betwixt the muscles, were the only parts that appear'd to be actually vitiated.

25. From this history it also sufficiently appears, that pus may be receiv'd into the sanguiferous vessels, and transferr'd to another part. For if it were not carried by means of the sanguiferous vessels, how should it, of itself, have come betwixt the muscles, and not those that lie near to the cavicle, but those that are opposite, or at a great distance ? Now give me leave to relate to you an observation of much greater moment, that is, an observation of the heart being wounded.

26. A poor man, a native of Milan, of forty years of age, being of a pretty muscular habit of body, and healthy ; except that his limbs were here

✓ ✓ and there cover'd with a filthy scabies; after having din'd, and drunk plentifully, fell into a quarrel with another man of his own sort, and receiv'd a wound with a knife, at the distance of two fingers breadths below the left pap. As but little blood was then or afterwards discharg'd, he walk'd, of himself, to about the length of seventy paces; after this he sat down, and throwing up from his stomach what he had taken at dinner-time, he died there within half an hour; or at least not much after that time: and this was about the fifteenth of March, in the year 1725.

The body being brought into the theatre of the college, in order that the anatomical demonstrations, which the celebrated John Baptist Vulpus exercis'd, at that time, in the second place, might be finish'd therefrom; it was examin'd with the greatest diligence by both of us. And many things were observ'd, indeed, which do not relate to this place; since here, in general, we only relate such things as appear'd to be more preternatural. And that I may just touch upon these things, before I write of the wound, they were briefly as follows:

In the belly, the spleen, which was, in other respects, sound, was somewhat larger in every dimension, than might seem to agree with the stature of a man who was square-built, and of a proper size; and even larger than seem'd to agree with the size of the liver. But, that there was little bile in the gall-bladder, I did not at all wonder; as I knew, that both a vomiting, and a copious dinner, whereby it had been press'd out, had preceded: and indeed, at the mouth of the biliary duct, and in that neighbourhood, the intestine duodenum was seen to be moist with yellow bile.

As to what relates to the head, the sanguiferous vessels were turgid, and without doubt, from the great number of air-bubbles wherewith they were distended; many of which bubbles we saw, here and there, in the vessels of the brain, and under the pia mater: being probably extricated from the blood, by reason of the warmth of the season; especially as the body had lain some time after death. For we did not come to the examination of the internal parts of the cranium, till the thirteenth day: at which time, taking out the brain, we observ'd that the cavity of the cranium was much larger towards the right side, than towards the left, in the occiput.

✓ But the thorax, and the wound, which we examin'd on the first days, were in the state I am about to describe. The left cavity of the thorax had a great quantity of blood extravasated in; it and the pericardium also, which was fluid however; and such as was seen in other parts of this body, wherein it was, in general, more dissolv'd, and more watery, than usual; perhaps from the quantity of fluid which had been drunk, and which is soon carried through the chyloferous into the sanguiferous vessels. Yet the narrowness and obliquity of the wound were the obstacles, in my opinion, to this blood's being discharg'd at the external orifice.

✓ By following the passage of the knife from this orifice, we found, that it had pass'd from that place which I have mention'd, betwixt rib and rib, obliquely upwards, and to the right side, to the mediastinum, the pericardium, and the anterior side of the left ventricle of the heart; which was to be pierc'd through, nearly about the middle of the length of the same side. There was a wound on the external surface of the heart, of narrow dimension

✓ fion indeed, but not less long than the point of the little finger's extremity is broad; so that, when I open'd the ventricle, I was at first surpriz'd, that the termination of the wound did not appear on the internal surface; till imagining, what was really the case, that the foramen was cover'd over by the network of thick fleshy fibres, and fasciculi, which lay opposite to the wound; I took those fibres and fasciculi away with great accuracy, as has been said in the fifteenth of the *Epistolæ Anatomicæ* (z): and it was manifest to all, that the wound had reach'd into the cavity of the ventricle, after piercing through the whole thickness of the fleshy paries, and the internal membrane.

In the lungs, we not only found the anterior surface itself of a black colour, and variegated; but we also found a part of the food which had been taken into the stomach, and which the larynx had intercepted, while it was thrown up by vomiting, in consequence of the proper offices and functions of the parts which are about the fauces having been disturb'd, in that tumultuous agitation of the whole body, and during the deficiency of the vital power: so that, besides what was in the bronchia, no inconsiderable portion of these ingesta had stagnated in the trunk of the aspera arteria. And we made no doubt, but the man's death had been more sudden on this account: and certainly the face, even for some days after death, was turgid; by reason of the vessels being so distended with blood, as to have the appearance which they are found to have in a suffocated person.

✓ 27. Those wounds of the heart which reach to the left ventricle, occur more seldom than those that penetrate to the right ventricle. For the heart is so situated, that a much less part of the former than of the latter ventricle, lies open to wounds, most of which are inflicted in a direct opposition to the heart. And this I consider as the effect of that same providence, whereby the larger trunks of the sanguiferous vessels are, wherever it was possible, either seated very deeply, or drawn back to a seat less liable to injuries. Thus the crural arteries pass, in great part, through the thighs internally, and through the ham: thus the brachials are carried through that side of the humerus which is turn'd towards the thorax; and not on the external part.

And the left ventricle of the heart is certainly that, by the force of which blood is impell'd into the brain, and to all the body; so that if this force be very much weaken'd, and the office of the ventricle be very much impeded, death must of necessity be the consequence: and this Galen (a), with justice, pronounc'd would happen, "particularly if the belly of the left part of the heart should be wounded."

✓ Now if you run over in your memory, the great number of wounds of the heart that you read in this third section of the *Sepulchretum* (b), you will be less surpriz'd, that those are by far the most in number which relate to the right ventricle; to which those two also relate, that I have pointed out

(z) n. 61.

(a) De Loc. aff. l. 5. 2.

(b) Obs. sub n. 23. & in Addit. Obs. 3.

above (*c*), from the History of the Royal Academy of Sciences at Paris : and out of the very few which have come within the left ventricle, you will see that there are none, after which the man dragg'd on his life, I do not say to the twenty-third day, or to the sixteenth, or to the ninth, or to the seventh, but to the fourth, or to the fifth ; though you will see that life was carried on to those periods, more than once, after a wound penetrating the right ventricle.

You will find that both he of whom Diemerbroëck (*d*), and he of whom Timæus (*e*), gives the history, died immediately upon the perforation of the left ventricle. It is true, he liv'd an hour whom Lucius (*f*) speaks of ; and even four or five hours another, whose case is related by Dolæus (*g*), though I believe no mention of it is made in the Sepulchretum ; yet in both these patients both the ventricles were pierc'd through.

But what is an hour, or what are a few hours, to such a number of days as I have mention'd ? to sixteen for instance, nay even to three-and-twenty ; for to this period it is certain that Fantonus the father saw life extended in a case of this kind. And if by reason of some typographical error, you should doubt whether that observation of his, which we read in this section (*b*), relates to the right ventricle ; you will have all your scruples remov'd, if you read the same over again, as it has been since publish'd, more than once, by his celebrated son (*i*).

There is, indeed, in the latter end of the Sepulchretum, another observation of the father's (*k*), on a man who " had liv'd seventeen days ;" whereas " the septum of the heart was wounded in the basis, the wound slightly penetrating the left ventricle, and terminating in the right ;" or, as the son afterwards publish'd it (*l*), " the wound slightly touching upon," or, " slightly injuring, the left ventricle of the heart, and penetrating into the right ;" so as to make you naturally conjecture, that the septum being obliquely pierc'd through, " by a thin and very sharp sword," the left ventricle was slightly graz'd upon in the passage, but that the right was open'd ; though " by a small foramen," just as in that other observation of which I first spoke.

But lest you should be in doubt about a history which is transferr'd into this section (*m*) from Henricus ab Heer, supposing that, because " he found " the basis of the heart, and the apex thereof, pierc'd by two musquet-balls, with a very great laceration," the wound had reach'd into the left ventricle ; read the whole of it, and you will find that the wound penetrated into neither of the ventricles : for otherwise he could not have satisfied these persons, who wonder'd how the life of the patient could have been produc'd to the end of the seventh day, by citing, as he says he then did, the opinion of the ancients, that, " when the substance of the heart only is " injur'd, if the wound does not penetrate to the ventricles, the patient may

(*c*) n. 4.

(*d*) Obf. 23. cit. § 2.

(*e*) Ibid. § 18.

(*f*) Ibid. § 16.

(*g*) Eph. N. C. Dec. 2. A. 2. Obf. 188.

(*b*) Obf. cit. 23. § 12.

(*i*) Patern. Obf. 33.

(*k*) Obf. 17.

(*l*) Obf. 17.

(*m*) Obf. cit. 23. § 10.

“survive for some days, till he is snatch’d away by a supervening phlegmon.”

Nor does it escape me that, besides the various situation, the strait direction also, or obliquity, the shortness or length, but particularly the largeness or narrowness, of the wound, has a great effect in accelerating death, or retarding it; in proportion as the heart is more or less hurt, or more or less blood is discharg’d from one or other of the ventricles. For which reason I suppose that this man, whom I dissected, might have dragg’d on his life for some time longer, if suffocation had not been added to the wound (for regard must be had to the circumstances that are join’d with the wound of the heart in those who die very soon, as, for instance, in a certain observation of Mauchartus⁽ⁿ⁾) yet not so long as he that I have describ’d above^(o) from Valsalva, who liv’d quite to the eighteenth day, after a penetrating wound of the right ventricle.

And it seems that this difference may be gather’d from comparing, one with another, the great number of observations, which I have referr’d to, of one or the other ventricle being wounded; unless there be some one of those obstacles that I mention’d just now, or even others: as in this man whom I dissected, the reticulated fibres and fasciculi lying one upon another, and so covering the wound; as in him whom Bartholin^(p) examin’d, “the lips of the wound collapsing;” as in him of whom Billyus^(q) speaks, “a coagulum of concremented blood stopping up the wound of the heart:” or if there is no obstacle, even the very weakness of the heart in contracting itself, and consequently in throwing out the blood at the wound; which, in the histories of Fantonus that have been mention’d, the frequent swoonings, and the quantity of blood discharg’d, seem to show.

And for these reasons it was, perhaps, that the young man, whose right ventricle of the heart had been wounded with a knife; the wound being equal to six lines of Paris, and inflicted horizontally, at the distance of three inches from the apex, reaching from the external paries to the opposite side; did not die before the sixth day. There had been a great profusion of blood, a very considerable syncope (besides very slight swoonings), and that more than once; and on the three last days scarcely any pulse; though on the second and third there had been a violent fever, with a strong and full pulse: which circumstances, together with others that were remark’d with more accuracy than I remember to have read in most of the observations of the wounded heart, you may see describ’d, briefly indeed, but with great perspicuity, by Stephen Gaspareni^(r), formerly my auditor, but now an eminent physician and surgeon at Feltri.

When I had revis’d thus far what I have hitherto said, that excellent treatise of the heart, by the illustrious Archiater Senac, was brought to me: and in reading over that chapter^(s) which is entitled, “Of wounds of the heart,” I saw that it contain’d whatever could be wish’d for, as far as relates to the theory, to the useful comparison of observations one with another, and to

(n) Eph. N. C. Cent. 1. Obs. 18.

(o) n. 3.

(p) Sect. hac Obs. cit. 23. § 15.

(q) in Addit. ad hanc Sect. Obs. 3. in Schol.

(r) Observ. Med. Chir. 9.

(s) l. 4. ch. 6.

the cure itself, as far as any curative methods can be attempted. For which reason I make no scruple to persuade you to peruse the whole of it, more than once.

✓ You will, at the same time, light on observations, some of which I was without, and chiefly those of his own that he gives; and among these, particularly, those which are of such a nature, as to confirm the opinion that wounds may penetrate into the ventricles, and yet no great effusion of blood be brought on; either because he found a deep wound stopp'd up with a coagulum of blood, or because the fibres, being irritated by the wound itself, contract themselves in such a manner, as to prevent the discharge of the blood; or in consequence of the wound being oblique: and he produces a singular instance of great obliquity; for he saw a wound, in which the sword had been pass'd through the substance of the heart, from the apex to the basis.

✓ And although he admonishes that this kind of obstacle can happen less easily in wounds of the right ventricle, by reason of the thinness of the parietes; he, nevertheless, does not deny that the effusion of blood, from this ventricle also, is sometimes not very great. But if the hæmorrhage, from either of the ventricles, be not so large as, of itself, to be speedily fatal; yet he shows that from the inflammation which comes on afterwards, and unless this be discuss'd, from the considerable suppuration, there is great danger at hand. These things, however, I had rather you would see of yourself, than learn from my recital.

28. And from a wound also of a large sanguiferous vessel; one of those in particular that are contain'd in the thorax, especially an arterial tube; that a great quantity of blood is pour'd out, and the man carried off; if it were not both evident by reasonings, and confirm'd by the frequent dissections of wounded persons, an observation of Jo. Andreas Usenbezius (*t*), which you will add to the Sepulchretum, might show. And then, indeed, it is certainly in the power of the anatomists, to demonstrate from whence the blood was discharg'd.

Whereas, on the contrary, if a slender vessel be injur'd, the blood, flowing out slowly, may, by its quantity being continually, though gradually, increas'd, destroy the man; but it is sometimes with difficulty that it is found, from whence the blood has been discharg'd: and indeed this question, in some cases, cannot be determin'd at all, unless time be given for making the enquiry by the help of injection; as in a man, in whom one of the cavities of the thorax was seen to be fill'd with a great quantity of blood, from a wound. But from whence this blood had flow'd was so obscure, that it could not be found out, even by our Mediavia, a man whose accuracy was well known to me. As it is a history by no means despicable in other respects, I will immediately communicate it to you, in the same manner as he himself communicated it to me, on the very day of the dissection, which was the first of May 1742.

29. There was a French cook here, who, happening to quarrel with another man, was wounded, by his drawn sword, with a blow which pass'd ob-

(*t*) Eph. N. C. Cent. 7. Obs. 58.

liquely from the right side to the left. The wound indeed was manifest about the right side of the sternum, almost in the middle of it: but whether it penetrated into the cavity of the thorax, could not be distinguish'd by the probe, nor by any other means. The cough and the spitting, which was now and then ting'd with blood in several places, could signify nothing certain in a man who had been, for a long time, subject to a cough; and to cineritious and bloody expectorations, with a difficulty of breathing.

Yet this difficulty of breathing was now become much greater, and had a fever join'd to it, with a great frequency of pulse, a hardness, and a violence of stroke; but without any intermission, or inequality. And on the last day of his life also, which was the fourth from the infliction of the wound, although the pulse was become extremely bad; yet the patient lay supine, or on either side, just as he chose; and even sat up in bed to write a letter: nor ever complain'd of an anxiety of the heart, or of any pain whatever.

In examining into the state of the wound after death, the cartilage of one of those ribs that are join'd with the sternum, was found to be cut into, quite to the middle of its height; but the remaining passage of the sword could not be clearly found out. For this was the state of the thoracic cavities. The right cavity contain'd nothing but the lungs themselves, which were every where connected to the pleura, flaccid, of a blackish colour, and in a very bad state; but without any hardness. The left cavity, however, was very full of fluid blood; and in this blood the lungs floated, being every where unconnected and sound.

The internal surface of the sternum had a kind of blackness in the left side indeed, but not the least trace of incision; nor could any traces thereof be found in any vessel, nor in the lungs. The pericardium, which was become pretty thick on the right side, seem'd to have adher'd to the heart in some part of it; and contain'd a small quantity of yellow and mucous pus. The external surface of the heart was unequal, and in some measure corroded. In the ventricles was no blood: yet there were polypous concretions.

But the substance of the heart was so lax, and flaccid, that although about the basis of the right ventricle, where some very small part of that mucous pus adher'd externally, it seem'd to have a foramen, and very readily admitted a probe; yet it was doubtful whether there was a foramen before, or whether the probe had not made this foramen for itself, by reason of the great laxity of the muscular substance. Thus, as the disease of the thorax, which had been of long standing, had held the physicians in suspense while the man was living; so they also held the anatomists suspended in their opinion, after death.

30. That the sword had penetrated into the left cavity of the thorax, and wounded some sanguiferous vessel, appears from the quantity of blood which was extravasated thereinto, although it is uncertain what vessel this was. But as it is very difficult to understand, from the state of both these cavities, and of the heart and pericardium, how those symptoms could be present or absent, which it is very certain, from the history, were present or absent; we ought the more studiously to retain this observation in our memory, that those things sometimes happen which are less usual; not being ignorant that

we ascribe a great deal, for the most part, to the presence or absence of the symptoms; but not all the circumstances always.

31. Thus far of wounds of the thorax: in regard to which you will read a history of Jo. Adrian Slevogtius (*u*), that deserves notice, on account of the slight symptoms of their most considerable effects. And as I am now about to add some observations of blows, and compressions, which happen without a wound, we will begin with that which was formerly communicated to me by Ignatio Pedratti, a physician at Cremona, whom I have formerly spoken of to you (*x*). You may compare it with another which is propos'd by the same Slevogtius (*y*).

32. A man fell from his horse. The horse struck his breast with one of his feet, as he lay. No external mark of injury appear'd therefrom: but he had so great a difficulty of breathing, that neither by blood-lettings, nor by the application of proper remedies externally and internally, could the physicians prevent death from coming on within the fifteenth day after the blow. No rib was found to be broken in the dissection: but betwixt the ribs and the pleura was a tumour of a considerable size, made up of congested blood, as it were: and there was a disease in the lungs which corresponded thereto.

33. A country-lad, of ten years of age, lying upon the ground, had the wheels of a cart run over his thorax: though in what posture he lay could not be learn'd. This was known, that he expir'd within an hour: and this happen'd at Bologna, in the autumn of the year 1706.

As I examin'd the natural state of some of the parts, for the sake of anatomical improvement, I found blood extravasated in the thorax, and some ribs depress'd and broken on the left side; and, on the right side, I found the inferior lobe of the lungs torn away from the back; that is to say, open'd with a large and deep hiatus, in a longitudinal direction. In the heart was scarcely any blood, and no polypous concretion.

34. After what has been said, in the preceding letters, of great injuries being found within the head from the effect of blows, at the same time that the head has been externally sound; and these sometimes in the part opposite to the blows; I suppose you do not greatly expect that I should explain these two observations. To the second, however, you see that a cause was added, by a sudden compression streight'ning a viscus full of blood and air, and forcing it against the opposite ribs. But to the first you will see that those things relate, which will be said on a future occasion (*z*), of the internal parts of the belly being ruptur'd, while the abdomen was sound.

I rather chuse to take notice, at present, of some other histories which may be added to the Sepulchretum; and which relate to blows and compressions of the thorax, whereof we treat. To say nothing, therefore, of the suspicion of Gahrliapius (*a*), of bones being generated betwixt the pleura and the coat of the lungs, at the juncture of the ribs; as if the first cause of

(*u*) Dissert. inscr. Vomica Pulmon. & cat. Exempla, § 61.

(*x*) Epist. 21. n. 43.

(*y*) Dissert. modo cit. § 21.

(*z*) Epist. 54. n. 14. & seqq.

(*a*) Eph. N. C. Dec. 3. A. 9, & 10. Obs. 43.

them had been a preceding very violent dashing of the breast against the ground; read, in Bohn (*b*), of that old man being so violently dash'd against a bench, that, five ribs being broken "transversly," he died within a week in a state of suffocation.

The same author (*c*) also dissected another man, who died much sooner; because, besides that many more ribs were broken, and some laxated, blood, which had been extravasated within the thorax from the ruptur'd intercostal vessels, and from one of the internal mammary arteries, had accelerated the suffocation. And this man had been run over by the wheels of a loaded carriage.

That man was carried off by suffocation likewise, but unexpectedly, and on the eleventh day of the disease, who had been trampled upon by the horses as he lay prostrate on the ground, and whose back had been compress'd by the wheel of a loaded waggon passing over it. In this body, besides other things, Theodorus Zuingerus (*d*) saw three ribs broken, and the cartilages of some of them quite torn away. And Mery (*e*) found two ribs broken in an old man whose breast had been compress'd by the wheels of a passing chariot; the emphysematous tumour first beginning at the seat of the fracture, and, with a difficulty of respiration, afterwards increasing through almost the whole circumference of the body, till death came on in the fourth day; so as to make us not wonder that the husbandman (*f*), upon whose side the whole bulk of a plough had been dash'd in such a manner, by a horse who ran away with it, as to break a rib, upon which an emphysema came on, should, as often as ever he drew in the air, have "a tumour, of the bigness of a hen's egg, protuberating in the region of the broken rib;" which tumour receded soon after in expiration. But this patient, as he was a young man, of a robust constitution, and treated in a different manner from the old man, recover'd.

I had almost omitted a more surprising history, and one which relates pretty much to those things that have been said above of wounds of the heart. This history is Christian Vater's (*g*); who having found the upper ribs of a woman that had been violently struck upon the breast by a passing carriage, and kill'd thereby on that very day; having found the upper ribs, I say, near to the sternum, together with the clavicle, broken on the left side, although they were less bent inwards, and had injur'd the pericardium much less; within this cavity (the parietes of which were found, and distended with extravasated blood) nevertheless, found the right ventricle of the heart, not far from the apex, "ruptur'd to almost the length of an inch."

And this observation you will join with that which is transferr'd, from the royal surgeon Boirellus, into the Sepulchretum (*h*); I mean, of a man who died three or four hours after a leaden bullet, discharg'd from a musquet, had enter'd his breast: for although the bullet had stopp'd short on this side

(*b*) De-Renunc. Vula. Sect. 1.

(*c*) Ibid.

(*d*) Dec. modo cit. 3. A. 5, & 6. Obs. 277.

(*e*) Mem. de l'Acad. R. des Sc. A. 1713. Obs. 4.

(*f*) Aët. N. C. Tom 5. Obs. 51.

(*g*) Dec. 3. cit. A. 9, & 10. Obs. 104.

(*h*) In Addit. ad Sect. hanc 3. Obs. 1.

the pericardium, yet within this cavity, the parietes whereof were entirely unhurt, but distended with blood, was found a wound of the heart; and in the inferior part of the right ventricle, in like manner. In regard to which two histories, I suppose, you will not be much surpriz'd, that the wound or rupture of that ventricle brought on so sudden a death, if you observe that the blood could by no means get out from the pericardium, which was unhurt, as it did in other wounds of the heart; and that being, for this reason, collected and crowded together, it had produc'd the same effect that, as has been already shown (*i*), a fluid effus'd into the cavity of the sound pericardium, from an internal cause, can produce.

But as to the heart being ruptur'd, without a rupture of the pericardium, Boirellus had promis'd that he would point out the cause of it when he publish'd his observation (*k*). And what Vaterus thought of this matter, you will see in the latter part of his observation. To me, however, though I do not disapprove the thoughts or inventions of others, it seems, that where the question is of the heart, or the arteries, being ruptur'd by a blow receiv'd on the body, without the parts themselves being touch'd by it; that ought to be added which Lancisi (*l*) did not doubt was to be attended to in the arteries, when weaken'd from a similar stroke: I mean, whether the percussion had happen'd in that point of time wherein they were dilated: for at that time, as they do not recede from the stroke, but even meet and give resistance to it, they themselves increase the cause of the injury.

And in proportion as the paries of the right ventricle of the heart, which is of itself thin, is thinner when dilated, it will be the more liable to receive an injury from the percussion. And if you add, that there is a greater quantity of blood in some bodies, you will the more clearly conceive of that paries being both dilated and extenuated, so as to be ruptur'd without great difficulty by the force of a sudden and very violent percussion.

Yet I do not think that animadversion of Lancisi is, of itself, sufficient to make us understand in what manner that could happen which Jacob Cicognini, formerly counsellor and physician at the court of Turin, and after that, as long as he liv'd, my most worthy colleague in this university, asserted to Valsalva and me that he had been witness to.

35. An old man, being busy in cutting wood in the forest of another person, was caught by the master of the forest in the middle of his theft. The master first blam'd him, which was answer'd from the old man by curses and threats; and, at length, as the old man was running away, the master struck him on the back, once only, with a club. The man fell down dead from the blow, after going two or three paces.

The great artery was found to be ruptur'd transversely, and cleft asunder; notwithstanding the vertebræ and ribs were sound and unhurt.

36. What I said above (*m*) of the same artery, when, after a fall from a very high place, it was found by Valsalva in a perforated state within the pericardium, I must say here so much the more, where the artery is found to

(*i*) Epist. 26. n. 18.

(*k*) Zodiac. Med. Gall. A. 2. M. Jul. Obs. Schol.

(*l*) De Aneur. 1. 2. c. 2. Propos. 21. cum

(*m*) N. 8.

be ruptur'd transversely. The old man was struck with a stick; and how often, and how much, we have seen this artery to be eroded internally in old men, our letters to you sufficiently show. If it happen that this vessel was very near to rupture of itself, when it receiv'd a concussion from a violent blow upon the vertebræ, to which it adher'd; it will not seem very foreign to probability to suppose that it might be broken through: especially as by reason of the various passions and feelings of the old man, who was caught in the theft, enrag'd, and put to flight, the artery would be streighten'd at the same time, in several places, by irregular contractions; and the action of threatening and cursing, and the efforts of running, would more speedily urge on the blood, and urge it more vehemently into this artery: to omit that, by two blows of this kind, (which, however, were receiv'd on the hypochondria) Samuel Grassius, as you will even read in the Sepulchretum (*n*), had, besides the spleen and the vena cava, seen the great artery also torn afunder in a young man.

And in the porter of whom I shall speak presently, the causes both of the sudden death, and of those parts that were found to be broken in the dead body, were, of themselves, very evident to all, and did not relate to the thorax only, but to the head also; as was the case in a man, and a young man, whom I have describ'd in the preceding letter (*o*): so that I scarcely deferr'd this observation to the present opportunity, on any other account, but to prevent my being too prolix in that letter; for it might with great propriety have been propos'd there.

37. A porter, of a pretty fat and muscular habit, being in very good health, and busy about something or other on a very high roof, fell down from thence, headlong, upon a road pav'd with hard stones, and died immediately. This happen'd in the month of January, in the year 1725, when the time was at hand in which anatomical demonstrations are annually given in this theatre.

His carcase was, therefore, given to the college, and was the more accurately dissected by me, as it was more fit for this purpose than most bodies are. But I shall now take notice of the preternatural appearances only, as I preserve the natural appearances, except a few, to another time; yet I shall not mention all that were preternatural, as I have hinted at some of these things when writing to you on other occasions, as will be said below in the proper places.

When the belly was open'd, we found some tract of the small intestines to be universally livid; and as two-and-twenty hours were not yet elaps'd since death, we distinguish'd the chyloferous vessels of that part of those intestines which was nearest to the stomach, that was distended with food; and for this reason we observ'd but a small quantity of bile in the gall-bladder. But in whom prominences were seated upon the ring of the pylorus, has been said in the twenty-ninth letter (*p*): as it has been hinted in the forty-third (*q*) what was the state of the urethra.

The trunk of the great artery, in all that part which belongs to the belly,

(*n*) In Addit. ad hanc Sect. Obs. 31.

(*o*) N. 34, & 35.

(*p*) N. 17.

(*q*) N. 9.

show'd here and there, internally, beginnings of future bone: and when look'd upon both internally and externally, instead of one cœliac artery, had three arising from itself; one of which was very small, two considerably large, but all very near to each other. The thorax had seventeen of its ribs broken. The left lobe of the lungs coher'd with the pleura. The superior vena cava, in the very extremity of it, appear'd to be in a manner eroded, as it were, on the internal surface; and the great artery, on its internal surface also, not far from the heart, was reticulated, for a considerable tract, with thick and white fibres: besides, at the curvature it had become indurated into a bony scale; and this disease was internal likewise.

Finally, the cranium, at the occiput, and the posterior parts of the sinciput, was broken asunder into fragments.

38. If I had chosen to attend to the principal cause of sudden death, this history ought to have been propos'd in the preceding letter; for you see from the comminution of the cranium into fragments, and those at the occiput, how great the concussion, not only of the cerebrum, must have been, but also of the cerebellum. Yet I chose to defer it to the present letter, not only for the reason I mention'd before, but also on account of the great number of ribs which were fractur'd.

From that letter you have examples wherein we saw the ribs also, though much fewer in number, and indeed some of the vertebræ dorsi, to be broken. Therefore, we not only pass by those things here, but that wound of the wool-comber likewise, which is already describ'd to you (*r*), and which was inflicted on the scapula, adding this one thing from anatomy; I mean, that we ought to take care, in wounds of that part, lest the upper limb of the same side be agitated: for the motion of this limb prevents those wounds from being easily brought to a cicatrix.

39. Before we treat, in the next letter, of wounds that relate to the belly, we must not omit here a wound which related to the belly and to the thorax at the same time; especially as it began in the thorax, which is the part we are now speaking of, and terminated in the same.

40. A taylor, of twenty years of age, was wounded by a foreigner, for a reason of very little consequence, by a double-edg'd and pretty broad knife, in the lower part of his right side. This happen'd on the 24th of March, in the year 1742; that is, on the very day when the resurrection of our Saviour was celebrated; a circumstance that made the fact more heinous.

He did not fall down after receiving the wound. But being immediately brought into the hospital, which was at some distance from thence, he vomited in the way, and discharg'd the excrements both of the intestines and bladder. When he came thither, he was cold all over his body; he had no strength, and no pulse; or, at least, his pulse was very obscure; and he scarcely could mutter over a few pious words. As the blood was discharg'd in very small quantity, the wound was for that reason dilated; but he show'd not the least sign of feeling. Therefore, after an hour, or a little more, from the infliction of the wound, he died without any difficulty of breathing, or any discharge of blood from the mouth.

Two days after the death of this patient, we began to dissect the body, accurately, in the same place, and continu'd the dissection the six following days; as it was very proper for our purpose by reason of the size and habit, which you could neither call fat nor lean. I shall take notice here only of what relates to the wound, and any thing else which occur'd unexpectedly.

The abdomen, which was neither tumid nor tense, and contain'd, nevertheless, such a quantity of blood as I shall mention, being cut into, and laid open, the surface of all the viscera appear'd to be slightly bloody. In observing the situation of these viscera, and among the others of the omentum, we found that, as it descended from the right side obliquely to the middle of the belly, it was drawn up on the left side, and roll'd together, so as to cover the stomach; and then we immediately went on to the examination of the wound.

The knife had enter'd the lower side of the right cavity of the thorax, betwixt the ninth and tenth rib; and after having pierc'd through the fleshy part of the diaphragm, near to those ribs, had pass'd through the nearest side of the liver, having enter'd it on the convex surface, at some distance from the lower edge, by a fissure about two inches in length; but having come out on the concave surface at a fissure somewhat less: so that the whole passage of the knife through the liver was not longer, in general, than two inches.

After it had come out from the liver, it was forc'd through the right kidney, at some distance from the upper part, passing obliquely, in like manner, from the anterior to the posterior surface, as in the liver; by a fissure which was almost one-half less in length than that in the liver. Finally, it had again pervaded the diaphragm, and had gone quite to the lower part of the cavity of the thorax, through the fleshy part of this muscle that lies behind the kidney: and, after having injur'd the trunk of the intercostal nerve, at the side of the twelfth vertebra dorsi, and a certain branch of the vena *fine pari*; and after having gone through such a number of other parts; it last of all wounded the neighbouring muscles which pass by the side of the spine: and these to the depth of an inch, or rather more, notwithstanding so many parts had been already pierc'd through at one stroke. Therefore, altho' neither in the intercostal muscles, nor in the diaphragm, nor in the liver, nor the kidney, nor in the side of the spine, nor in those muscles which I last of all mention'd, it had wounded any vessel of a considerable size; yet it had cut into so many smaller vessels, that within the short time for which life continu'd, no less a quantity of blood seem'd to have been effus'd, than if the emulgent vessels, or the vena *portarum*, or rather the trunk of the vena *cava* itself, all of which we found to be unhurt, had been wounded.

For, upon lifting up the intestines with the hands, a quantity of black blood was seen under them, and still more in the cavity of the pelvis; so that most of the persons who were present at the dissection, seem'd to think that there were twenty pounds at least: although, as it was so fluid that very few coagula could be observ'd therein, and as nothing of a polypous appearance was seen in the dissection of the whole body, either in the vessels, or in the heart itself, it is probable that it had also continu'd to flow from the incis'd vessels after death, and that it had increas'd the quantity of that which had been extravasated before death. This, at least, is certain, that,

at the end of the fourth day after the death of the man, we saw, even then, blood discharg'd from the very extremity of the wound which we have describ'd, at the side of the spine.

But whether part of the blood descended from thence, through the transfix'd diaphragm, into the belly; or whether, on the other hand, it ascended into the thorax of the supine carcase from the belly; is not easy to determine. This, however, is certain, that before the thorax was open'd; when, after removing the viscera of the belly, and exhausting the blood, we examin'd the diaphragm; blood issu'd forth from the last wound of this part; and, by pressing the hand upon that part of the diaphragm, something was perceiv'd to fluctuate above this place: and a kind of croaking and sound was heard, similar to that which arises from flatus included in the intestines. And, finally, when the thorax was open'd, some quantity of blood was found in the cavity on that side; and the lobe of the lungs therein was drawn upwards to a considerable degree.

For this lobe was every-where unconnected to the pleura; whereas the left lobe was connected thereto anteriorly, and at the side, but particularly on the back-part. Besides these things, there was nothing either in the thorax, or in the belly, that deserves to be taken notice of here. For it was to no purpose that we look'd whether there was any thing bloody contain'd in the bladder, by reason of the wounded kidney; as the small quantity of urine that was contain'd therein, was without any mixture of blood. But as to what we observ'd in the tunica albuginea of one of the testes, this has been already said on a former occasion (s).

Of the appearances, however, that I saw in the dissection of the head, these things ought not to be pass'd over; I mean, that the right vertebral artery, at least within the cranium, was four times as wide as the left: and that within the dura mater, not only externally, but where it invests the lateral ventricles of the brain also, the vessels were not distended with a smaller quantity of blood, than if the man had died of a phrenzy. So, also, in those ventricles, each of which contain'd about a spoonful of clear water, the plexus choroides were of a blackish colour inclining to red.

So in whatever part the medullary substance was cut into, small bloody drops distill'd here and there; and if you wip'd these away, and compress'd the cerebrum, other larger drops immediately burst forth: and we thought it altogether surprising, what should prevent the return of the blood from the cranium, unless we suppos'd some convulsive contractions to have been excited; in consequence of the injury done to the trunk of the intercostal nerve; which retain'd the blood there, in spite of the great extravasation thereof into the belly. And to these contractions you may also attribute the vomiting; although you, perhaps, have sufficient causes in the wounds of the kidney and diaphragm, from whence to account for the existence of this symptom.

41. But however these things might be; this you will, in particular, gather from the observation in question, (and from others similar thereto)

that if any surgeons happen to be not very well skill'd in anatomy, they may fall into very grievous mistakes, by supposing that wounds which enter betwixt the ribs, belong only to the thorax. That is to say, they are led aside by not being well acquainted with the arch'd situation of the diaphragm; and never observing that the upper part of the belly is, therefore, contain'd betwixt the ribs, they do not, in the least, suspect, that the viscera of this cavity may, at the same time, be injur'd by those wounds.

This danger is so much the more increas'd, if there be any cause in the belly, which drives the diaphragm up higher than usual: whether this be, as I have taken notice of in a fat woman (*t*), a quantity of pinguedinous matter, or of flatus, or of water, or even the bulk of the distended uterus, or of any other viscus; as, for instance, of the liver; whereby, even in a natural state, as I have already admonish'd (*u*), the right side of the diaphragm is frequently rais'd up. And the danger is still greater, if the wound is inflicted upon a person when in a recumbent posture, instead of standing upright.

Nor do wounds of this kind occur so rarely, but I can remember four instances at least; which you may add to the Sepulchretum; besides one of Glisson's (*x*), that certainly should have been inserted there, by those who compil'd and made additions to the Sepulchretum. The first is that of Mauchart (*y*), which is similar to the one produc'd above, from Valsalva (*z*), in this circumstance, that as much blood as was exhausted from the thorax, so much immediately flow'd in thither, by the wound of the diaphragm, from the belly.

The second is that of Goetzius (*a*). The third, of the celebrated Heister (*b*). And the fourth is that of Cramerus (*c*). And in all these cases, in fact, the wound descended from the thorax, which it had first enter'd, through the diaphragm into the belly, and had perforated the liver. Moreover, on account of the same confirmation, and position, of the diaphragm, which I have mention'd, and its declivity towards the posterior parts; it also happens, that if the wounds, inflicted upon the upper part of the abdomen, are continued to any considerable extent, not only the viscera of the belly, but those of the thorax also, will be wounded together with the diaphragm.

However, you see that wounds of this kind must be referr'd by us to the next letter; as we here attend to the part from whence they begin. You may therefore expect this letter shortly; and, in the mean while, farewell.

(*t*) Epist. 27. n. 2.

(*u*) Epist. Anat. 1. n. 13.

(*x*) Anat. Hep. c. 9. in fin.

(*y*) Eph. N. C. Cent. 1. Obs. 19.

(*z*) n. 3.

(*a*) Aët. N. C. Tom. 2. Obs. 181.

(*b*) Dissert. de Medicinæ Utilit. in Jurisprudens. n. 61. & seqq.

(*c*) Commerc. Litter. A. 1741. Hebd. 27. n. 1. ad cap. 2.