

propriety, plac'd in the number of the most alarming symptoms, and those which show death to be near at hand: and to this we should also add, that which I have describ'd to you in another letter (*b*), not, indeed, as being join'd with a pain in the intestines, which, by reason of their paralysis, had never taken place, but as being join'd with a great inflammation of them all. The next letter you are to expect will be on the subject of tumour and pain of the hypochondria. In the mean while farewell.

LETTER the THIRTY-SIXTH

Treats of Tumour and Pain of the Hypochondria.

FOR those reasons which I have given in the thirty-second letter (*a*), I pass over the very short section, upon the piles, which follows in the Sepulchretum, and come immediately to the two next sections to this, that is to the sixteenth, and seventeenth, and intend to comprehend the arguments of these two sections, which are tumour, and pain, of the hypochondria, in this one letter. For these two affections are frequently join'd together, as it will be easy for you to perceive, from those very observations of Vallalva, with which I begin.

2. A woman of forty years of age, of a yellowish complexion, had long been troubled with a hardness in the right side of her belly, which went down quite to the os ilium, and below it. If you touch'd the tumid part it was painful. She was thirsty. For about a month before her death, she complain'd of a pain in her stomach, after taking food, and breath'd with difficulty. On some of her latter days a vomiting had come on; but on the two last, a very severe and violent pain.

The abdomen was found full of a yellow water, which was bitter in its taste, and, like the serum of the blood, coagulated when on the fire. The stomach was narrow in the middle, so as to resemble the straightness of the pylorus, and, in some measure, to bear the appearance of two stomachs. The liver had grown out into a great bulk. For with its right lobe it reach'd almost to the lower part of the belly. The substance of this lobe was universally indurated, and, in many places, distinguish'd with whitish bodies, some of which, that were the largest, were equal to a filbert in magnitude: when it was cut into, it show'd, in some places, a beginning of erosion, and a putrefaction of the juices to have been at hand. And the left lobe of the liver, being in like manner indurated, press'd upon the stomach in that part,

where I have said it was so much streighten'd. The coats of the gall-bladder were become thick, and the cavity very much streighten'd; and in the cavity, was contain'd a black, thick, and viscid bile. In the abdomen of this body was no appearance of lymphæducts.

In the thorax the lungs were whitish, and variegated with spots of a blackish hue: the left lobe was connected, in some degree, to the back; but the right was every where free. The ventricles of the heart contain'd a fluid blood; yet in the right was the slight beginning of a polypous concretion.

3. In three observations which I have produc'd in other letters (*b*), I have describ'd the stomach to be double, as it were, yet not divided by so great a constriction, as in the present case; though I have taken notice of a constriction, which was still greater than this, from Blasius (*c*), in a man who had been, in every respect, healthy, except his extreme hunger. Nor did I doubt but structures of the stomach, of this kind, had existed from the original formation of the body (*d*): for which reason, I did not search after the cause of these constrictions in the liver, although, in the two first of those observations, it was extended towards the left side, more than it naturally is, but not hard, especially as in the third, the liver was within its natural bounds: nor indeed in the last-mention'd observation, did I account for the vomitings, and pains of the stomach, from that constriction in particular, as they had not been observ'd in the two former.

Yet here I shall ascribe the same symptoms to the greatness of that constriction, inasmuch as it seems to have been more and more increas'd, contrary to what generally happens in the latter part of the disease, from the hardness of the liver increasing every day, and compressing that part of the stomach in particular. For not only reason, but manifold observation, confirms how much the functions of the stomach are disturb'd, when this viscus is compress'd, and depress'd, by the increas'd bulk of the liver: as you will see from the observation of Bartholin (*e*), on a girl of six years of age; and of Fantonus the father (*f*), on a priest, the latter of which had the bulk of the liver so much increas'd as to fill "the whole epigastrium," and the former, so as to occupy almost "the whole abdomen." It is true the liver, when not at all morbid, stretches its thinner part, sometimes, quite to the spleen, as I have taken notice in a former work (*g*): but when it is diseas'd, it has, sometimes, scarcely any bounds to its extension through the belly. Neither of which circumstances ought to be unknown to physicians, and surgeons, lest they should be deceiv'd, in some cases, by that appearance which is common.

Where the liver is found there is room only for suspicion; as for instance, if a wound, by chance receiv'd upon the left hyochondrium, be attended with symptoms different from those, which generally attend the wounds of the viscera, that every body knows to be plac'd there. But when signs of a diseas'd liver are not wanting, as in the woman we are speaking of, the yellowish complexion, and hardness, beginning from the right hyochondrium,

(*b*) Epist. 16. n. 38. epist. 26. n. 31. epist. 30. n. 7.

(*c*) Ibid. n. 8.

(*d*) Epist. 26. n. 32.

(*e*) Sepulchr. l. hoc. sect. 1. obs. 4.

(*f*) Obs. anat. med. 24.

(*g*) Advers. 2. animad. 2.

it will be less difficult, in such a case, to ascertain the extension of the liver to that part, to which the same continued hardness extends itself.

But whether in the other woman, whose history follows, the continuation of the pain, if you press'd the part with your hand, went so far as to prove the same thing, may better be conjectured by us, than affirm'd; as Valsalva, who was then a young man, and wrote his observations on the living body with great brevity, has not determin'd the question.

4. A woman of sixty years of age complain'd for a long time of a pain above the umbilical region: she had a thirst; she cough'd; and spat up a catarrhus matter. Last of all, she breath'd with difficulty: a few days before her death her belly swell'd suddenly to a great degree; her feet were affected with an œdematous tumour. At length, that pain going off by degrees, she came to the final period of her life.

In the belly was a great quantity of limpid water: but no traces of the lymphatic vessels. The spleen was twice as big as in its natural size. The liver was hard: and the gall-bladder was full of smooth calculi. But in another part of the liver, a congeries of vesicles was seen adhering to it, from which, when lacerated, a serum was discharg'd. And within the substance of the same viscus, towards that part which was turn'd to the diaphragm, was found the cavity of an abscess, which occupied more than a third part of the liver. The matter of the abscess had burst forth into the cavity of the thorax, on the right side, which was universally full of a sanious pus. Yet the lungs were found.

5. As you have been inform'd into what part the abscess of the liver had burst, I do not doubt but you now wish, with me, that all the symptoms which attended a case of this kind, that, perhaps, had never before occur'd to any one, and particularly the latter symptoms, had been collected by Valsalva with more exactness. For Stalpart (*b*), when he wrote of a certain man, in whom pus had pass'd from an abscess of the liver, not plentifully, nor into the cavity of the thorax, but in a small quantity, and into the lungs, through a fistula that perforated the diaphragm, which was become consolidated with both of these viscera, added no example of the same appearances having been seen in dissection, by any other person, contrary to his usual method, and contrary to what might have been expected from his extensive reading. And after him, if we look for observers that are to be depended upon, as we certainly ought, I do not, at present, remember to have read any author, who has met with the same appearance, and still less with the same as Valsalva has describ'd. Who, I suppose, has left in writing all the symptoms he was able to collect. But amongst them you see to what cause the tumour of the belly, and the œdematous swelling of the feet, are to be ascrib'd. And there may be a difficult respiration, from the liver being thus affected, even when the diaphragm is sound; as there may be a cough also, the origin of which was so much the more ambiguous in this woman, as it had an expectoration of catarrhus matter join'd with it.

There are extant here in the Sepulchretum (*i*), histories of abscesses in the liver, to the number of twenty. But there is not one of them all, in which

(*b*) Obs. rar. 46. cent. 1.

(*i*) Sect. 17. obs. 2.

a greater care in the observation of the symptoms is not to be desir'd, if you except that of the man of Noremberg (*k*), which is describ'd by Coiterus. But in him a vomica had possess'd the flat surface of the liver, so that it appears to have open'd itself into the cavity of the belly. And on the same flat part, it was in a young man whom Paawius (*l*) dissected; but this had not discharg'd its pus; so that the foramen, "which was big enough to admit two clenched fists," form'd by an "erosion" of the diaphragm, "in that part which lies on the left side of the liver," is not suppos'd to have been form'd by the eruption of the pus: besides, none of the symptoms, which preceded the patient's death, are related, as none are, in like manner, in another case (*m*), wherein the same Paawius found two ulcers in the gibbous part of the liver, which penetrated inwardly.

Nor will you read the peculiar symptoms of the liver being suppurated, in the observation of Blasius (*n*), where the abscess was of such a nature, that the coat of the liver was the only part which separated the pus from the diaphragm, to which the liver was closely connected. And these things I took notice of that you might perceive the more clearly, how very desirable it was that what others had not done, could have been done by Valsalva; I mean in regard to the symptoms, which are, for the most part, common to abscesses of the liver, and which are not yet ascertain'd, or, at least, such as are not in the number of those that Coiterus has remark'd, besides a cough, and a thirst, which Valsalva has also remark'd: and whether those are among the signs of a ruptur'd abscess of the liver, which are pointed out by Coiterus, in the following manner: "the tumour, and hardness," which had been in the right hypochondrium, and the region that lies beneath it, "vanish'd; and the patient being seiz'd, on the same day, with some swoonings, expired." For Valsalva mentions nothing to this purpose, but that the pain, which had been above the umbilical region, "went off gradually," perhaps from the matter of the abscess being carried off, more and more, from thence into the thorax. And what detriment happen'd to the action of the thorax, from this metastasis, he does not so much as hint at; as he, likewise, does not say a word of respiration being made more difficult, nor yet a word of swoonings.

6. If you read over the great number of histories, which were pointed out just now, in the Sepulchretum, you will find that the last-mention'd symptoms have no more been observ'd, in those where a vomica of the liver had discharg'd itself into the cavity of the belly (*o*), than sudden death itself, if you except a man whose case I have mention'd, as being describ'd by Coiterus (*p*): and, on the other hand, you will read that a baker (*q*), whose liver had suppurated, "was sometimes seiz'd with a swooning," though, at the same time, the "membrane of that viscus was untouched and found. Nevertheless, both of these circumstances, which are not to be met with in those histories, has so often occur'd to physicians, and among others, to my preceptor Albertini, that he press'd it very earnestly upon practitioners, not to suffer a patient to

(*k*) §. 6.(*l*) Ibid. §. 7. 8.(*m*) §. 8.(*n*) §. 16.(*o*) §. 2. & 5.(*p*) §. 6.(*q*) §. 14.

be mov'd when there were symptoms of an abscess already form'd in the liver; not because he was ignorant that motion has been prescrib'd, at this time, by authors, who are, in other respects excellent, which I also read has succeeded happily sometimes in our memory; but because he suppos'd, that without using motion, it would, probably, happen, that the pus of an abscess so ruptur'd, without injuring the membrane of the liver, might be carried down to the intestines, through the branches of the biliary duct; and because from a contrary practice, he foresaw how easily the external membrane of the liver might be ruptur'd, so that the pus should be pour'd out into the cavity of the abdomen, and kill the patient instantly, by bringing on a syncope.

For this he remember'd to have happen'd at Bologna, at the time he was a young man, when an excellent physician, and, at the same time, an eminent surgeon, following the practice of those authors, had prescrib'd motion to a virgin who had a suppuration in the liver; by which means the pus being pour'd out into the abdominal cavity, the patient died soon after, in the arms of the women by whom she was supported. And he had afterwards observ'd the same thing to happen, even without motion, at least with a slight motion, such as we naturally use in bed, or while we are rising from bed, in several persons, but particularly in a noble marquis, who had an abscess in the concave part of the liver. And by these observations I was influenc'd to suspect, that almost the same kind of death, in another nobleman (all the symptoms of whose disorder I will write to you accurately at another time (r)) was to be accounted for from almost a similar cause. But he so much the less approv'd of motion, because the abscess is sometimes so large, or of such a kind, that although it may find an exit, by chance, through the biliary ducts, yet the patients cannot be cur'd with that success, which had happen'd to him, in a matron of the first rank, and in like manner in a servant-maid, both of which he assur'd me he had perfectly cur'd, by a long perseverance indeed, but not by any other medicines than turpentine resin, and whey, and afterwards by the juices of ground-ivy, and the consolida media.

For where a vomica of the liver has open'd a passage for itself, through the muscles of the abdomen, two instances of which happen'd at Bologna, although even then, all endeavours were us'd not only by internal, but by external remedies applied to the cavity of the abscess, that the liver might be heal'd, yet they were able to bring about this effect, only in one of the cases: but in the other, in which a matter sometimes was discharg'd, that resembled water wherein fresh meat had been wash'd, and sometimes a yellow humour, they could not obtain the same success; and the patient died at last: notwithstanding in him the tumour had not been open'd so much by the force of nature, as by the error of art. For the physician, although a man of good reputation, and the surgeon with whom he was associat'd, by no means attending to this, that the jaundice had preceded, and other appearances, in like manner, which show'd the liver to be affected, had suffer'd themselves to be deceiv'd by the touch, perhaps for the same cause, which

(r) Epist. 40. n. 28.

was found by Fantonus the father (*s*), in the extenuation of the abdominal muscles, so as to imagine the tumour, which was actually in the liver, to be in these muscles; for which reason, by applying emollient cataplasms, they had, with a mistaken diligence, brought on a suppuration.

You see what it is I disapprove. For I am not one of those who hold that where nature, itself, urges the suppurated tumour of the liver, to the muscles of the abdomen, the pus should be suffer'd to remain there, for a longer time than is necessary, and by this means be increas'd every day, become more acrid by stagnation, infect the blood, erode still other and other parts of the liver, and open a passage for itself, which would be less expedient, as for instance, into the stomach; for into this cavity was such an abscess found to have burst, by Vogelius (*t*), through a large foramen; and into the thorax, as I have shewn above; or, which happens more frequently than either of the foregoing, into the cavity of the belly, from whence a slow and miserable death is brought on, if the immediate danger is avoided, which I have said was seen by Albertini (*u*), and is confirm'd by the illustrious Van Swieten (*x*). His words are, "there is danger lest a swooning, and sudden death, follow, at the time when an abscess of the liver is ruptur'd: for the branches of the vena portarum, that were before press'd upon, by the vomica, being now free from that pressure, by the discharge of the pus, may easily be ruptur'd from the blood rushing into them with impetuosity; especially as they have been macerated, and almost half-eroded, by a very acrid pus having so long lain upon them." Wherefore, agreeably to the opinion of this, and other authors of weight, I would, before these fatal accidents could happen, inform the patient, and the intimate friends, or relations, of the patient, how many and how considerable dangers threaten'd, if a free opening were not given to the pus, as soon as possible: and yet that if this free opening were given, with all that caution which the case requires, a recovery was not always, but sometimes only, to be expected, and that this was signified by the aphorisms of Hippocrates (*y*); and even that those abscesses of the liver also had been more than once heal'd, from which when open'd, far different humours were discharg'd, from what Hippocrates had wish'd: to which kind of instances you will also add that, although the cure was long, and difficult, which is describ'd by the celebrated Jo. Peter Albrechtus (*z*)

But now to come back from this digression, let us go on, from the consideration of those symptoms, which Valsalva has not taken notice of in the history of this woman, to the consideration of those that he has remark'd.

7. Do not suppose that the congeries of vesicles, adhering to the liver, and when lacerated discharging serum, was any thing else but hydatids, as he himself has expressly said, in a separate paper, that they were such as are frequently found to adhere to the morbid liver, externally. And you may with propriety suppose, that the quantity of limpid water, which was found extravasated in the belly, was the effect of many, and without doubt, of the larger vesicles being burst asunder, by the quantity of serum, with which

(*s*) Obs. anat. med. 13.

(*t*) Aët. n. c. tom. 5. obs. 90.

(*u*) N. 4.

(*x*) Comment. in Boerh. aphor. §. 939.

(*y*) 44. & 45. f. 7.

(*z*) Eph. n. c. dec. 3. a. 5. obs. 22.

they were turgid, or, at least, in some measure. I, therefore, would not have you suppose, that these were of the same nature, of which those peculiar vesicles were, fill'd with a yellow humour, that you will read the description of, from the observation of Valsalva, in the third of the *Epistolæ Anatomicae* (a).

But I shall not repeat those histories here, notwithstanding they all relate to disorders of the liver, and some to abscesses of it, as I am determin'd to pursue my original method, which is to avoid that negligence, in consequence whereof, you will find that a great number of repetitions have been admitted into these sixteenth and seventeenth sections of the Sepulchretum. For to omit taking notice that in the former section the twelfth and eighteenth observations are the same, in the latter those are certainly the same, which are pointed out in the second observation, under article the tenth, and the twentieth, and in like manner, the fourth observation, and article the fourth of the eleventh, and that which is in the following eighth article, and that under number two, article fifteen, and under the same number eleven, the articles two, and six; to say nothing of the same, which are repeated *totidem verbis* in the scholia to the sixteenth, and eighteenth observations. But without repeating what I then wrote, I shall add only three things to those histories of Valsalva.

8. And first, to that which is given there under number eight, it is proper I should adhere to what it was not necessary to add in that place: I mean that the serum, with which the belly overflow'd, emitted a particular kind of halitus, which smell'd like what often proceeds from persons in fevers, and indeed frequently from their urine: but that when put on the fire, in a short time it became so turbid, instead of continuing limpid, as to resemble cow's whey not well deputed: and, at length, that by the force of the fire it was wholly dissipated. Nor should this circumstance be omitted, that about the lumbar glands, some slight traces of the lymphatic vessels, which were much emptied, had discover'd themselves.

9. But to the next history which I have subjoin'd to that (b), nothing remains to be added to make it compleat, according to the observation of Valsalva, after having sufficiently describ'd it to you in a former letter (c). You will perhaps rather expect from me, that as the vesicles describ'd in that history, were contain'd within a very large one, as within a purse, I should defend the opinion of Valsalva against many authors, the number of whom I see is much increas'd, within these few years, in particular, and who give it as their opinion, that the vesicles found in encysted tumours, which sometimes occur in the liver, and the other viscera, do by no means relate to the glandular follicles being enlarg'd. But I have no disposition, nor indeed is there any necessity, to fall into that dispute again, since the opinion of Valsalva did not depend upon that history only, nor upon any observation of vesicles whatever.

You may even see that Vallisneri, who, in like manner, long before them, saw bladders, or cysts, pregnant with other smaller bags, or vesicles, did

(a) N. 8. 9. 10.

(b) N. 9.

(c) XXI. n. 55.

not, in that very writing which I then refer'd to, take any vesicles whatever, for glandular follicles dilated. Nor did Valsalva find vesicles only in encysted tumours of the liver, for in that history, certainly, which I have just now compleated to you, he had found the whole liver made up of vesicles: although even in those cystic tumours of the same viscus, it is not put beyond all doubt, that the included vesicles can by no means relate to glandular follicles. And what if vesicles not unlike these, have sometimes appear'd in external encysted tumours? Do they, as they are external parts, for that reason want glandular follicles? But, as I have already said, I would not wish again to enter into these disputations.

10. It is much better to attend to this circumstance, likewise, in the last of those histories of Valsalva (*d*), which Malpighi expressly commended in it; I mean the biliary duct communicating with the abscess of the liver, by a large orifice, and dilated in the remaining part universally, so that it manifestly appear'd how this duct might take up the vesicles from the cavity of the abscess, and transmit them quite to the duodenum. For which reason we have the less occasion to doubt, whether this duct does not frequently transmit, through its corroded branches, blood, and pus, which it has receiv'd from vomicae of the liver, down to the intestines, in the manner that is taken notice of above (*e*); and as the biliary ducts being much enlarg'd, having the orifice, by which the bile flows into the duodenum, big enough to admit a little finger, with great ease, evidently confirm'd, in a certain girl (*f*), who having, at different times, discharg'd many pounds of pus by stool, had a great quantity of the same purulent matter in many abscesses of the liver, in those ducts, and in that intestine.

These things then being granted, and as we have frequent, and evident, examples of a similar circumstance in the kidneys, from whence the ureters transfer pus and blood to the liver, I cannot help being surpriz'd, that some very learned men should, nevertheless, sometimes seem so far forgetful of this open passage from the liver, as to assert that the mesenteric veins "often produce purulent diarrhoeas, and carry out the corrupted substance of the liver," as if these vessels convey'd humours, from the liver, to the intestines, and not from the intestines to the liver; and that others hold it impossible to conceive, how a person could vomit blood, and discharge it by stool, without any mark of injury in the stomach, when, at the same time, they are not ignorant that in each lobe of his liver, which was very much enlarg'd, a considerable abscess was found.

But let us return to the observations of Valsalva, which I have not yet publish'd; and to those two relating to the liver, which I have describ'd above, let me add as many which relate to the spleen.

11. A young man of about twenty years of age, having, from an original strength, and firmness of constitution, degenerated into the state of a Valetudinarian, for two years past, attributed this change in his health to hunting, and dancing, and to other things of that kind, which he had indulg'd himself greatly in the practice of, and to the effect of the business by which

(*d*) N. 10.

(*e*) N. 6.

(*f*) Eph. n. c. dec. 3. a. 4. obs. 73.

he earn'd his livelihood; for he was by trade a flax-dresser. He was become pallid in his countenance, and complain'd, according to the custom of hypochondriac persons, of slight disorders of the belly, and thorax, which recur'd now and then. At length, in the summer of the year 1688, a large and hard tumour discover'd itself in the left hypochondrium, with a sense of weight, and a difficulty of respiration in walking. To these symptoms was, suddenly, added a large vomiting of blood, with a great loss of strength, an increase of tumour, and a fever. By the assistance of remedies he was freed, on the first days, from the vomiting, and after that from the fever; and having us'd chalybeates for the three succeeding months, the hardness of the tumour was also remov'd: yet it continued equally large, with a pallid, and, as it were, almost citron colour of the countenance.

But in the month of January, the vomiting of blood returning two or three times, he was seiz'd with a violent fever, attended with a hard and quick, though at the same time small pulse, a pain, weight, and tension, of both the hypochondria, and an inextinguishable thirst. However, on the ninth, or eleventh day, of the fever, he was taken off by a very placid kind of death.

The body being dissected, it was amazing what a small quantity of blood remain'd in all the vessels. And, for this reason, the viscera of the belly attracted the eyes by an unusual paleness, and almost whiteness, except the spleen which preserv'd its natural colour; but this viscus was so much increas'd, as to exceed the liver in bulk, and weigh four pounds and a half. Yet it was not harder than it generally is, except that on its convex surface, in one or two places, was contain'd, deep within its surface, a substance of a very solid nature, of the bigness of a large nut. In the trunk of the splenic vein, polypous concretions lay hid, which divided themselves, together with the branches of that vein, in a very elegant manner, even within the spleen. The liver was very pale, except that here and there it was mark'd with black spots. The gall-bladder, which was more pale than the liver, and even whitish, contain'd a little bile of a very dilute colour, a similar bile to which was not wanting in the fundus of the stomach. The other parts of the belly were found.

In the thorax the lungs on their anterior surface were pale; but on the back-part they appear'd inflam'd, and were of a black colour, inclining to purple: but, when cut into, they discharg'd a great quantity of frothy serum. In the right ventricle of the heart was only a small polypous concretion; and in the left only a beginning thereof.

12. A great number of remarks might be made upon this history. But a regard must be had to brevity, and therefore many things must remain undiscuss'd. The large, and frequently-repeated, vomiting of blood in this young man would have been easily accounted for, at the time when it was not doubted, but any thing might be sent from the spleen into the stomach, by the vein which is call'd *vas breve*. But after that the circulation of the blood, and experiments, have taught differently, the circumstance requires quite a different explication; as, for instance, if we say, that in proportion as less blood can be brought by the *cæliac artery* into the obstructed spleen, so much the more must be carried through the other branches of the same artery to the stomach, or that the return of the blood from the stomach,

through the *vas breve* is impeded by the tumefaction of the spleen, which frequently, and greatly compresses this vessel, betwixt itself and the dilated stomach; so that by one or the other of these hypotheses, or any other of a similar kind, it may be understood, how the blood can open an exit for itself, from the over-distended vessels, into the cavity of the stomach, which is already particularly dispos'd to such a rupture.

Nor will it I suppose seem to be any objection with you, that the stomach of this young man has been said to be found; for you will imagine that the blood had been discharg'd by a great number of orifices, that were very small, into this viscus, which was probably furnish'd with very lax fibres.

But if you examine the ancients themselves, or those who continued for some time to be their sectaries, and look into the dissections made by them, and collected in the *Sepulchretum* (*g*), of such patients as had labour'd under a disorder of the spleen, and a vomiting of blood at the same time, you will find only one (*h*), which shows any vessel to have been found manifestly open in the stomach. This was written by Riolanus, in the second book of his *Anthropographia* there pointed out, yet not in the fifteenth chapter, but in the seventeenth, and about the end. To whom I shall readily give credit in the affair, but as I just now explain'd it, in regard to the *vas breve*, which was dilated to the thickness of a little finger: I will also believe, if you please, that he found the same vessel open'd into the stomach; although I see that he is there much dispos'd to magnify those things which confirm his own opinion.

For I omit that, when speaking of him, who, as you have it in the fifth book of the *Epidemics*, was suffocated by a vomiting of blood, and saying "that a great quantity of blood had come forth at the spleen and downwards," he adds nothing in relation to the proper interpretation of these words; as if he chose rather they should be so understood, as to relate to the discharge of blood within the belly, (which the very ancient author of that book could not have seen, as it was not usual then to dissect human bodies) rather than to very red spots in the skin, appearing, according to the interpretation of Vallesius (*i*), in the region of the spleen, and beneath it. I therefore omit this. But I can by no means pass by his saying, that in the body of cardinal Cibo, who died after the same kind of vomiting, "Valverda had remark'd (in the fifth chapter of the sixth book) that by compressing the spleen, the stomach was fill'd with blood, which was carried thither by the *vas breve*."

For Columbus, who had dissected the body, has not hinted any-thing of this experiment, as he has said nothing more of the dissection, than what is read in the *Sepulchretum* (*k*): and Valverdes, who has spoken of it, has made use of such words, that you cannot properly understand, whether the stomach "was turgid with blood" internally, or externally, when the spleen was compress'd; and indeed Sanctorius, who had inspected both of the authors, understood them so as to write what you will see in the scholium, sub-

(*g*) L. 3. f. 8. obs. 71. & seq.
(*h*) Obs. 73.

(*i*) Comment. in eum locum, n. 37.
(*k*) Obs. cit. 73. §. 2.

join'd to that observation of Columbus: "while the region of the spleen was compress'd, the blood regurgitated to the orifice of the stomach."

Yet many bodies, although they were dissected after very great, and fatal, vomitings of a bloody humour, or even of blood itself, have shown no sign of an open, or eroded, vessel in the stomach; and even the *vas breve*, notwithstanding the spleen was much bigger than in its natural size, was extremely small, and the roots of it, though they reach'd to the external coats of the stomach indeed, yet scarcely reach'd to the internal: observations of which kind you may find even in the *Sepulchretum* (*l*).

Wherefore, the blood is either brought from the intestines, into which it had burst, or through the biliary vessels, from the liver, which the celebrated Van Swieten (*m*) thought to be the more probable; as, having examin'd with great care all the viscera of the belly in the body of a person who died of a disorder of this kind, he could no where find any appearance of a ruptur'd vessel, nor any considerable injury of any kind.

Indeed, there is also extant an observation of the celebrated Budæus (*n*), which I have already pointed out, in a woman, in whom, after having vomited a great quantity of matter, similar to grumous and corrupted blood, although she had the *vas breve* full of the same kind of matter, and almost equal to a finger in thickness, yet the substance of the stomach was without any conspicuous veins, and the gall-bladder was enlarg'd, and turgid with the same matter, so that it was easy to perceive, from whence this matter had come into the stomach, which even then contain'd a large quantity.

But I would not have you suppose from hence, that it is my opinion blood can never burst into the stomach, from the *vas breve*, in consequence of the direction of the blood being preternaturally chang'd for a time. For it does not escape me what Georg. Wolffg. Wedelius (*o*) has said was found in a matron, after a vomiting of blood; what Jo. Dan. Dolæus (*p*) in a girl; what Stangius and Hillerus, jointly, according to Hoffmann (*q*), in a young man: the last of which observations, I have taken notice of to you elsewhere: and the two first I imagine are the same that I remember to have read in Stahl (*r*). In each of these bodies the spleen was either larger, or harder, than it naturally is: the *vas breve* was also either thicker, or in part turgid with blood, or at least conspicuous by its black colour, in the inside of the stomach, and had its branches there ruptur'd, or some one of them so far pervious into the stomach as to admit a probe by that passage, or flatus, or even blood, when this vessel was gently compress'd.

Yet although any person, who is not ignorant how easily either a probe, or flatus, or impell'd humours, may open to themselves a passage, after death, through the lax coats of the distended branches of the vessels, which was not before open, will perhaps be in some doubt as to these observations; yet you are at liberty, for me, to admit of them, so you do but remember that they were few, when compar'd with the others: and that we cannot,

(*l*) In addit. ad. cit. sect. 8. obs. 11. & 13.

(*m*) Comment. in Boer. aph. §. 950.

(*n*) Eph. n. c. cent. 1. & 2. obs. 105.

(*o*) Earund. dec. 1. a. 9. obs. 20.

(*p*) Earund. dec. 3. a. 5. & 6. obs. 257.

(*q*) Medic. rat. t. 4. p. 2. f. 1. c. 3. obs. 2.

(*r*) Dissert. de vena port. porta malor. f. 3.

therefore, readily assert with Wedelius (s), "that a bloody vomiting most frequently arises from a preternatural opening of the vas breve." And although he should answer in regard to every one, according to what he observ'd in a young student, that the vomiting of blood returns, chiefly, at the time when the patient lies on his right side, and that therefore it was necessary for him to lie on the left side, as he had order'd; would it from thence follow that the blood came forth from the vas breve, as if no other vessels besides this went to the left side of the stomach?

But whether these, or any other passages, for the blood, evidently lie open into the stomach, at that time, or, which is generally the case, no passages at all are open'd; for you will even read in the commentaries of the famous Academy of Petersburg (t), of a man who was carried off by a sudden death, whose stomach was found quite full of coagulated blood, and yet "perfectly sound," whereas "in the spleen, on the contrary, were found evident marks of putrefaction;" whether, therefore, passages through which the blood has been discharg'd, do, or do not, manifestly appear, you will always explain, after some of the methods which have been hinted at by me, or by others, or at least after some similar method, not only the observations that I have taken notice of, but also those which occur in this sixteenth section of the Sepulchretum (u), of the spleen having become more than once tumid, but decreasing after a very large vomiting of bloody serum, or blood; and to these you may add that which Jo. Maurice Hoffmann (x) has publish'd, from the papers of his father: although where it is not well-ascertain'd by dissection, what part is diseas'd, or what part is sound, the fault may be unjustly attributed to the spleen, which ought to be thrown upon some other part that is near it, or even upon the stomach itself.

13. You may enquire here, why therefore in the young man in question, whose spleen, without doubt, was not free from disease, not only this viscus had not its tumour diminish'd by a large vomiting of blood, but even increas'd? To which may be answer'd, that a great loss of strength through the whole body, from a violent profusion of blood, being added to the great laxity of this viscus, which was already become very infirm, the blood could not be propell'd, and carried through it, but with great difficulty, especially as it was become more inert from this profusion; and that therefore it was under a necessity of stagnating more in the spleen, by which that viscus became more and more relax'd. But it may seem much more surprizing, as the vomiting of blood return'd two or three times, in the latter end of the disease, how so violent a fever could follow these vomitings, and be attended with those signs which seem'd to signify some inflammation in the hypochondria, of which, perhaps, these red spots, distinguishing the liver here and there, were tokens.

For the blood which remain'd in all the vessels, was in so small a quantity, and had such an inertia as you would naturally suppose to be the consequence of those hæmorrhages, as the dissection demonstrates. And not

(s) Obs. 20. cit.

(t) Tom. 1.

(u) In schol. ad obs. 13 & 14.

(x) Eph. n. c. cent. 9. & 10. in append. n.

1. obs. 6.

to speak of the appearance itself, the small quantity of blood was argued from the paleness, and almost whiteness of the viscera, and at the same time the inertia, especially when considered in conjunction with the small quantity of bile, which was of a colour extremely dilute. In the bodies of cachectic persons, I have often observ'd the cortex cerebri to be very pallid, and the medulla to be much whiter than usual, in consequence of the sanguiferous vessels, which go thereto, being some empty, and some semipellucid, and for that reason scarcely at all obstructing the enquiry of the eye, that should endeavour to discover, by looking externally, the parts whence the small roots of the nerves go out from the trunk of the medulla, so that I have sometimes much wish'd for brains of this kind, either in order to see these parts the more easily, or to demonstrate them. However, whether the small quantity of bile, and the very dilute colour of it, signified that the more acrid particles were contain'd in the blood, you may of yourself determine. In the mean while, I will enquire what that was, or rather what that was not, which the spleen of this young man contain'd, deep within its substance, in one or two places, of a more solid nature, and of the bigness of a large nut.

14. You have in one of the two sections of the Sepulchretum, which I first mention'd, that is in the seventeenth, an observation (*y*) of the spleen containing, within its substance, a steatoma consisting of an " adipose matter, " and of the bigness of a nut." You have, in the same section, many observations of the spleen being become in part cartilaginous, or in part bony, or even, as Pechlinus (*z*) asserts, stony; to which you may join other observations, not only from the preceding section (*a*), but also from the first of the former book (*b*). But I believe that induration, which was found in this young man by Valsalva, was of neither kind; for either of them would have been easily known: and he himself, when he had found in the old woman, of whom I spoke to you in the twentieth letter (*c*), a bone within the external part of the spleen, did not in the least hesitate to affirm, that he had found a certain bony body of a spherical figure. I should therefore imagine that it was of some other kind, or if it was of either kind that I have spoken of, I should suppose it was of the second, that is the beginning of a bony or stony concretion, rather than of the first.

For this is much the more frequent in the spleen, not only as a great number of observations, pointed out in the Sepulchretum, show, but as others also, which are scatter'd up and down, in anatomical writers, and are easily to be found, confirm. Wherefore, you will find a great number, in like manner, in my letters which I have already sent (*d*), or which I shall send hereafter. However, I would not deny but this has been more frequently observ'd in old men, than in young, and likewise in the coat of that viscus, rather than within the substance of it. For in the coat, or at least on the external surface, after those who first observ'd these appearances, as

(*y*) 17.

(*z*) In additam. obs. 2.

(*a*) In addit. obs. 1. & schol.

(*b*) In addit. obs. 31. & schol.

(*c*) N. 41.

(*d*) Epist. 7. n. 9. & 11. epist. 10. n. 19. epist. 24. n. 18.

Andernacus (*e*), Vesalius (*f*), and Columbus (*g*), they have continued chiefly to be seen.

Yet this appearance has even been seen, sometimes, in young men, as by the celebrated Fantonus (*b*), and by myself (*i*): nor are observations wanting, which show it to have existed within the coat likewise. For Carolus Stephanus (*k*) formerly admonish'd, that it was necessary to cut deep into the substance of the spleen, "that we may see whether there are any calculi in its substance, as they sometimes have been found;" and you will read here in the Sepulchretum (*l*), that a stone, of the bigness of a chestnut, "had been found in the spleen of a beautiful young woman:" and in the eighteenth section (*m*), that the spleen, which was immoderately enlarg'd, "was full of very white stones;" and in another (*n*), "that it contain'd many stones;" to omit mentioning others taken notice of by Lentilius (*o*), and among these, "two pretty large stones, besides many others which accompanied them:" and I myself will, on another occasion, describe to you a case, in which I found a bony body going inwards, from the coat of the spleen, that was also bony; and to this class I should likewise suppose, that, which I just now said was seen by Valsalva, in the old woman, was to be refer'd. And what will you say to this, that Littre (*p*) show'd to the Royal Academy of Sciences at Paris, not only the "external membrane," as some write, but the whole spleen of a certain old man become bony: and in the Musæum of this university, we have another, taken out of a body which was publicly dissected in the college, before the beginning of the present century.

15. And as this spleen has hitherto been describ'd by no body, I hope it will not be disagreeable to you, if I give you the account of it. As I have, by the consent of the celebrated Vallinieri the younger, who is governor of the Musæum, diligently examin'd it, as far as could be done externally. It is seven inches long, and four inches broad, in its broadest part, and at one extremity more than two inches broad; for with the other it terminates in an angle: in one place it is as thick as the little finger, in other places less by one half, and in many places, but especially at the borders, much thinner. It is of an irregular figure, and curv'd longitudinally: of an unequal and tuberosus surface, yet more so on its concave, than on its convex part. Almost every where about the edges are to be seen the dried remains of the membranous coat: these remaining parts go from thence to each surface, but most evidently to the hollow surface, which is still evidently invest'd with its membrane, and for that reason appears of a yellow colour inclining very much to a brown; but the convex surface is of a yellow colour inclining to white, if you except some places in which the membrane remains, just as it does on the hollow surface. And it is probable that when they pull'd away the spleen from the diaphragm, to which it adher'd very closely, they tore the membrane away from the convex

(*e*) Apud. Bauhin. theat. anat. l. 1. c. 43.
in adnot.

(*f*) De fabr. corp. hum. l. 5. c. 9.

(*g*) De re anat. l. 15.

(*b*) De obs. med. anat. ep. 8. n. 10.

(*i*) Epist. 24. n. 18.

(*k*) De dissect. part. corp. hum. l. 3. c. 40.

ubi de liene.

(*l*) Sect. 16. obs. 20.

(*m*) Obs. 22.

(*n*) Obs. 25. §. 9.

(*o*) Eph. n. c. dec. 2. a. 7. obs. 136.

(*p*) Hist. de l'acad. r. des sc. a. 1700. observ. anat. 7.

surface of that viscus, so as to leave it almost universally fix'd to the diaphragm, and in some places even universally, and at the same time, some lamellæ of the indurated spleen which coher'd to the membrane in those parts; and it is probable that from hence was the origin of certain oblong hiatusses, and foramina, of which there is scarcely any on the hollow surface, as there is not the least trace of those places through which the vessels formerly enter'd.

If you look at these hiatusses, you perceive that this spleen is not every where solid; you even see that it is cavernous, and empty, in many places; so that it is not at all surprizing, it should weigh no more than ten drachms: although that stone, which I mention'd just now (*q*), as being found in the spleen, of the bigness of a chesnut, was "of the weight of two ounces and a half, and one drachm." For this was made up of laminæ, like egg-shells, wrap'd over one another, "in the form of a crust;" so that no empty spaces were interpos'd, as in this Paduan spleen, and perhaps also in that Parisian spleen, the weight of which we know to have been an ounce and a half, but are ignorant of the dimensions.

It is also known, in what kind of man this spleen was found, that is in a man who had not been subject to disorders, which are suppos'd to have a reference to the spleen; and of what substance it seem'd to consist, that is of a stony substance. But in regard to ours the latter circumstance is doubtful; and the former, as I have heard from the son of my predecessor, who had been present at the dissection, was quite different. For the body, from whence it was taken, was that of a porter, and not an old man, who had not only been weaken'd by dreadful and incurable pains in the region of the spleen, but had even been oblig'd thereby to enter into this hospital, where he died.

But in regard to the substance of this spleen, although Vallisneri the elder, to whom it had been last given, wrote upon it, with his own hand, these words *milza effeatta d'uomo*, that is to say, "the spleen of a man ossified:" and although some small parts of it, which are protuberant on the hollow surface, seem to be bony, yet when you inspect the other surface, you will certainly think that it would have been more proper, if he had made use of the same word here also, which he often made use of in regard to the brain of an ox, which was suppos'd to be stony (*r*), and had written *osseolapideous* upon it, which I take for granted he would have done, if he could have bestow'd as much time and labour upon this, as he bestow'd upon that. But it might be more easy for Lanzoneus (*s*) to determine upon a similar appearance; for he having found in a blacksmith, who was five and fifty years of age, of a melancholic temper, and who died of a quartan fever, among other marks of disease, the spleen so hard that it did not yield to the knife, but when "struck with the hammer, flew asunder into three separate parts. "like a stone;" did not in the least hesitate to pronounce that it was "petrified."

16. And, indeed, I have often before inspected, and now particularly, whilst I write these things to you, I have under inspection, a membrane of four

(*q*) N. 14.

(*r*) Consideraz. int. al. creduto cervello di bue impietr.

(*s*) Eph. n. c. cent. 9. obs. 7.

inches in length, and two inches in breadth, which was taken from the convex surface of a human spleen in my presence, and by my order. This seems to be almost wholly converted into flat and thin laminæ, which whether you consider them on the external, or the internal surface, you immediately perceive to be entirely bony, without the least occasion for doubt. But betwixt them, and, in part, out of them, grow small tubercles externally; but internally larger tubercles lie upon them, of an unequal and granulated surface, which went down within the substance of the spleen to the depth of half an inch: and these seem to be a kind of excrescences, as if from a juice of a middle nature betwixt bone, and calculus, which had been effus'd and concreted. Of which ambiguous nature that substance seems to me in great measure to be, from whence the spleen that I have describ'd, from the College Musæum, became indurated. In examining of which, I learn'd that what I had conjectur'd from the membrane, which I just now spok'e of, and others, was certainly not always true, though perhaps sometimes; I mean that the conversion of the spleen into a bony, or stony nature, begins in the coat, and, in general, in that part of it which invests the convex surface, and which is, for this reason, subject to the alternate pressure of the diaphragm.

For as often as ever it happen'd to me to see it, in that part, I have seen it, and others have seen it there likewise, or at least all these, nearly, who have said in what particular part, of the investing coat, they found the appearance; for what Pechlinus (*t*) found on the opposite surface, is rare: and to this I suppos'd that the monitum of Boschas is to be refer'd, which is likewise produc'd in the Sepulchretum (*u*), of "the upper coat of the spleen " where it is turn'd towards the muscles of the abdomen, being become so " hard, that it seem'd to be a scirrhus within the substance of the spleen," though without reason: as you will also readily suppose, that what the most excellent Plancus (*x*) remark'd, in a nobleman far advanc'd in age, that is to say an ossification "in the membrane of the spleen," where it adher'd closely to the peritonæum, or that which (*y*) others observ'd in a woman of three and thirty years of age, that is "half the external surface" of the same viscus, "intirely chang'd into a cartilaginous nature," to be of the same kind.

For as to the very skilful Weiffius (*z*) finding the beginning of a change of this kind, that is to say, "a white, tendinous, and hardish substance, upon the back of the spleen, and its middle surface, in an oblique and transverse direction;" or as to an old anonymous author, as you have it in the celebrated Targioni (*a*), having found "so great a hardness of the spleen " in two places, where it had adher'd to the ribs, that the part seem'd bony, "or at least cartilaginous, but very hard;" you will be in little doubt, I suppose, on determining that these are to be refer'd to the class spoken of above. I therefore conjectur'd that the disorder was, afterwards, propagated from that part of the coat, which covers the convex surface of the spleen, into the remaining parts of the coat, and that by this means the whole spleen:

(*t*) Obs. cit. supra. ad n. 14.

(*u*) Sect. hæc 17. obs. 21.

(*x*) Epist. de monstris...

(*y*) In commerc. littr. a. 1734. hebd. 29.

(*z*) Et a. 1740. hebd. 35.

(*a*) Prima raccolta di osservaz. med.

was at length surrounded, as Bauhin (*b*) found it, and, if I rightly understand, Columbus also (*c*), and they in like manner who are here pointed out in the sixteenth observation of the Sepulchretum. And that after this, the indurated matter increasing more and more, and pushing inwardly all round from the coat, compresses the whole substance of the viscus, destroys it, and fills up its place. Yet this, though it may sometimes happen, as I have said, certainly did not happen in the spleen describ'd by me (*d*); since whatever part of its coat remains (and a great part of it does remain) is not only not bony, or stony, but is even, at this very time, of such a nature, that when moisten'd externally; for I have made the experiment in more than one place; itself, only, becomes soon after soft, just as dried membranes are wont to do.

But thus far on this subject. Now let us go on to another observation of Valsalva, which is one of those that relate to the spleen.

17. A woman of eight and twenty years of age, of a slender make, being married, but not having born children, had been formerly troubled with a chronic fever, which had left the spleen so much increas'd in its bulk, that a tumour of this region was very evidently felt: she also kept her palish complexion, and was sometimes taken with a fever, which began with a rigor, and continu'd some days. As she had ceas'd to have a discharge of menstruous blood, for two years past, she soon after was troubled with a cutaneous, but obstinate ulcer, of the left leg: at the side of which ulcer, the leg swelling afterwards, an abscess was form'd. This abscess, although it had been exceedingly well cleans'd, and seem'd to be coming to a cicatrix, yet when the time was at hand that the menstrua should, according to their regular course, have been discharg'd, the ulcer was irritated, increas'd, and emitted a much larger quantity of serous ichor; and on the contrary the farther it was past the time of menstruation, the less was the ulcer irritated, and the less matter was discharg'd. At one of these very times therefore, when, on the preceding day, not only a small quantity of ichor, but such as had a strong smell, had been discharg'd, and no new marks of death being at hand, had come on; behold she was oblig'd, early in the morning, to sit upright in her bed, and, turning herself to one side and to the other, complain'd so much of a streightness of the præcordia, and of a very great anxiety at her chest, that sometimes she could scarcely utter a word, and spat up a great quantity of frothy matter, and matter that was tinctur'd with blood: and thus within an hour she died.

The cavity of the belly was fill'd, almost universally, on the left side with the spleen, which was so much increas'd in its bulk, and especially in the longitudinal direction, that it weigh'd eight pounds and a half. The internal parts, of this viscus, did not seem to differ from their natural constitution: externally, both the sanguiferous, and lymphatic, vessels appear'd enlarg'd, so that the lymphatics were discover'd up and down through the coat of the spleen, and made a very beautiful appearance.

The spermatic vessels contain'd there blood of a violet colour; so th you might perceive it had been retain'd there for a considerable time. T at testes were
he

(*b*)
(*c*) Locis supra indicatis ad n. 14.

(*d*) N. 15.

almost wholly scirrhus, so that no body need wonder at the woman's being barren though young. In them was no vesicle, if you except one in the left, which was equal to the half of a filbert, in its magnitude. This adhering very closely to the substance of the testis, and being distinguish'd with sanguiferous vessels, contain'd not a limpid, but a brownish humour: which being let out, a body of a yellow colour came into view, of the bigness of a lentil, and almost of the form, but adhering to the vesicle internally, so as to be scarcely prominent: and this body was surrounded with some very small globules, like a bulwark. And there were in the same testis some other bodies also, which were of the same colour, but not of the same figure, nor furnish'd with the same surrounding bulwark.

As to the thorax, every part therein was found, except that the lungs were suffus'd with a redness, and when cut into discharg'd a great quantity of matter, of the same kind with that which I have said the woman spat up before her death.

18. Of barrenness from a disorder of the ovaries, and of suffocation, from deprav'd humours suddenly falling upon the lungs, it is not the proper place to treat here; nor yet of married women, who do not bring children, being frequently, at length, liable to some very great disorder; nor of some abscesses in women, which, to all appearance, tend to a cicatrix, and are, nevertheless, frequently very difficult to be brought to it, and for this reason, that when the time returns, in which they are us'd to discharge blood from the uterus, the abscesses, which were already almost heal'd, from the turgescency of the humours, and the motion thereof, which make their impetus upon the whole body, and especially on the weaker parts, open afresh, and enlarge their dimensions, which I remember to have happen'd in the leg of a noble matron, in particular, for many months successively.

As we are, therefore, passing on to the consideration of other things, more suitable to the present occasion, we cannot avoid thinking of those long, and obstinate fevers, which leave an enlargement of the spleen behind them; and of those ulcers of the legs which are the consequence of enlarg'd spleens. And that those ulcers have been, in fact, join'd with such enlargements, even some of the letters, which I have sent to you, have shewn (e). But that the same has been observ'd even from the most ancient times, a passage of the second book of the Prorrhetica (f) teaches us: but take care how you read it, as it is quoted here in the Sepulchretum (g), in the scholium to the sixteenth observation: "they who have an enlargement of the spleen and hæmorrhages, but "not an ill smell of the breath, will have foul ulcers of the tibia"; for in the Greek the very words are μήτε αἱμορραγίαί γίνονται, that is, "nor have a hæmorrhage from any part," as others have more faithfully translated it: therefore this opinion may, in some measure, be accommodated to that woman, who had no eruption of blood from the uterus. And as she was of a slender habit, that would also very well suit with her case, which is immediately subjoin'd in the same scholium, from the observation of Spigelius, "that lean persons are much more liable to tumefactions of the spleen than fat persons."

(e) Epist. 4. n. 30. Epist. 12. n. 2.

(g) Sect. 16.

(f) N. 42.

But that these tumours are the consequences of long-continu'd fevers is demonstrat'd to you by more than one of my letters (*b*), and confirm'd by more than one observation (*i*), in the section of the Sepulchretum. To which you may add the observation of Christian Vater (*k*), made upon a student, who, having been long afflicted with intermitting fevers, had his spleen enlarg'd to the size of a man's head; and, what is remark'd by that excellent anatomical professor Weiffius (*l*), that "whenever" he lit on very large spleens, in the dissection of bodies, he generally found, upon inquiry, that these persons, when living, had labour'd under a violent fever at some time or other, "and that either an intermittent, or a synocha continua:" to omit at present what I have elsewhere taken notice of, from those celebrated men Hoyerus, and Kramerus (*m*), of the infarction of the spleen, after intermittent chronic fevers, and particularly the quartan; whose observations I could wish were not confirm'd by examples amongst us, also, of fevers of that kind, but of such as are badly cur'd. And that such have been observ'd by the ancient physicians also, these words of Hippocrates, or rather of Polybus, are a proof (*n*): "this disease," that is the tumour of the spleen, "happens when from fevers, and bad management of these fevers, bile or "pituita, or both, have fallen upon the spleen." For a viscus which is of itself lax, and cellular, and from which the return of the blood is slow, as it is to pass through the liver, before it enters the vena cava, is extremely liable to tumours, especially if that little share of strength which it has originally, being weaken'd by a disease of long continuance, and the blood being made inert and sluggish, some particles are left therein, which ought either to be corrected, or thrown out of the body.

For the sluggish motion of the blood being increas'd for these reasons, while, like muddy water beside its channel, it is diverted into the cells of the spleen, it of course deposits therein whatever corpuscles it may contain, which are heavier and more gross than the constitution can bear, and by this means, in part obstructing its own return, distends the cells of this viscus more and more. And the more the whole spleen is distended by the distention of the cells, so much the weaker it is, and for that reason more liable to retain, in great measure, those fluids which afterwards flow into it. For which reason it sometimes grows out in an incredible manner, so that Aetius wrote even formerly, that in some persons "the spleen became contiguous to the groin," as you will read in the Scholium just now pointed out; except that as he is there said to have asserted this in the seventh book, and as he compil'd, in all, only four books of medicine collected from the ancients, each of which were divided into four discourses, you must look for it in the third book of the Tetrabiblion, discourse the second, chapter the sixteenth.

This blunder, and that which is still more considerable in the sentence of the Prorrhetica, were transfer'd into the Sepulchretum, by copying the words of Diemerbroeck, and not turning to the authors he has quoted. For he

(*b*) Epist. 15. n. 6. epist. 20. n. 2. 30. 51.
Epist. 31. n. 2.

(*i*) 11. 13. 17.

(*k*) Eph. n. c. dec. 3. a. 9 & 10. obs. 165.

(*l*) Commerc. littr. a. 1745. hebd. 24. n. 1.
ad 7.

(*m*) Epist. 20. n. 52.

(*n*) De affection. n. 21.

introduc'd afterwards, as I suppose (*o*), examples of very large spleens, insisting upon that which weigh'd three and twenty pounds. But Boschus (*p*), if I understand him properly, had asserted that a spleen had been found, by his own father, which "weigh'd three and thirty pounds." But among the observations that are more modern than these, although I do not remember to have read any, in which the spleen was said to come near to that weight, yet those which were publish'd from Henricus Alb. Nicolai (*q*), and, before, from Maurice Hoffmann (*r*), are by no means to be despis'd. For the latter found the spleen to weigh fifteen pounds, and the former found it still half a pound heavier; and both of them found it so, that the diaphragm, on the left side, was driven to the superior ribs; and Henricus so that, at the same time, the spleen hung down quite to the iliac region.

But Preuffius (*s*), in an infant, saw it extended in its magnitude, from the left hypochondrium through the whole side, quite to the pubes: and Vercellonus (*t*) still farther, that is to the lower part of the abdomen; and as it could not go beyond this boundary, it was reflected up again, and terminated behind the uterus, in a mass equal to the size of a fist. It is true, that which was found by Jo. David Mauchartus (*u*), chang'd into the figure of a cone, did not extend itself so far; yet it was large, as, being fix'd to the basis of the diaphragm, it was equal to a large human head in its bigness: in its weight, also, it did not exceed four pounds with as many ounces; but it contain'd that which makes this observation very rare, that is to say, so great a quantity of water within a kind of coat, like a hydatid, I suppose, which had occupied all the internal parts of that viscus, so that Mauchartus did not hesitate to call this disorder "a dropsy of the spleen;" for four pints of water burst forth therefrom.

Thus taking the word empyema in the most extensive signification, you may call that an empyema of the spleen, which was found by Anthony de Haen (*x*), as that viscus occur'd to him "full of pus, which was in great quantity, thick and white;" though by its inflammation it had before been mistaken for a pleurisy.

19. Now before I pass on to other observations, from these of Valsalva's, I am not willing to omit one from him, which will give you to understand, what viscera besides those that naturally lie in the hypochondria, may there create very great and even fatal uneasinesses; especially if to the disorders of these viscera, although slight in appearance, a convulsion be added, which I do not doubt was added in this case.

20. A virgin was seiz'd with a violent vomiting and a fever. The former was appeas'd; but the latter remain'd. A violent pain came on under the false ribs, by which she was carried off within two days.

In the belly was found a very limpid serum. The stomach and the intestines were very turgid from included air. Both of the kidneys were three

(*o*) Anat. 1. 1. c. 16. edit. Patav.

(*p*) De facultat. anat. lect. 2.

(*q*) Commerc. litter. a. 1732. hebdom. 33. n. 2.

ad 5.

(*r*) Eph. n. c. dec. 3. a. 9 & 10. in append. n. 1. obs. 5.

(*s*) Earund. cent. 3. obs. 11.

(*t*) Earund. cent. 7. obs. 9.

(*u*) Earund. cent. 9. obs. 41.

(*x*) Apud Swieten comment. in Boerh. aph.

times bigger than their natural size : but the left contain'd, betwixt its proper membrane and the substance which lay beneath it, a little quantity of a famous matter, and particularly on that part which was turn'd towards the spleen.

In the cavity of the thorax was a little water. The lungs were found, except that they were distinguish'd with black spots, which were few in number. The pericardium was full of serum. From the ventricles of the heart flow'd out a pretty fluid blood ; yet in the right, was the beginning of a polypous concretion.

21. The increas'd bulk of the left kidney, and a disorder therein, at the same time, have more than once excited a tumour, or pain, in the hypochondrium of the same side. And this may be learn'd from some histories, which are produc'd in these two sections of the Sepulchretum, as in the sixteenth, that which we have under article the second, of the twenty-second observation, and in the seventeenth section, two which are read under the ninth article of the thirtieth observation, where Ballonius says as follows : " they did not suppose the pain to be nephritic, and yet it was so ; but the " situation of the pain, and of the part, deceiv'd the practitioner." And that this may sometimes happen on the right side also, that history which is given in the same thirtieth observation, in the first place, demonstrates.

But that which is read last in this observation shows that the same thing may happen, not only from the parts which lie below, as the kidneys do, but also by the parts which lie above ; as, for instance, by the septum transversum being overloaded with a quantity of pus, and forc'd downwards : for thus I conjecture that this history ought to be explain'd, rather than by a kind of consent, and affinity ; as from the same septum, when depress'd by the force of water, or a thick serum, I have already shown you (y), that a hardness and pain have been brought on in the upper regions of the belly. But now, not to recede from the kidneys, and from other parts which lie beneath the hypochondria, I think the observation of the celebrated Bonfiglius (z) ought to be added, in reading of which attentively, you will readily perceive that an inveterate tumour, that had been formerly felt in the right hypochondrium, was nothing else but the kidney, which, by being increas'd more and more in its bulk, had at length fallen forwards from its natural situation into the iliac region, where it was found to be five times as big as its natural size.

But in regard to other parts, the celebrated Gœkelius (a) will show you, that from the omentum, having its bulk enlarg'd by a kind of scirrhus fatness, wherein the whole spleen was enwrap'd, there was a tumour of such a kind in the left hypochondrium, and with such a resistance, that, for this reason, the tumour " exactly resembled a scirrhus" of the spleen. And Schrockius (b), Hurterus (c), and Gerbezius (d), remark'd a tumour in the other hypochondrium, together with a pain from a scirrhus, which adher'd very closely to the intestines, ileum and colon ; or from the colon being rais'd into such a bulk, that by forcing itself against the ligaments of the liver, it drove

(y) Epist. 16. n. 26. & epist. 30. n. 30
& 31.

(z) N. c. cent. 9. obs. 4.

(a) N. c. cent. 6. obs. 94. ad n. 7.

(b) Et cent. 1 & 2. obs. 186.

(c) Ibid. obs. 184.

(d) Et dec. 3. a. 7 & 8. obs. 186.

that viscus from its natural situation, towards the left hypochondrium: or a pain only, which had been falsely imputed to the liver; whereas it arose from the mesentery, which was, soon after, found to be "eroded" under that viscus, 'nearly to the breadth of a span. But let us return to the disorders proper to the viscera which lie in the hypochondria.

22. However, as I have, much the more frequently, describ'd to you observations of the liver or spleen being tumefied, it will, for that reason, be sufficient here, to add to those which I have hitherto produc'd from Val-salva, a few that are common to the tumours of both these viscera.

23. A woolcomber of about forty years of age, came into the hospital of Padua for obstructions, as he himself said, of the hypochondria. And that he said what was true, not only the bad colour of his face, and an infirm state of health for a whole year already, and a slight fever, with which he was often attack'd, and was not free from even at this very time, demonstrat-ed, but the application of the hand to both hypochondria, and chiefly to the right, particularly confirm'd. When he seem'd to have receiv'd some ad-vantage from a course of remedies, behold he was seiz'd with an acute fever, attended with signs of an internal inflammation of the thorax; and by that he was carried off within ten or twelve days.

His body was brought into the college, that I might therefrom begin the anatomical demonstrations of the year 1746: and as I examin'd the carcase, I saw that it had a pretty clear appearance on the skin, and was not alto-gether lean, nor were the feet œdematous. The muscles of the abdomen being dissected, scarcely at the distance of two days from the patient's death, and that in the month of January, were lax, and at their lower part inclin'd to a greenish colour. Yet the parts which were contain'd in the belly had a natural appearance, if you except the following. The liver was immoderately large; so that the very great magnitude of it immediately struck the eyes of ev-ry one: and although it had not a bad colour externally, yet, internally, I ob-serv'd it to be of a palish colour inclining to brown; and, besides this, universally mark'd with certain brown spots, if you examin'd it with a stedfast and atten-tive eye, either on the inside or the outside; and harder than it generally is, which appear'd not only to the fingers, but was also evident, by cutting into it in several parts, and in several directions. And while I was making these incisions, I also observ'd this circumstance, that no yellow point had appear'd any where with any of the sections of the veins, which is the general mark of the small branches of the hepatic duct being cut transversly, at the same time, whether this happen'd from these vessels having collaps'd in some measure, from the small quantity of bile which was secreted in the liver, or rather because the bile was of a more pale and dilute colour, and less apt to tinge: and indeed, in the cyst was but a small quantity of bile, in proportion to the bulk of the liver; the cyst itself was small, and had thin coats; and the bile inclin'd to a kind of cineritious colour.

The spleen was twice as big as it naturally is in every dimension; but in other respects, as far as I was able to judge, it was not to be found fault with. The splenic artery, from the origin to the termination, contrary to the general appearance, had nothing tortuous in it in any part, nothing vari-

cous, if I may so speak, excepting one place only, about the middle of its length, where it was a little inflected.

On the mesentery had grown a hard body, of the bigness of a small cherry, and almost of the figure, but unequal, and granulated, on its surface, and of a middle nature betwixt bone and stone: at one side of this body was an arterial and venous branch, which ran very close to it, but did not enter the substance, going out from thence to the intestines, which were at about two inches distance from this body. The ileum had that appendix, or diverticulum, if you chuse rather to call it so, which, as I have describ'd it in the thirty-fourth letter (*e*), it will be sufficient to have slightly taken notice of here. For it will be more to the present purpose, to observe what other appearances I saw in the belly of this man. The external iliac vein, on the left side, near the opening of the internal, was hard, and yet not bony, as the coats were only much thicken'd, in that part, for some little extent: and these coats being laid open, I saw, in the cavity of the vein, on one side, where it was perforated with no orifices, small chords protuberating, and a kind of small valves.

But that deserves our attention still more, which I saw in the kidneys, and in their arteries, though it was rather unusual, than preternatural. These arteries were about nine inches in length, but narrow in proportion to this large extent, except that they were rather wider in the upper extremities. The length of the sinusses, also, that receive and send out the vessels, was unusual; which was the more easy to be taken notice of, as that whole part of the substance of the kidneys was wanting, which should have made up the anterior paries of the sinusses: and for this reason, the larger of those branches, that convey the urine into the pelvis, were quite naked, and expos'd, and the sanguiferous vessels were expos'd in all that part which is generally buried within the sinus. But as two arteries, that is the inferior and the superior, and as many veins went to each kidney, the veins went out from the sinusses in such a manner, that the inferior ascended obliquely into the superior, which was transverse. And the arteries were not join'd with each other, but the inferior, as well as the superior, was carried in a transverse direction, without any obliquity, for which reason the inferior did not go to the sinus, but penetrated the kidney, almost at its lower side, beneath the sinus,

From this description you perceive, that both the inferior arteries must have arisen much lower than the arteries of the kidneys generally do: and indeed they did arise from the aorta, at not more than the distance of an inch above the division into the iliacs; and, what is, perhaps, much more extraordinary, not from the sides of the aorta, but from the very middle of its anterior surface, where they were so near to each other, that their orifices were but just separated, by a very thin septum: coming out from thence, on both sides, similar and equal, and being divided into no branches, before their insertion, they were inserted as I have already describ'd; whereas the superior arteries, which were a little, but not much, thicker than these, dif-

fer'd neither in their origin, nor in their ramification, from those which we generally see.

The inspection of other parts we could not prosecute with the same diligence, as a better body was procur'd in the mean while. For which reason we did touch the head.

In the thorax, finally, we found the right lobe of the lungs annex'd to the pleura, and hard: in the pericardium was a bloody water, to the quantity of some spoonfuls: in the heart, two veins, which ran longitudinally upon its posterior surface, were turgid with blood, and in a manner various.

24. Setting aside the consideration of the appearances which have no affinity to our present subject, if we attend only to those that relate to the tumefied spleen, and to the tumefied and obstructed liver, the splenic artery, if we are to suppose that it was not without inflexions in its original formation, may seem to any one to have lost these tortuous diverticula, while the course of the arterial blood into the hard liver being obstructed, a greater quantity of it was therefore necessarily oblig'd to flow into the splenic artery. And how much, when the liver is obstructed, the small arterial branches within that viscus are compress'd, and how much less a quantity of blood they admit, is not only demonstrated by reason, but sometimes also confirm'd by evident observation. For the celebrated John Baptist Vulpus has affirm'd to me, that he twice happen'd to find the trunk of the hepatic artery so dilated, in a body where the liver was obstructed, that he could introduce his thumb into the cavity.

However, when the liver is thus affected, how easily the constitution degenerates into a cachexy plainly appears in the man we speak of, from that small quantity of discolour'd bile, besides other things.

But if a very considerable disease occupy the liver, we learn from a great number of observations, that, frequently, the constitution tends not only to a cachexy, but even to a dropsy. Among which are worthy to be read, those given by the celebrated Rostius (*f*), and Usenbenzius (*g*) either on account of the appearances found in the scirrhus liver, or on account of its weight. And to these you may also add that which I shall immediately subjoin.

25. A porter who seem'd to be of a middle age, and who had never been attack'd with any disease, felt a very considerable uneasiness in his loins immediately after lifting up a heavy load, which then oblig'd him to lie in bed for two days, and made him so weak, for the remaining part of his life, that he could not now lift up even the weight of twenty pounds, without occasioning a pain in his loins. A month after this accident he seem'd to himself to hear the agitation of water in his belly, while he turn'd himself in bed, and soon after to perceive a kind of body, as it were, ascending from the hypogastrium, into the scrobiculus cordis, as it is call'd, which, stopping there, caus'd the beginning of a very hard and pretty large tumour; with which being afflicted, and with a slight fever, at the same time, he came into this hospital, in the fifth month after his lifting that heavy load, and related all these things which I have related to you.

(*f*) Aët. n. c. tom. 2. obs. 178.

(*g*) Et Cent. 9. obs. 27.

It was then certain, that he had a continual, though slight fever, which was exacerbated in the night-time, that there was a tumour in the scrobiculus cordis, and also below the lower ribs, but especially on the right side, and that water was extravasated in the abdominal cavity. In the mean while this extravasation increas'd, so that when I happen'd to have occasion to go up into the hospital, just about a month from the time of his coming into it, and being ask'd to feel the man's belly, I scarcely perceiv'd any particular tumour elsewhere than in the scrobiculus cordis, the abdominal cavity being so greatly distended with water.

This tumour was very hard, and very unequal, but free from pain, even when you press'd upon it. I inquir'd whether it was troublesome by its weight? whether there was any pain which was produc'd quite to the throat? and whether he was ever troubled with a cough? To all which queries the patient answer'd in the negative. But when I ask'd him whether the tumour increas'd at that time? He not only answer'd negatively, but even asserted that it had subsided, and was grown much less; I suppose because it was in great measure obscur'd by the increasing water: and indeed, those who had felt it at other times could not perceive it to be diminish'd. The face of the man was somewhat pale, but not yellow, nor of a cineritious colour; and even the white parts of the eyes, though I examin'd them very attentively, did not appear to me to have the least yellowness.

He lay, for the most part, on his back: though he could lie upon either side. He was thirsty, but not to any great degree. He drew his breath not quite freely, yet not with any great difficulty. Which circumstances I remark'd with the more nicety, as I foresaw that the patient would die in a very short time, and give us the opportunity of examining into the state of his viscera, for which reason I left him with an uncertain, and, in part, a suspended opinion, in regard to the universal seat of the tumour: and the patient, having his pulse, at length, become very small, but preserving his senses perfectly to the very last, died in a very placid manner, as he was speaking to some persons around him, in the beginning of April, in the year 1745, about fourteen days after I had seen him.

But when the body was dissected, as it was on the following day, I was so much taken up with business of importance, that I could not attend. However, our Mediavia presided at the dissection, in my room: from whom I receiv'd this account on the same day.

The body was lean, and no where, unless slightly in the scrotum, and still more slightly in the feet, affected with an cedematous tumour. The belly contain'd a great quantity of extravasated water, not of a disagreeable smell, not thick, nor turbid from a kind of thin membranes, as it were, swimming in it, but pellucid, yet inclining to that colour which we see in oil of almonds. The omentum being drawn up into the left hypochondrium, was found indeed, but of a greenish colour inclining to brown. The stomach was small and contracted. The spleen was twice as big as it naturally is, externally whitish, and internally had some white substances, which, however, were not hard. But the liver was by far the most enlarg'd, so that some of those who were present judg'd it to weigh about fourteen pounds. At least it occupied the whole upper region of the belly, and the part which lay next thereto anteriorly,

riorly, although it did not extend itself much below the ribs: and it had grown out so much towards the left side, that the ligamentum suspensorium, which was in other respects pretty thick, being curv'd very much towards that part, the umbilical fissure was at the left side of the cartilago ensiformis. The whole liver was hard, and distinguish'd, in several places, with protuberating spots, not narrower than a thumb's breadth, and these of a yellow colour; but in other respects this viscus was pallid. These were the appearances externally. And internally, if you except a few portions of the hepatic substance intermix'd here and there, the whole viscus consisted of a substance, which could not more easily be cut asunder, than the mammary gland: this substance was of a white colour, degenerating into yellow, and being press'd seem'd to emit a kind of purulent ichor. Finally, the gall-bladder was exceedingly small.

26. When a black smith, and, in like manner, a woman of whom the celebrated Schmidius speaks (*k*), perceiv'd that something was broken within them, not without a great, or a burning pain in the region of the liver, from exerting themselves in lifting up great burdens, it appear'd that neither of them was deceiv'd from what was found in the body of the smith, and from the circumstances which happen'd to the woman. But what our porter hurt in his loins, in endeavouring to lift that burden, and what it was which had impos'd upon him, so as to appear like a body that was ascending, although you may happen to conjecture properly, yet you cannot easily demonstrate. This, however, is certain, that as the disorder, and tumour, of the liver increas'd, the water was increas'd in the belly, whether you suppose it to have been there before, in any preternatural quantity, or not. For without doubt, the very swelling, and weight, of the liver naturally press'd upon the trunks of the vena-cava and vena portarum, and a great number of lymphæducts, at the same time, while the patient lay continually in a supine posture of body, so that out of some of these being ruptur'd, or if they were found, from the mere stagnation of the blood, more water would be pour'd out into the cavity of the belly.

A cause was also added, which made the blood inert and sluggish, I mean the very great disorder which there was in the liver that was scirrhus; so that a bile was secreted, which was not fit for the purposes to which nature intended it; and this bile was in small quantity also, as the smallness of the cyst confirm'd: for which reason neither good chyle, nor good blood, was prepar'd. To this add, that the spleen was preternaturally increas'd in its bulk, and diseas'd in its internal constitution: for although we cannot well determine, what is the office of this viscus in particular, yet we do not doubt but it is, in general, of use in preparing one or both of these humours. But why in this and the former man, and in so many other examples, among which I could reckon not only that infant spoken of by Preussius (*l*), but also the woman whose history is given by Portius (*m*), if the same thing were not so often seen in dissections; why, I say, the spleen, and the liver, were found tumid, I do not suppose, you will enquire, as you very well remember from whence both these viscera receive their blood.

(*k*) Commerc. litter. a. 1734. hebd. 34.

(*l*) Obs. cit. supra ad n. 18.

(*m*) Aët. erud. Lipf. a. 1704. m. Septembr. in relat. ejus opuscular.

For as both of them have their arterial blood from the same cæliac artery, which ever of the two shall first become tumid, and, for that reason, admit a less quantity of blood, must, of consequence, force a greater influx into the other. And as the liver receives its venous blood, in part, from the spleen, which we suppose to be intended for the purposes of secreting the bile, there is no doubt but, if the liver is tumid, a greater quantity of blood will remain in the spleen: but if the spleen be tumid, a blood of such a kind will be sent therefrom, as is very unfit for going through the narrow passages of the liver, and at the same time, very improper for the secretion of a well-condition'd bile; so that if this be secreted in a very viscid, and thick state, it will be in part obstructed in the liver, and will itself, consequently, increase the bulk thereof.

27. These things, however, and some others, which I have advanc'd, in almost the same manner, in this letter, I would have you admit with such limitations, as to suppose that the effects I have mention'd, may be the consequences, if a proper time be given for these causes to act, and there be no impediment to their action; for they do often follow, as I have said just now, but not always. Thus, to illustrate our supposition by examples: Jacobus Sylvius (*n*) dissected a stone-cutter, who had an enlarg'd liver, which was tender, and pale, like a liver that had been boil'd; but his spleen was of a cineritious colour, had two small scirrhii externally, and internally appear'd as if it had been boil'd. Why was it not also enlarg'd? Left you should happen to suppose this to have been owing merely to the tenderness, which, counteracting the effects of the increas'd weight of the liver, still preserv'd an easy passage for the blood, through this viscus; know that there were in this man, which is an extraordinary instance, "three large branches, " that went from the left emulgent vein, to the spleen," through which, as the circulation of the blood now teaches, a great part of the blood, that otherwise must have pass'd with difficulty through the liver, and have distended the spleen, by remaining there, was diverted into the emulgent vein. But whether the same three branches, by carrying away the blood from the spleen, sooner than the nature of that viscus requires, and by depriving the liver of a part of that assistance, which it receives from the spleen, and which is necessary to the full performance of its functions, contributed any thing, in a long course of time, to those disorders which were observ'd in both the viscera, you yourself will judge.

According to those things, which I have just now said, or these that I have now hinted at, it will be easy for you to explain other examples, as that of Riolanus (*o*), and of Fantonus the father (*p*); in which cases, the liver being indurated, and increas'd in its size, the spleen was not only not larger than it generally is, but was found to be so extremely small, that it scarcely weigh'd an ounce, or that the traces of it alone remain'd. For suppose that the spleen was diminish'd, whatever the cause of this might be; and you already perceive, how much more arterial blood must, of course, have been sent to the liver, and how little assistance, therefore, there must have been given to the secretion of good bile.

(*n*) Observ. adject. Isagogi anat.

(*p*) Obs. med. anat. 24.

(*o*) Anthropogr. l. 2. c. 16.

Or suppose, on the other hand, that the liver is increas'd in its bulk, from some cause or other, so as to occupy the whole epigastrium, as in the example of Fantonus, and to thrust the stomach down into the umbilical region: you will then easily conceive, how both the spleen, which is a soft and lax viscus, and the splenic artery, from whence it receives the blood by which it is nourish'd, preserv'd, extended, and dilated to a proper degree, may be at the same time compress'd: and as this artery passes under the pancreas, being affix'd to it longitudinally, you see evidently, how much it must have been press'd upon, in the example given by Riolanus, in which the pancreas was universally scirrhus, and in its bulk, and weight, was equal to the liver itself. For as to his finding remains of the spleen, in another body, of the breadth of a finger-nail, this might, perhaps, have been owing to a greater, and more long-continu'd, compression of the splenic artery, as he there found the pancreas to be not only scirrhus likewise, but even indurated like a cartilage.

28. However, to say nothing of the pancreas, and return to the spleen, and liver, I confess there is so much mutual commerce, and connection, betwixt both these viscera, that if one be diseas'd, in consequence of the other being diseas'd, there is no reason for surprize: but on the contrary there is reason to wonder, if a disorder be found in either of them only, as when you read in the Sepulchretum (*q*): "the liver was large, and in many places "hard; . . . the remaining viscera of the belly being in a natural state:" or (*r*) "the liver was almost without moisture, and pallid; . . . but the "spleen, and kidneys, had a natural appearance." Nevertheless, even in a long disorder, where a greater injury is found in the other viscera, than in the liver, it by no means follows, that in this also the disease must have been of long standing: which I would have to be understood chiefly of the second of the observations, just now pointed out.

We must take care, moreover, that we do not, now and then, take some appearances which have existed from the original formation of the body, for the causes, or effects, of diseases: of which kind I should suppose those "several incisions" of the spleen to have been, that are mention'd in this seventeenth section of the Sepulchretum, under observation the nineteenth, and which seem to be reckon'd among the morbid appearances, just as I believe of those "chinks or fissures of the liver," which are sometimes produc'd, in the preceding seventeenth section of the Sepulchretum, as the causes of a pain in the right hypochondrium." Blunders of this kind are easily refuted, by a frequent and attentive observation of the fissures of both, or of one, or other, of the viscera, which most frequently occur in bodies of every kind, and not without some utility, as I have said in a former work (*s*).

But, although a reason could not be given for all the cases, in which we read of the found state of one of these viscera, being join'd with the disorder of the other, these would not be the only instances, which seem to happen sometimes contrary to expectation. For, not to quit the history of the por-

(*q*) L. 3. f. 14. obs. 36. §. 4.

(*r*) Epi. anat. 1. n. 35.

(*s*) Ibid. obs. 20.

ter, it certainly does not very-well appear, why the patient did not feel any uneasiness from the weight of the liver being so much increas'd: nor yet why, among the symptoms which I observ'd to be absent, some, in particular, could be absent, in so great a depravity of the liver. And without doubt, we ought to take warning from hence, not to be too rash and hasty in pronouncing any thing for certain, by denying or affirming in some cases. And indeed some things occur in medicine, which are still more extraordinary, and surprizing, than those I have just now hinted at; and which ought, therefore, to render the physician more cautious, in forming a diagnosis, and consequently in acting.

Two cases of that kind I will, in this place, communicate to you, as I have receiv'd them from others, since they will not be foreign to the present purpose; for they relate to a morbid state of the two viscera, which lie in the left hypochondrium, the spleen, and the stomach. Of the spleen our Mediavia observ'd as follows, in the living body first, and after that in the dead body, about the end of the year 1735.

29. A man of a lean habit, among other disorders on account of which he lay in this hospital, had a tumour also in the left loin, where this begins to terminate in the outer side of the body, under the lowest rib. This tumour sometimes appear'd less, and sometimes bigger, to the eye that examin'd it, yet never was very apparent at any time; but it yielded to the hand that press'd it, as if it contain'd a fluid. At length the man sunk under his diseases.

The belly being open'd, it appear'd evidently from whence this tumour arose. For the lower part of the tumid, and very soft, spleen reaching to that place I have mention'd, and being, at one time more, and at another time less, forc'd thither by the flatus of the stomach, and intestines, caus'd such an appearance in this body, which, as I have said, was very thin, as might easily have impos'd upon some rash and inconsiderate surgeon, to the great detriment of the patient.

30. In the second book of the predictions (*t*), after many things that are said of those who have large spleens, the following words are immediately subjoin'd: "but if tumours should also come on in the feet, they will even seem to have water. Yet it is necessary to examine the belly and the loins likewise." I would have you see, therefore, among those who have interpreted the oracles of Hippocrates, whether there is any one, by whom the inspection of the loins is refer'd to these enlarg'd spleens, the other symptoms of which immediately precede.

But Peter de Marchettis, whom I have already commended, read to me a case in the year 1730 (from a letter of a neighbouring physician, who was very much esteem'd by each of us) which relates to the stomach: the case was as follows, the circumstances having been all very well-known to the physician who wrote, as they happen'd in the place where he resided.

31. A woman had a tumour form'd at the region of the stomach, which being examin'd by the surgeon, seem'd to him to be coming forwards to sup-

(*t*) N. 42.

puration; yet after having applied many things proper to hasten the suppuration; he, nevertheless, could not bring it thereto. Finally, this was the issue of the case, that the tumour disappear'd, the skin remaining contracted, where the tumour had been in the form of a cicatrix, notwithstanding it had not discharg'd any moisture. After this the woman conceiv'd, and the time of utero-gestation, of delivery, and child-bed, being happily pass'd over, she being in good health and her milk flowing properly, as in a woman who gave suck, and having now reach'd beyond the third month from the time of her delivery, she of a sudden perceiv'd that a little moisture distill'd from that cicatricula. And on examining the moisture, found that it was the wine which she had just drank. She could also, if she endeavour'd to do it, force out by this way some of the pudding she had taken in. Yet the final event of the disorder was that the wound was perfectly heal'd up, and the woman continu'd to be in good health, as the physician who was interrogated by other letters from Marchetti, which he wrote with great friendliness, in order to satisfy me in regard to the case, assur'd me.

32. You may also read many examples of the stomach being perforated, the foramen either lying hid within the cavity of the belly, or being open'd externally, in the history of a virgin who labour'd under this disease, for seven and twenty years, publish'd by the celebrated Christian Wencker (*u*); and these may be added to the Sepulchretum: for although it was not possible to cure any of these patients, it was possible, however, to dissect them all after death. But you will find a successful case, and not unlike that which I describ'd to you just now, in the programma which Etmuller the son added to his dissertation, intitled "*de prægrandi pedis inflammatione.*" And as in this programma you may, at the same time, see every thing that relates to the perfect cure of a stomach thus injur'd, so that nothing shall fall out from thence into the cavity of the belly, I will add nothing farther to this letter, which is already very long, except to entreat you to preserve your usual affection for me, and take care of your health.

(*u*) Argentorati a. 1743.

LETTER the THIRTY-SEVENTH

Treats of the Jaundice, and of bilious Calculi.

THE morbus regius, or jaundice, so is frequently join'd with the disorders of the liver, of which I particularly wrote to you in the last letter, that in the Sepulchretum, the eighteenth section, which professedly treats of this disease, is with great propriety immediately subjoin'd to the two sections which treat of those disorders. To the jaundice relates this observation of our Valsalva.

2. A young priest was seiz'd with the jaundice, a little after a kind of perturbation of mind: this disorder was also attended with a pain at the region of the stomach, and a vomiting, by means of which he threw up both his food, and his medicines, frequently. After a day or two, the patient was observ'd to be unquiet, and in some measure stupid, so as to forget every-thing that was related to him. The physician did not observe any fever, till the close of the third day: at which time it discover'd itself with great violence, with a delirium, and convulsions of such a nature, that the patient was oblig'd to gnaw every thing with his teeth, and by his great strugglings almost overcame the strength of those who were about him: besides these, he was troubled with a vomiting of a darkish-coloured matter. In the morning a vein was open'd, from whence the blood rush'd forth with impetus: the serum of which, when it receded from the coagulating part, ting'd a linen rag, that was dip'd into it, of a yellow colour. The convulsion ceas'd: but the patient lay to all appearance asleep, scarcely mov'd himself, and did but just show that he felt the cupping-glasses which were applied to him. His respiration was almost natural, except that it was sometimes suspicious. He died on the beginning of the fifth day.

The belly being open'd, the liver was found to be flaccid, and inclining to a palish colour: in the gall-bladder was a darkish bile. In the stomach was matter of the same kind with what he had thrown up, on the last days of his disorder: on its internal coat, about the left orifice, were a kind of red points, at some little distance from each other. And there were many very small glands, in several places throughout the belly, which were inflam'd by stagnating blood.

The thorax being open'd, the lungs were tumid with air, and free from connexion with the pleura, if you except some small membranous bands, which

which had tied the left lobe to the pleura. In the pericardium was a little water. In the ventricles of the heart was concreted blood.

The skull being cut open, and the dura mater being incis'd, a little quantity of serum issued forth: in the interstices of the sanguiferous vessels, which creep through the dura mater, a kind of gelatinous concretion was observ'd, but in a very slight degree: the cerebrum was very lax, nor altogether of its natural colour, which perhaps had been deprav'd by the tincture of the bile. While the spinal marrow was cut through, in the upper part of the vertebral tube, in order to take out the brain, from the external paries of this medulla, a ferous matter flow'd for a considerable time, as if from a lymphæduct being cut through.

3. What effect passions of the mind may have in bringing on a jaundice, is not only demonstrated by frequent observations, in the practice of medicine, but evidently confirm'd by the present. Nor will this be surpris'g, to those who consider how much the nerves consent with the passions, and how much power the same nerves have, in affecting the sanguiferous, and excretory vessels, and in affecting the internal secretory organ, whatever that may be, and consequently in impeding, and vitiating, the secretions, and excretions, of the humours. Suppose, that in some bodies the hepatic nerves consent most, or if other nerves consent also, yet that the vessels of the liver, and the secretory organ, yield more easily to the action of the nerves; and you will immediately understand why a jaundice arises in them, from the passions of the mind.

Thus in Hoffmann (*a*), you will read of a woman, in whom, "as often as ever from a preceeding commotion of mind . . . new febrile paroxysms came on, the jaundice immediately return'd with all its symptoms." And if you take into the account, certain dispositions of the blood, or of the matter of the bile, which is to be secreted therefrom, or of the other viscera, you will so much the more easily understand the affair, and conceive of the origin of those very violent symptoms, which are sometimes added to a jaundice, and bring on death much sooner than expected. All which circumstances may not only be perceiv'd, in the observation that I have given you of the priest, but may also be illustrated, by examples that are in great measure similar. The first of which was related to me, when I resided at Bologna, for there it had happen'd, and that not many years before, by grave and learned men, and confirm'd by Valsalva himself, who had been present at the dissection.

4. A very ingenious young man who was set apart for learning, and the priests office, was greatly terrified by a fierce and violent man, who held a musket to his breast, unexpectedly, and threaten'd to shoot him. The day after he became isteric, and soon after that delirious so as to know none of his acquaintance, but cried out every now and then, oh vile man! and then being seiz'd with very great convulsive agitations, so that he could scarcely be held by the hands of many persons, he died within four and twenty hours from the beginning of his delirium.

The dissection of his body show'd nothing that was worthy of remark, except

(*a*) Medic. rat. t. 4. p. 4. c. 12. obs. 5.

that the sanguiferous vessels, which creep through the pia mater, were, for the most part, distended with black blood.

5. This history we might have put in the number of those which relate to deliria, or even to convulsions. But because the jaundice appear'd first of all the disorders which came on, in consequence of the fright, I chose rather to give it you under this head. The jaundice seems to have been brought on by a contraction of the hepatic nerves: and the matter of the bile being, in great measure, retain'd in the blood, becoming acrid, and greatly affecting the brain, as in a young man, and a man given to letters, seems to have brought on all the other symptoms.

6. We will not search after other examples, among medical writers, which are to be compar'd, in many things, with the example of Valsalva (*b*), as we have two here in the Sepulchretum (*c*), one of Ballonius, in a young man, son of the Count de Chaulney, and another of Guarinoni in the Cardinal Sforza. This latter icteric patient had at first no fever, but what was latent, so that the physicians did not attend to it, till after it became more violent, when being seiz'd with a slight delirium, and afterwards with a fresh increase of fever, with a very great tossing of body, and not long after with two sudden epileptic paroxysms, and, finally, three days before death, being attack'd with various convulsions, he was nevertheless carried off gradually, and gently; the liver, and almost all the other parts of the body, being ting'd of a yellow colour, to a very great degree, and the lungs being in the same state, in which they are generally found, in those who have been long excruciated with a difficulty of breathing, at the time of their death.

But the young man, from a lively and good-natur'd disposition, being made morose, and melancholic, and being suddenly seiz'd with the jaundice, after fifteen days, when no such thing was thought of, gnash'd with his teeth, and was convuls'd in the night; was in an extasy as it were, and after great howlings and convulsions died: the brain being found in such a state, that the cause of death did not seem to have been there, the lungs being very much diseas'd, but the liver still more, so that it was *ὑπέχλωρον* as it were; for thus the word ought to be written, and thus it is written by Ballonius, as you will see by looking into his second book of the Epidemics, which is quoted (*d*), not in page two hundred and forty four that is pointed out, but in page two hundred and fifty eight; and as this word signifies greenish, or palish, you plainly see that this young man agreed with the priest of Valsalva, in this colour of his liver also. And they all agreed in that stupor of mind, which Ballonius calls a kind of extasy; or trance, Guarinoni *levis desipientia* or a slight suppression of the senses, and Hippocrates, or at least the authors of the prædictiones (*e*), and *coacæ prænotiones* (*f*), *μώρωσις*, and have taught to be bad "from a jaundice:" interpreters render it by the word *fatuitas*, which signifies a stupidity, or dullness, of the internal senses, who are follow'd by Zachias, in an observation that confirms this, and is transfer'd into the Sepulchretum (*g*).

(*b*) Supra n. 2.

(*c*) Obs. 6. & in additam. obs. 5.

(*d*) Edition quæ una tunc erat, & diu fuit, parisiens.

(*e*) L. 2. n. 4.

(*f*) N. 2.

(*g*) Obs. 7.

But if you enquire, why there was not a furious delirium in all these patients, though there were convulsions, there is no doubt but this may be accounted for, and in some measure from the different age of the patients, the different temperature and disposition of the blood, bile, and viscera. Thus in the cardinal, the blood was fluid, and found without any coagulum in any part, of which kind Boerhaave (*b*) affirms it to be, in icteric bodies, so that "when taken from a vein it does not coagulate:" but in the priest of Valsalva, it had not only been concreted, when taken away from the vein in a proper vessel, but was also found to be concreted in the ventricles of the heart; for which reason, the stagnating blood appear'd about the stomach, in the form of redish points, and here and there throughout the belly, like many small glands which were inflam'd: and that blood of this nature has been sometimes found by anatomists, in the heart of other icteric patients, the observation of Zachias, which I have already pointed out, and another likewise of Bartholin, which you have here in the Sepulchretum also (*i*), sufficiently demonstrate; not to mention here my observation upon the potter, who was in great measure icteric, and whom I have describ'd to you on a former occasion (*k*), or another of Valsalva, on that icteric girl (*l*), which still more deserves our attention, because, though, except the mucous concretion in the heart, the remaining part of the blood was fluid, yet when expos'd to the air it coagulated.

But to this disposition in the blood to concreate, other causes must be added, both in this fluid itself, and in the brain, in order to bring on a delirium. And yet it is of no great importance, if the brain, not even at this time, nor when there were the most violent convulsions, appears to be injur'd. For that which was the cause of delirium therein, may escape the penetration of the eyes: and from the nerves being irritated, even on the outside of the brain, or from an irritation on the spinal marrow, which we must suppose to have had this effect in that priest, horrible convulsions may arise.

7. However, the brain was not found to be altogether uninjur'd, in that body, whether you attend to that which was observ'd in the dissection of the meninges, or even the very colour of the brain, which was not entirely natural, and was readily suppos'd, by Valsalva, to have receiv'd a tincture from the bile. For notwithstanding the substance of the brain is itself found to be yellow, sometimes in this disease, I do not, however, remember to have read many observations, wherein it was so found, perhaps by reason of the extreme smallness of the vessels, which go to the internal substance of the brain, in the first place, and in the second place, perhaps on account of their rarity. And this at least I can say, that some time ago, when I had, according to custom, a great number of heads in the theatre, in order to give the anatomical description and demonstration of the brain, observing a yellowness of the face, of the skin in other parts, and of the membrana conjunctiva of the eyes, in one of them, I inquir'd to whom it had belong'd, and found that it was the head of a man who had been asthmatic, and jaun-

(*b*) Prælect. in instit. §. 773.
 (*i*) Obs. 24.

(*k*) Epist. 7. n. 11.
 (*l*) Epist. 10. n. 7.

dic'd,

dic'd, and had died the day before: through the external surface of the pia mater, I saw, in several parts, considerable spaces of a yellow colour, inclining to greenish; yet soon after, when the brain was dissected, I found the colour therein to be the same as it naturally is.

Again, when a like occasion was offer'd afterwards, notwithstanding I found the small quantity of water, in the lateral ventricles of the brain, to be of a yellowish colour, and the plexus choroides somewhat inclin'd to that colour, and the pineal gland itself, in other respects very short, and pretty hard in its body, and having a small substance adhering to its basis anteriorly, not sandy, nor yellow, but white, and towards its upper part having something in it like blood, or a sanguiferous vessel; I say, notwithstanding I saw this gland inclining from its usual cineritious colour, to an obscure kind of yellow; yet all the remaining parts, for I dissected them, preserv'd their native colour, so that whatever was medullary, I found to be extremely white. So also here in the Sepulchretum (*m*), after a long-continu'd jaundice, you will see that the substance of the brain was very white; although not only the meninges, and particularly the dura mater, but the cranium also, externally, and, in part, internally likewise, was yellow.

For this disease sometimes tinges the very bones with a yellowness, which, as some assure us, can never be wash'd out from the skeleton. How yellow the bones were in an icteric foetus, the observation of Kerckringius shows, which you will also read here in the Sepulchretum (*n*): nor is it to be wonder'd at; as, instead of blood, he found a yellow humour like gall, of the same kind with that which was found by Vesalius, in like manner, in Martellus a nobleman of Florence, as you would learn from this same section of the Sepulchretum, if his dissection, which is given imperfectly twice over (*o*), were once fully describ'd, as it is in another place (*p*).

However in all these places you should read Martellus, instead of Marcellus, which is falsely transcrib'd: and suppose that Van Helmont (*q*), himself, had lit on observations not unlike these, when in the mesenteric veins of two icteric patients, he saw that appearance, from whence he suppos'd “an excremental virus, or a yellow and stercoreous cruor, or a yellow liquid excrement, the consequence of a second digestion, which was preternaturally taken up into the veins, and dispers'd through the whole body,” to be the occasion of the jaundice; whereas it was a bile, which, by reason of its having not been secreted from the blood, in a proper proportion, either on account of its great plenty, or on account of the disease of the liver, as in Martellus, abounds at length, therein, to so great a degree sometimes, that the blood which is taken away, and the urine which is then discharg'd, appear to be perfectly like each other (*r*); and that not only in persons where the disease is to prove fatal, but even frequently in those who are to escape (*s*), which happen'd to them, or, at least, to that icteric patient in whom, as Baglivi (*t*) relates, “instead of blood, yellow water only, flow'd out from the nostrils, and from the cupping-glasses, which were applied to the sca-

(*m*) Obf. 3.

(*n*) Obf. 34.

(*o*) Obf. 8. §. 4. & obf. 20.

(*p*) L. 2. f. 11. obf. 36. §. 1.

(*q*) Vid. in hac Sepulchr. 18. sect. obf. 26.

(*r*) Vid apud Hoffmann. supra ad n. 3. cit. cap. 12. §. 4.

(*s*) Ibid.

(*t*) De experim. circa bilem.

“ rifications,” juſt as we read in Lower (*u*) of the recovery of that young man, who, having had a large effuſion of blood from his noſtrils, and being well-ſupported, in the mean while, with broths, began at length to have a fluid diſcharg’d from the ruptur’d veſſels, which was more like broth than blood.

8. But among theſe parts which are obſerv’d to be the moſt eaſily, and moſt frequently, ting’d with a yellow blood, are the adipoſe membranes in particular, and thoſe which are call’d *conjunctivæ* in the eyes. Valsalva ſuppos’d the fat to be the moſt prone of all the parts to contract the ſaffron-like colour, where the ſerum of the blood is only a little yellow. For he had found the fat to be of this colour, in many who were not affected with the regius morbus, and eſpecially in three bodies, which he diſſect’d almoſt at the ſame time, that is to ſay in a hydrocephalous patient, in a man who had been wounded, and in another who had been carried off by an ardent fever.

But this yellowneſs is ſo obvious in the white of the eye, in patients labouring under that diſeaſe, that the ancients ſeem to have been perſuaded, thereby, to ſuppoſe that all objects appear yellow to thoſe who have the jaundice, which Hoffmann (*x*) ſays, is call’d into queſtion, by our Mercurialis in his *Præleſiones Bononiæſes*, by which he meant perhaps to ſay in his *Præleſiones Patavinæ* (*y*), or rather, in his *Leſiones variæ* (*z*). For in theſe writings, having brought the teſtimonies of Varro, Lucretius, Sextus Empiricus, Caſſius the phyſician, and even of Galen himſelf, all of which affirm this circumſtance, he put in oppoſition thereto the tacit teſtimony of other medical writers, who are ſilent upon the ſubject, and his own repugnant obſervation, in a great number of icteric patients. And he might have join’d with his own obſervation, a great number of others, without doubting but he would have of thoſe who ſhould ſucceed, by much the greateſt part, aſſenting to his doctrine.

At leaſt, even lately, although after Sydenham (*a*), Boerhaave alſo (*b*), had written the ſame as thoſe ancients, that very learned man, Haller (*c*), has confeſs’d “ that he did not find evident experiments to prove this obſervation,” nor had he read, “ that the cornea had been found yellow,” in icteric bodies; and that not only a ſlight change of colour, in the humours of the eye, but a very great one, was requir’d, in order to produce this effect: as, for inſtance, when from blood being extravasated into the aqueous humour, according to the obſervation of St. Yves, the light appear’d to be red. And, indeed, Boerhaave ſeems to me, when he aſſerted this a ſecond time (*d*), and produc’d another obſervation of his own very much ſimilar to that of St. Yves, to have thought “ that a little bile mixing itſelf with the aqueous “ humour,” might be compar’d with blood being extravasated therein. But it probably happens, from the extreme ſmallneſs of the veſſels, going to the humours of the eye, as has alſo been ſaid of the internal part of the cerebrum (*e*), that a tincture of the bile does not often reach thereto.

(*u*) Tract. de corde c. 2.

(*x*) §. 4. modo cit.

(*y*) L. 1. c. 32.

(*z*) L. 6. c. 12.

(*a*) Proceſſus in morb. curand. ubi de ictero.

(*b*) Prælect. ad inſtit. §. 544.

(*c*) Adnot. ad eum locum.

(*d*) Prælect. modo cit. §. 840.

(*e*) N. 7.

To me, at least, when I formerly dissected the eyes of an icteric woman, no appearance of yellowness appear'd in any of the three humours: nor yet in the tunica cornea: which coat in this body, as in other icterical bodies, and particularly in that potter also, of whom I spoke above (*f*), though I examin'd it accurately, and, at the same time, when there was a great yellowness in the neighbouring tunica adnata, I could never find to have any yellowness in it. Yet it may sometimes happen, though very rarely, that objects appear yellow in this disease, that is to say, if the tunica cornea be universally saturated with bile, and not "then only, which even Mercurialis grants, but also if the humours of the eyes are, at any time, ting'd with a very great yellowness;" one or the other of which, or, if you please, both, you may suppose to have taken place, in the two examples, that Hoffmann (*g*) testifies his having seen, in favour of the opinion of the ancients; and in a third, in like manner (for I do not remember to have read any more) which is added by the celebrated Scardona (*b*).

9. And there may be in the eyes of some persons either a greater number, or a greater diameter, of the small vessels going to the tunica cornea, and to the humours, and, at the same time, in the blood of these persons, a matter of the bile which is more fit to pervade and tinge these small vessels, whether this depends upon the nature, and properties of that matter, or on its quantity. For we see after it is secreted, and deposited in its vesicle, that it passes more easily through the membranes of this reservoir in some bodies than in others, and, in like manner, that it tinges the contiguous parts in some bodies with a very deep and saturated colour, and in others with a very slight one, or with none at all.

That is to say, the blood, from whence it proceeds, if you choose to express yourself in the words of Willis, which you see produc'd here in the Sepulchretum (*i*), "is too much inclin'd to a sulphureo-saline dyscrasia," in "some, and in other has "the sulphur too much depress'd:" for which reason also, as the former are very prone to the jaundice, so the latter, says he, "are perfectly free from this disease," as he saw in many cachectic and phlegmatic habits, although "labouring under an obstruction, and induration of the liver, in respect to most of its ducts." Which hypotheses, however, we must admit with caution, or wait to distinguish the times, and the changes, which the jaundice itself brings on, lest you should be afterwards surpris'd, when you read, in the same place, the observations of Hildanus (*k*), or de Graaf (*l*). For the former asserts "that a pituitous and cacochymic patient had, at times, labour'd under the jaundice "for some years together;" and de Graaf, that the bile of an icteric body was "entirely serous, and ting'd with so slight a yellowness, that the linen rags, which were dip'd into it, receiv'd scarcely any yellow colour therefrom."

But in regard to the quantity of that matter, the nature of which I have spoken of, it is surprizing how great an abundance thereof may be in some

(*f*) N. 6.

(*g*) §. 4. cit.

(*b*) Aphor. de cognosc. & cur. morb. l. 3. c. 10. comm. ad n. 8.

(*i*) Schol. ad obs. 1.

(*k*) Obs. 8. §. 13.

(*l*) Obs. 10.

bodies, if to that which the native constitution of the body, the time of the year, foods, and drinks, and other things of that kind, which happen to agree in one effect, have accumulated, another be moreover added; as, for instance, if a fever, if immoderate exercise in the sun, if poison, even that which is introduc'd into the blood by the bite of a venomous animal, and, finally, if any thing else of that kind, suddenly let loose those particles of sulphur also, which had been more constricted, and depress'd, in the blood, and carry them away to the liver, so that there are, now, more bilious particles, than it is possible for this organ to secrete.

There is, besides, another method still more known, by which the matter of the bile may be increas'd in the blood; as, for instance, when little, or none of that matter, which is in the blood, is separated therefrom, either on account of some disorder of the blood itself, or of the internal secreting organ, or on account of the passage of many branches of the hepatic duct, or of the trunk itself, or of the ductus communis being obstructed. For this being obstructed, although what is already secreted does not return into the blood, as many go on to think, yet fresh bile cannot be sent into the full and distended ducts; and, therefore, as the matter of the bile is not carried away from the blood, in the same proportion as it is increas'd therein, by the concocted aliments, it must, of course, be augmented more and more every day, and abound.

10. And in this way that I have spoken of, it may be obstructed by more rare or more frequent causes. In the number of the more rare are those which you read here in the Sepulchretum; as, for instance, the ductus communis reduc'd to the narrowness of a capillary vessel (*m*), or contracted into itself, like a solid chord (*n*), and indurated (*o*), or altogether solid and bony (*p*), or compress'd by some glands which lie round about it (*q*). And to the more frequent causes, in the first place belong convulsions, and the *crispatures* arising from hence, which are propagated quite to the beginnings of the small branches of the hepatic duct, constringing and shutting them up, as they are the narrowest. And though this effect thereof cannot, from the very nature of the cause, fall under the notice of the senses, yet it is so consentaneous to reason, that we may, without any scruple, make use of this hypothesis, to explain those jaundices, which have their origin, either from violent affections of the mind, or from pains.

There are, also, very learned men, who thus explain the jaundice that is brought on by the bite of the viper, from whom I should not dissent, if the intestinal faeces are but white at that time, as the strong constriction of the orifice of the ductus communis, from convulsion, which they suppose, requires: but if they continue to be yellow, and even yellower than usual, I shall then go on to understand and explain the case, in the same manner that I just now told you (*r*), before any obstruction of the passages was spoken of.

Moreover, among the more frequent causes, are to be number'd the obstructions happening in the other vessels, as well as in the biliary vessels,

(*m*) Obf. 14.

(*n*) Obf. 17.

(*o*) Obf. 25. §. 7.

(*p*) Obf. 16.

(*q*) Obf. 11.

(*r*) N. 9.

though it is my intention, chiefly, to consider the latter in this place, whether the obstruction of these tubes is made by some particles being secreted with the bile, which are grosser and more viscid than they ought to be; or is owing to calculi generated from these, and from the bile, by which the branches of the hepatic duct, or the trunk itself, or the ductus communis, are stuff'd up. And I do not say, the cystic duct, for this reason, because the obstruction of this passage is not able, of itself, to impede the passage of the bile from the liver to the intestines; although there have been many in former times, and are some even in ours, who, in spite of the admonition of Wepfer (*s*), "that a jaundice did not follow the obstruction of the neck of the gall-bladder, unless the ductus communis, also, is obstructed," have themselves suppos'd that men became jaundic'd, not only from a calculus sticking in the cystic duct, but also from a calculus in the cyst.

In regard to which opinion, that you may plainly perceive what is to be thought thereof, whatever remains of this letter (and a great part of it does remain) will turn upon the consideration of bilious calculi; since those things which I have hitherto hinted at may be sufficient for you to attain to most of the other causes of the morbus regius, and, at the same time, to open a way to those things which remain to be said on the subject of bilious calculi, either when within, or on the outside of, the liver.

11. These calculi are generated in the liver, "very frequently," and found in dissections, according to what Platerus asserts in the Sepulchretum (*t*), and Henenius (*u*), who says they are "often so large as would scarcely be credible." To both of whom I will not deny but it might have happen'd so. But as to what Matthiolus has suppos'd, in dependance upon certain reasons (*x*), that stones are generated "in the liver very frequently, as they are in the kidneys," I confess if I attend to the almost innumerable dissections of the human liver, made by Valsalva, and by me, I cannot readily assent to his opinion. For although both of us have found calculi in many kidneys, it never happen'd to me to find more than one in the liver formerly: and Valsalva never found one, in all his dissections, that I know of.

But when I say these things, I mean no more than to consider that comparison betwixt the calculi of the kidneys, and the liver, as I am by no means ignorant, even from the Sepulchretum itself, by how many eminent men they have been found, or taken notice of, in the liver. For besides those three whom I have mention'd, I see that the names of our Fallopius (*y*), Scaligerus (*z*), Trincavellius (*a*), Dodonæus (*b*), Camenicenus (*c*), Peucerus (*d*), Blasius (*e*), Heerius (*f*), Dobrzenskyus (*g*), for so his name ought to be written, are produc'd: to which I could add others, and among these Columbus (*h*), Forestus (*i*), and Reverhorstius (*k*): none of whom, however, has suppos'd ob-

(*s*) In additam. ad hanc 18. Sepulchr. sect. obf. 4.

(*t*) Sect. 17. l. hujus 3. schol. ad §. 1. obf. 13.

(*u*) Obf. cit. §. 2.

(*x*) Sect. hac 18. schol. ad §. 12. obf. 8.

(*y*) Obf. 13. cit. §. 6.

(*z*) §. 4.

(*a*) §. 7.

(*b*) Sect. 18. cit. obf. 4.

(*c*) Ibid. obf. 8. §. 12.

(*d*) Cit. obf. 13. §. 3 & 8.

(*e*) 9.

(*f*) 10.

(*g*) Sect. 16. obf. 5.

(*h*) De re anat. l. ult.

(*i*) L. 19. obf. med. 14.

(*k*) Dissert. de mot. bilis §. 52.

servations of this kind to be frequent. If you examine each of these authors separately, you will, perhaps, be surpriz'd, that except Dodonæus, Camenicensus, and Dobrzenskyus, there is not one who makes mention of the jaundice in these patients, or even describes the ductus communis as shut up with a calculus, or the liver full of small stones.

But you will cease to wonder, when you attend to this circumstance, that it is not sufficient, in order to shut up all the passage of the bile, that a few and small calculi have been form'd in the liver, nor even that large calculi have been form'd there, unless they are lodg'd in such a part as to beset the larger branches of the hepatic duct, and entirely shut them up, either by compressing or obstructing them, which may be also brought about by small and innumerable calculi, "filling" the whole liver "on every side," as Dodonæus says, not lying at a distance from each other, "in a scatter'd way," as was seen by Forestus; for when they adhere in all the smaller branches of this duct, they produce the same effect as if they stop'd up the trunk itself.

12. But I have said that the passage of the bile is prevented from calculi, either by means of compression, or obstruction. For if any one should say that calculi are sometimes form'd in the little glandular bodies of the liver themselves, and that to this class, without doubt, belong'd those lesser calculi, which Riedlinus (*l*) saw "on the external surface of the liver," I should not contest his opinion, although I believe they are more frequently generated in the very branches of the hepatic duct, as those who have very minutely trac'd them, have found. And as, certainly, nothing had happen'd more frequently to Ruyfch (*m*), in oxen and sheep, than to find calculi in the pori biliarii, so nothing happen'd "more rarely," than to find these concretions in the "parenchymatous substance of the liver itself;" so that, although he very attentively "dissected away all the fleshy part," in more than a hundred livers, yet he found in one only, a calculus "buried in the parenchymatous substance, and not at all affix'd to the porus biliaris."

Nor can I suppose, that the ancient observations of Platerus (*n*), of hepatic calculi resembling "a tephaceous concretion, ramified in the manner of coral, and hollow internally," are to be refer'd to any other part, than to the same biliary branches, especially as I read Glisson (*o*) expressly asserting, that similar observations "of tubuli of so great a length, that if they could "but have been taken out in their perfect state, they would, like coral, "have resembled a great number of the ramifications of the porus biliaris, "in one continu'd stony series," were made by him on the livers of oxen, and even within the same pore or duct. The branches of which Reverhorst, also (*p*), found to be internally beset with a calculous crust, in the body of a man.

Nor have I found calculi, in the human liver, in any other place than in these branches (*q*). Nor do I suppose that those stones, which by Columbus (*r*), and Camenicensus (*s*), were suppos'd to be found in the vena

(*l*) Eph. n. c. cent. 3. obf. 45.

(*m*) Obf. edit. cum dilucid. valvular. in lymphat. 24.

(*n*) Schol. cit. ad obf. 13.

(*o*) Anat. hep. c. 7.

(*p*) §. 52. cit. supra ad n. 11.

(*q*) Epist. anat. l. n. 43.

(*r*)

(*s*) Locis cit. ad n. 11.

portarum, had any different situation: yet my reasons for thinking thus, although not sufficiently attended to by some authors of eminence, as I have already given them on a former occasion (*t*), I shall not repeat here. These calculi, therefore, when at length from tubular bodies, by continual and fresh accretions of similar matter, they are made perfectly solid, as happens in aquæducts, must, without any doubt whatever, occupy the whole passages whereof I have spoken, and prevent the transit of the bile.

13. I have also said this; that calculi of the liver, though large, do not bring on a jaundice, is not to be wonder'd at, unless they are in such situations as necessarily to obstruct these passages. And I believe that this disease was present, for I cannot now positively affirm it, in a certain man, whose liver had a stone in the center of the concave surface, of the form and magnitude of a pigeon's egg, as an anatomical friend of mine, who had dissected the body, inform'd me by letter, many years ago. But I do not wonder that this disorder had not been observ'd in three women, who, although they had a much larger stone, or a greater number of concretions, and more heavy ones, within the membrane of the liver, nevertheless, had them in such a situation, that they seem'd to be rather on the outside of the liver, than within its substance: and this was the reason I did not make mention of them above. For that membrane being drawn away from this viscus, by the included weight, and being extended downwards, had form'd a sacculus in two of them of the length of a span; for in the third it was describ'd only as a follicle, pendulous downwards.

This last observation is from Benivenius (*u*), and is totally different, as you will easily perceive by comparing them, from the second, which is given in the Sepulchretum (*x*), from the third chapter of his book. And a similar observation to his; except that in the sacculus not many calculi were contain'd, but one large calculus, only, was included, together with a great quantity of glutinous humour, and that the woman never complain'd of any thing but of a heat in her liver; the observation of Georgius Greifselius (*y*), is subjoin'd. And it was in consequence of bearing these examples in my mind, and observing therefrom, that besides the gall-bladder itself being enlarg'd, another kind of cyst, distended likewise with a fluid, might sometimes hang below the liver, which, although it was entirely preternatural, would, nevertheless resemble this natural cyst; it was in consequence, I say, of reasoning from these examples, that in the case of Laurence Bacchetti, formerly a physician at Padua, the history of whose disease, and dissection, two other learned men have publish'd, since Dominic Militia (*a*), I carried myself with so much caution, as not to affirm any thing for certain, though I made no scruple to declare my opinion.

This gentleman had a tumour hanging below the liver, which you immediately felt by applying your hand to the abdomen: it was globular, and moveable, so that you could easily bring it towards the right side, or towards the left, by means of the hand with which you laid hold of it. When different physicians seem'd to have different opinions, as you will read

(*t*) Epist. 1. cit. n. 49.

(*u*) De abdit. nonnull. &c. c. 94.

(*x*) Sect. 17. obs. 13. §. 1.

(*y*) Ibid. §. 11.

(*a*) De morb. exitial. nob. virgin.

in Militia, who declares the several opinions of all; to me, who saw him once after others, this tumour seem'd to be the gall-bladder, enlarg'd by an immoderate distension of fluid, and produc'd downwards, which I declar'd to Dominic Stephanelli, a physician, and friend of the patient, who with great politeness attended me home, and very earnestly desir'd my opinion; yet I made this declaration in such a manner, as to affirm nothing for certain. What I had thus declar'd was so evidently confirm'd by the dissection, that although the declaration might be pass'd over by some, yet the appearance itself could be conceal'd by no body.

I had seen the same thing before, and particularly in an old man, from whom I had already describ'd it, in the first of the *Epistolæ Anatomicæ* (b). And I remember'd to have read of it very frequently, and not only among the ancients, as when Vesalius (c) found, in Martellus, the same cyst, "of the bigness of two fists," or when Fernelius (d) said that it is sometimes distended by exuberant bile, "into a very large size;" but among the more modern authors also, as, for instance, in Zwingerus (e), who saw it "about six times larger than is natural," but particularly the younger du Verney (f) and Yurgius, whose observation of one of a still more monstrous size, is taken notice of by Abraham Vaterus (g); so that after this I do not think it worth while to point out those which have been since produc'd, nor yet to inquire how great a cyst was found by Lancisi, which, by reason of its very remarkable length, Pacchioni intended to describe, as he expresses himself in a letter which he wrote to me in the year 1710. Although two observations, which I lately read in the writings of the very illustrious Van Swieten (h), are by no means to be neglected: the first from those of the illustrious society at Edinburg, who found this cyst to contain eight pounds of bile, and that in a boy not more than twelve years of age; the second made by himself, who, in the body of a woman, found the same cyst to be so distended, as to reach quite to the right os ilium, and this cyst had protuberated, by its own bulk, betwixt this bone, and the lower ribs, even before her very lean carcass was cut into.

But it was also found to be extended, in a Polonian senator (i), "to so surprizing a degree," that in the living body, "it could be felt by the hands." To return, however, to those things which were publish'd at that time, which was in the year 1732, although I very well remember'd them, yet not unmindful of those three observations, that I pointed out in the first place, of a facculus hanging down from the liver, nor yet of the admonition, in the latter end of the sixth book *de morbis popularibus*, that even good physicians, "not to mention others," are often deceiv'd by "appearances," I was not willing to imitate Baglivi, who, if he were living at present, and should read what is written by our Vallisneri (k), and Scheffelius (l), would certainly repent of having written too hastily, and in confe-

(b) N. 43.

(c) *Epist. de rad. chin.*(d) *Pathol.* l. 6. c. 5.(e) *Act. n. c. tom. 1. obs. 78.*(f) *Mem. de l'acad. r. des sc. 1701.*(g) *Differt. qua calculi in vasis. fell. &c. thes. 5.*(b) *Comment. in Boerhaav. aph. §. 950. & 935.*(i) *Commerc. litter. a. 1733. hebd. 11. n. 2.*(k) *Opere t. 3. p. 6. lett. 37. annot. 1.*(l) *Differt. de lithiasi fell. §. 28.*

quence of attending to some observations, but not to all that it was in his power to attend to (*m*), “when you see obstinate jaundices, or those that have been cur’d, return afresh, you may take it for granted, that these are produc’d by a calculus of the gall-bladder, and for this reason you may pronounce them incurable.”

14. But in order to treat of these calculi of the gall-bladder, according to my promise, inasmuch as their situation certainly is on the outside of the liver, let me first observe, that there is so great a number of observations, of these concretions being found in the human body, that the list of those which relate to the calculi of the liver, admits no idea of comparison therewith. And if you inquire after the reason of this difference, you will find more than one, when you attend to the causes which are advanc’d, for the generation of calculi in the cyst being so frequent.

Our Veslingius (*n*) has suppos’d the thickness of the cystic bile, and its very long stagnation in that cavity, by which the meatus cystici, and valvulæ, are much streighten’d, and less passable. And these causes you will find so peculiar to the cyst, that the greater part of them are not, by any means, transferable to the hepatic ducts, and it is surprizing that a very eminent physician, among the more modern, who has acknowledg’d these very causes of the difference we are speaking of, has not equally observ’d that they are also common to the cow species; in which, as he there confesses, that hepatic calculi are more frequent, so he ought, at the same time, to have assign’d some cause of this difference betwixt the human species, and this species of animals.

But those things, which Veslingius had previously demonstrated, were, in the mean while, illustrated, and enlarg’d, by others; either by remarking a greater thickness of the bile in some men, and a greater disposition to concretion; or by acknowledging a longer retention than is natural, by reason of the spasmodic crispatures, and constrictions of the cystic duct; or by reason of the power of self-contraction being deprav’d, and weaken’d, in the relax’d coats of the vesicle. And this weakness of the coats becomes so much the greater afterwards, in proportion as a greater quantity of bile is retain’d, just as it happens in the urinary bladder, when from the quantity of retain’d urine its power of contraction is weaken’d, and overcome: which is a simile that was not only us’d formerly by Galen (*o*), but has even been us’d by the younger du Verney (*p*) in the present age: and from hence you understand what is, in general, the principal cause of those vast enlargements of the cyst being brought on, which I spoke of just now.

To these causes others were, moreover, added by Abraham Vater (*q*), whose name ought not to have been suppress’d by those who wrote the same things afterwards. For he, having remark’d how difficult it is for the bile to ascend, on account of the declivity of the fund of the cyst, and observ’d the necessarily slow passage thereof, on account of the obliquity of the duct, judg’d, from considering both these causes, that the cyst being compress’d by the stomach, none but the thinnest, and most fluid, part of the bile was squeeze’d out, and that the thickest was always left behind, in healthy bodies,

(*m*) De experim. circa bilem.

(*n*) Synt. anat. c. 4.

(*o*) De loc. aff. f. 5. c. 7. haud ita procul a fine.

(*p*) Cit. supra ad n. 13.

(*q*) Obs. rariff. calcul. 3. §. 1.

which

which would easily concreate, unless it was presently diluted by a new afflux of hepatic bile, and restor'd to its former consistence.

But when this fresh afflux is either less than it ought to be, or the bile is secreted in a more viscid state than usual, it does not fully answer the purposes of dilution, and renovation; for which reason the inspissated bile of the cyst more easily degenerates into calculi. And Fernelius (*r*) had trac'd out these causes to Vaterius, and, in some measure, even to Veslingius, when he asserted that these calculi "had their origin from yellow bile, which having been long retain'd in its proper receptacle, and not timely evacuated, nor diluted, and renovated, by a new influx, grows hard in a surprizing manner."

15. Since, therefore, in this great infirmity, and intemperance, of human life, so many causes, which must be readily granted, are at hand to favour the production of cystic calculi, there is not the least reason to wonder that they have been so often found, both by the ancients, and by moderns. For after Gentilis (*s*), and Niculus (*t*), had testified their having seen concretions of this kind, the latter in the gall-bladder, and the former in the meatus thereof, Benivenius (*u*), Vesalius (*x*), Curtius (*y*), Falloppius (*z*), Fernelius (*), Stephanus (*a*), Columbus (*b*), and Coiterus (*c*), to take no notice of authors of less note, produc'd their observations to the same effect: and from the time that human bodies began to be more frequently dissected, even to this very day, no writer in anatomical, or medical, matters has had occasion to speak pretty fully of that vesicle, but he has made mention of calculi being seen by him there; so that it is with justice the celebrated professor Fabricius (*d*) says, that calculi of the gall-bladder have, in general, been more frequently observ'd than those of the urinary bladder; and it is shown by the illustrious Haller (*e*), that they are even to be met with more frequently in some countries.

Wherefore I would not have you be surpriz'd, if I say, that while I write this present letter, I have before my eyes, at least two hundred observations of this kind, nineteen of which are my own; but I would rather have you wonder that I have not read, or do not remember, a great many more. Yet those, of which I have spoken, are not so few in number, but that I may from them venture to answer your inquiry, as to what occurs more frequently, or more rarely, in cystic calculi, and that without seeming to answer too hastily, or rashly. You may make this inquiry first of all, in what kind of bodies they are most frequently found? For Carolus Stephanus (*f*) has asserted, that they have been seen by him, "chiefly, in women, who were pretty far advanc'd in life:" and, in this age, Frederick Hoffmann (*g*) has said, "that they are found very rarely in men, who are in the flourishing time

(*r*) C. cit. ad n. 13.

(*s*)

(*t*) Apud Donat. de med. hist. mirab. l. 4.

c. 30.

(*u*)

(*x*) Cit. supra ad n. 13.

(*y*) Comment. in mundin. anat. ubi de hepate in fin.

(*z*) Obf. anat.

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(*) Cit. ad n. 14.

(*a*) De dissect. part. corp. hum. l. 3. c. 42.

(*b*) De re anat. l. ult.

(*c*) Obf. anat.

(*d*) Propempt. ad dissert. Jo. Barth. Hoffmann.

(*e*) Opusc. pathol. obf. 33.

(*f*) C. 42. modo cit.

(*g*) Med. rat. t. 4. n. 2. f. 2. c. 3. §. 12.

“ of life, but more frequently in old men, and still more frequently in women than in men.” The first thing pronounc’d by Hoffmann, therefore, is much more true than the last. For I see in the observations spoken of, that the number of males and females is nearly equal. But although I find old people, promiscuously, of both sexes, to the number of sixty-one, whose ages are particularly pointed out by the observers, I find no more than eight who are said to be young: and among these there is no infant, and but one child; and the least age, amongst these eight, is that of twelve years, and the greatest nine and twenty.

Without doubt, in a flourishing time of life the juices are thinner, more briskly agitated, and less prone to concretion, than in the decline of life, or as Hoffmann particularly saw, than in the less laborious life of very old men, especially, and women. For which reason Haller, whom I have already commended, accounts for “ the frequent calculi of the gall-bladder, which he found in criminals, who had been long confin’d to prison,” from the want of muscular action (*b*). And to the same cause, you must refer what the illustrious Van Swieten (*i*) found to happen in bile, which was not agitated: For, “ having left it to putrify in a pure glass vessel, he found calculous coagula in the bottom of the vessel.” Yet the middle age, although it is an active season of life, has not juices to be compar’d with the flourishing prime of our age, for which reason it happens, that this time of life cannot equally resist the injuries of intemperance, and of the passions, to both of which it is still more liable than old age. If you add to this, that a great part of the women in the lower classes of the people, do not lead a very sedentary life: and if you compare all these things with those which are said above (*k*), upon the causes that produce calculi of the gall-bladder; you will, of course, easily perceive that the observations are consonant to reason.

16. But if you now inquire, whether Reverhorst (*l*) has written truly or not, when he has admonish’d us, that we might remark, in regard to these calculi, “ that the younger the body is from whence they are taken, the more pale are they in their colour, that in a middle age they are of a yellow low colour, but in a more advanc’d time of life of a darker yellow, or even almost black,” it will be much more easy to give you an answer to this question. For it is not the question, here, what is more frequent, but what is perpetual; so that I can readily affirm, even from inspecting my own observations, that this is too hastily pronounc’d. For I have found not only blackish, but very black calculi, in many of a middle age likewise; in a young man of five and twenty, and in an old woman of seventy-five (the former of which is the youngest, and the latter the oldest, from whose gall-bladder I have hitherto taken calculi) they were not very different in colour from each other, so that they were neither black in the old woman, nor very pale in the young man, especially if you compare them with one of a cineritious colour, which I found in a woman of sixty years of age within one.

But that you may not depend upon my observations alone, I have, certainly, not read of calculi being found in a younger woman, than that virgin.

(*b*) *Experim. anat. de sang. mot. c. 6.*

(*i*) *Comment. in Boerhaav. aph. §. 950.*

(*k*) *N. 14.*

(*l*) *Dissert. de motu bilis §. 57.*

of nineteen, who is describ'd by Bonetus, in the former book (*m*). Yet in her all the stones were "yellow, and resembled bile in their colour." On the contrary, that woman, whose history is accurately describ'd by Cajetanus Tacconus (*n*), was of an advanc'd age, that is of sixty-three years, and affected with a black jaundice besides. Nevertheless, all the calculi from her body, "not only inclin'd to a whitish colour, or dilute saffron hue;" but, notwithstanding they were internally yellow, were furnish'd with coats that were "white, and shining, and resembled the internal silver surface of mother of pearl."

And, without doubt, the age is not to be so much consider'd, as the matter of which they are, or have been, made, for they do not always bear the colour of the bile in which they are found; and this colour, according to the various disposition of the blood, or of the organs, may sometimes be, or have been, of a different nature, or the bile may have even hid, under the same colour, particles of a different kind, though at the same time of life, and equally proper to form calculous concretions. Thus Abraham Vater (*o*), thus the celebrated Trew (*p*), to pass over other observations of my own, and those of different authors, met with them in the manner I am speaking of; for the former "found a calculus, in a very thick and black bile, which was of a colour inclining to white," and the latter, in bile which was of a bright yellow, found a calculus that was, externally, "in great measure white, and brown in other parts, but became very white, by means even of the slightest friction," yet internally, if you excepted "a kind of redish spot, it was pale," and the former of these appearances was in a man, and the latter in an old man, not in any young man.

17. Nor do they more favour the opinion of Reverhorst, who have, in general, affirm'd that these calculi "are found to be black, blackish, or brown, for the most part:" although, as I know that the calculi found by our ancestors, and by others, have been frequently of a colour of this kind, so myself also confess, that I have more frequently found them in the former years of my observations, than in the latter; yet a great number of mine, and still a greater number of the observations of others, must of course slip my memory, before I can easily believe that these concretions are "for the most part" found to be of that colour. Kentmann, (as you read in Schenck (*q*), writing of these calculi in general, says that they are "all of a colour approaching to yellow, which is, by degrees, chang'd into a deep yellow, or saffron colour, as they increase in their size," and indeed he soon after produces examples "of a kind of yellowish calculi," and "of a yellow one" being found here by our Falloppius.

But a much greater number of instances are added, in the writings of the same Schenck, of concretions of a different colour. And this must be granted: but then other observations are to be set in opposition thereto, as of Joannes Francus (*r*), who saw calculi "of a saffron colour," as of Cæsalti-

(*m*) Sepulch. l. 2. f. 4. obs. 35.

(*n*) De raribus hepatis affectibus, observ. obs. 1.

(*o*) Dissert. qua calculi, &c. thes. 4. & 5. (*p*) Ibid.

(*q*) Commerc. litter. a. 1743. hebd. 32. n.

3. & hebd. 36. n. 4.

(*q*) Obs. med. l. 3. ubi de Vesic. fell. lapid.

obs. 1.

(*r*) Ibid.

nus (*s*), who saw them of the same colour, as of Bofchus (*t*), who found them “of a citron colour,” as of Panarolus (*u*), and Dobrzensky (*x*), who found them “of a yellow colour.” Nor indeed are Hoechstetter (*y*), Schelhammer (*z*), Steinius (*a*), and Bierlingius (*b*), to be pass’d over, by whom “yellow, yellowish, and saffron colour’d calculi” have been seen; nor yet Horstius (*c*), nor Helwigius, (*d*), by both of whom a great number was found; those being all of a “yellowish colour” which were seen by the latter; and, in part, by the former.

To these you may add Platner (*e*), and Bezoldus (*f*), one of whom found them “of a golden yellow colour,” and the other “of a yellow colour inclining to white,” and not only these but even many more, among whom are the members of the laudable society at Edinburgh (*g*), who found “yellowish calculi,” in a boy of twelve years of age, and the celebrated Trew (*h*), who saw them “slightly yellow externally,” even in the body of a person who had liv’d more than seventy-four years, and still more the celebrated Haller (*i*), as he saw, even in a woman who was said to be more than a hundred years of age, perhaps all the calculi, but, at least, one of them in particular, of a yellow colour.” The same author having found sixteen in another old woman (*k*), says that thirteen of them were “yellow:” and that in a man who had been hang’d (*l*), they were of a yellow colour “inclining to white.” But Weitbrecht (*m*) even found them to be “yellow,” in an old man.

Other observations, besides these, I have either just now taken notice of, or shall take notice of hereafter: and still others, and those not few in number, I shall purposely pass over; for it is not my intention to point out them all, but only as many as are sufficient to show, that these gall-stones are not found, “for the most part,” of a black or brown colour. And even Vater (*n*), Hoffmann (*o*), and Bezoldus (*p*), when they treated of the colours of these calculi, in general, put among the number of those, which are “commonly,” or “more frequently,” observ’d, “the concretions of a yellowish hue,” as is the expression of the two first; and Bezoldus has particularly said “that they “most frequently incline to yellowness.”

18. And although a great number of those who have mention’d cystic calculi, have been silent in regard to their colour, yet there are so many who have not been silent upon this head, that it sufficiently appears they generally are found to be either of a yellow, or a black colour. I say generally, because blue concretions have also been seen, as by Coiterus (*q*), Ne-

(*i*) Quæst. med. l. 2. in ipso fine.

(*j*) De facult. anat. lect. 2.

(*u*) Jatrof. pent. 5. obs. 22.

(*x*) Eph. n. c. a. 1. obs. 129.

(*y*) Obs. med. dec. 10. cas. 9.

(*z*)

(*a*) Apud Scheffel. diff. de lit. fell. §. 10.

(*b*) Sepulchr. l. 4. f. 1. in additam. obs. 12.

(*c*) Ibid. l. 2. f. 7. obs. 125.

(*d*) Ibid. l. 3. f. 7. in addit. obs. 1.

(*e*) Progr. edit. 17. mart. a. 1746.

(*f*) Differt. de cholelitho cas. 1.

(*g*) Cit. supra ad n. 13.

(*h*) Commerc. litter. a. 1734. hebd. 6. n. 5. in fin.

(*i*) Opusc. pathol. obs. 33. hist. 4.

(*k*) Ibid. hist. 11.

(*l*) Ibid. hist. 13.

(*m*) Commerc. litter. a. modo cit. hebd. 9.

n. 2.

(*n*) Differt. supra ad n. 13. cit. thes. 3.

(*o*) C. 3. supra ad n. 15. cit. §. 2.

(*p*) Differt. modo cit. §. 5.

(*q*) Obs. anat.

retius (*r*), and Goritzius (*s*), who also observ'd "small red points," perhaps from the particles of the adhering cyst being lacerated here and there: for this calculus was so streightly confin'd in the cyst, that there was a necessity of extracting it by force: and they have been seen of a red colour, as by Camenicens (*t*), and by Bartholin (*u*): of a cineritious, as by our Fabricius (*x*) and Boscus (*y*): of a whitish colour, as by Reverhorst (*z*), by Vater (*a*), by Haller (*b*) by Van Swieten (*c*); and even of a silver colour, as by Platerus (*d*): of a golden colour, as by the same (*e*), and in part by others; for I have not undertaken to mention every one in this place: and finally, of a green or greenish colour, which is much more frequent than those last spoken of, or others which for the sake of brevity are omitted, so that I have very often seen the same, the cineritious sometimes, the golden-colour in part now and then, but the others I have never yet seen.

Nevertheless I have also seen calculi of a variegated colour, in the manner I have describ'd them in the epistle sent to Schrockius (*f*); and Gerbezius (*g*) saw them of a brown colour mix'd with white; Baeumlinus (*h*) of a white and yellow, inclining to green; and many others, that were contain'd even in the same cyst, distinguish'd with spots of bright red, or scarlet hue, and with others of pale or a grisly colour. Out of which colours, and others that are just now mention'd, you cannot properly call any one black. And to these you may, moreover, add the calculi which are without, or almost without, any colour: of which kind was that large one found by Scultetus (*i*), which not only fill'd the cyst, but even distend'd it, and was "pellucid like chrystal;" or those that the royal surgeon Tamponettius (*k*), and Manchius (*l*), formerly found, the latter "transparent, though friable," and of the bigness of a silbert," and the former "shining and soft like a concreted gum, and of the bigness of a pigeon's egg," (so that it brings to my mind one describ'd by the celebrated Heister (*m*), which, beneath a rugous surface, "had a substance, and, in general, a colour, not far unlike a gum, which is somewhat more solid than gum arabic) or that which is "represented, in a plate, by Bezoldus (*n*), of the form of a chrystal, and "perfectly pellucid," found by Henricus Albertus Nicolai, and pointed out in the fifth observation (*o*).

That whitish calculus, also, which I have more than once mention'd from Vaterus (*p*), was pellucid and transparent:" to which, if you attend less to the colour, you may add from the Sepulchretum (*), those thirty found by

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| (<i>r</i>) Apud Schenck. obs. cit. supra ad n. 17. | (<i>f</i>) In act. n. c. tom. 2. obs. 147. |
| (<i>s</i>) Eph. n. c. cent. 8. obs. 20. | (<i>g</i>) Eph. n. c. cent. 1. obs. 57. |
| (<i>t</i>) Epist. ad Matthiol. | (<i>h</i>) Commerc. litter. a. 1743. hebdom. 28. n. 2. |
| (<i>u</i>) Cent. 3. epist. med. 86. | (<i>i</i>) Armata chir. obs. 61. |
| (<i>x</i>) Apud Schenck. obs. cit. | (<i>k</i>) Zodiac. med. gall. a. 1. April. obs. 7. |
| (<i>y</i>) De facultat. anat. lect. 2. | (<i>l</i>) Ibid. mai. obs. 8. |
| (<i>z</i>) §. cit. supra ad n. 16. | (<i>m</i>) Act. n. c. tom. 1. obs. 181. |
| (<i>a</i>) Diff. ibid. cit. thes. 4. | (<i>n</i>) Dissert. de cholelitho §. 5. fig. 4. |
| (<i>b</i>) Obs. cit. ad n. 17. hist. 1 & 6. | (<i>o</i>) Dec. obs. illust. |
| (<i>c</i>) Comment. cit. supra ad n. 15. §. 935. | (<i>p</i>) Thes. 4. hic cit. & 5. |
| ad 2. | (*) L. 3. f. 17. in addit. append. ad obs. 2. |
| (<i>d</i>) Obs. l. 3. ubi de tereft. excret. | §. 1. |
| (<i>e</i>) Ibid. | |

Scharpius, which were “pellucid like a carbuncle;” and perhaps, likewise, eighty more, which were found by our Sanctorius (*q*), “similar to the stones “call’d chrysolites,” I suppose like the chrysolites which are describ’d by Pliny (*r*), “transparent, and of a golden colour.”

But if you would consider nothing besides a shining property, in cystic calculi, others ought to be taken notice of here, as from Griselius (*s*) that which was a little less than a hen’s egg, and when broken, “shone as if “it had been full of nitre;” or from Jo. Theodore Schenck (*t*), and Jo. Rhodius (*u*), those which were many degrees less than the last-mention’d, but being broken, in like manner, shone like chrystals “of tartar” or talc, as that also did like “talc,” which I first took notice of from Trew (*x*): and even to myself (*y*), the nucleus of some has appear’d to be distinguish’d here and there, with a kind of shining points. But that those “blue concretions” of Neretius (*z*), or Platerus (*a*), were shining, the former, at “one time, of a bright silver colour, and at another time, of a bright golden “hue,” that is externally only; for I do not read that they were broken; has but little reference, I think, to those of which I just now spoke. To which I suppose, these that are describ’d by Baglivi (*b*), may be with more justice suppos’d to relate; for he says that they “almost emitted sparkles, as “if they had been a congeries of black salt chrystalliz’d.”

However, to that class certainly belong, chiefly, those two which were not long ago describ’d by the celebrated Morand (*c*), one from the observation of the famous Geoffroy, and the other from his own, the former internally in part, but the latter externally, and internally, for the most part, shining, and almost quite pellucid: and to that class belong other calculi describ’d by other authors, and particularly by the very excellent Haller (*d*), which I shall more properly take notice of below (*e*), when I speak of the structure of gall-stones, not without that “chrystalline” calculus, if I am able in the mean time to find it any where in Hildanus.

19. For now it is necessary, previously, to touch upon a few things in regard to the various magnitude, number, figure, and situation, of these stones. There was a time then, when one of these concretions was not only found to fill, but also to distend, the cyst, as I said just now, and even to distend it “very greatly,” as you will see in the Sepulchretum (*f*). A calculus has also been found equal to the size of this cyst, of which you will have more than one instance, in the same place (*g*). At one time it has been “half as big as an hen’s egg,” as our Fallopius found it (*h*); and at another, as big as a pigeon’s egg (for I pass over the intermediate degrees of magnitude in the second and third, as I do in the first and second) of which size they have been seen by many after Coiterus (*i*); and amongst these by our

(*q*) Comment. in I. Fen. I. can. avic. qu. 76.

(*r*) Nat. hist. l. 37. c. 9.

(*s*) Vid. in modo cit. sect. 17. obs. 13. §. 11.

(*t*) Vid. ad Sachii Gammarolog. epist.

addit. 7. ad c. 14.

(*u*) Cent. 3. obs. med. 45.

(*x*) Supra n. 16.

(*y*) Obs. cit. 147.

(*z*)

(*a*) Locis Paulo ante cit.

(*b*) De experim. circa bilem.

(*c*) Mem. de l’acad. R. des sc. a. 1741.

(*d*) Opusc. pathol. obs. 33.

(*e*) N. 23, & 24.

(*f*) L. 3. f. 10. in addit. obs. 1.

(*g*) Ibid. f. 13. obs. 12. §. 7. & f. 18. obs.

8. §. 14.

(*h*) Apud Schenck. obs. 1. sit supra ad n. 17.

(*i*) Obs. anat.

Vallisneri (*k*), in the last of the Gonzaga family that was duke of Mantua, who suppos'd it to be an hereditary disease, for this reason, that Bartoletus (*l*) had likewise found a calculus at the orifice of the cyst, in Ferdinand Gonzaga, who was also a Mantuan nobleman: which would not have been an improbable argument, if this last duke had descended from Ferdinand, who, however, left no sons. But they are generally found to be of a much less size than these: and indeed are, sometimes, so very small, that Vesalius (*m*) compar'd those which he found in Martellus, to "millet seeds."

And as the gall-bladder, in this body, was certainly equal to the size of two fists, as I have even said above (*n*), and fill'd with stones of that kind, you may easily imagine, from hence, how great a number of them is sometimes met with. They who have actually number'd them after Fallopius (*o*); who, with that pretty large one, found "a hundred and twenty-three," have reckon'd not only "three hundred," as Bartoletus (*p*), or "three hundred and six," as the brother of Platerus (*q*), more than which I have even found; but above "seven hundred," as Mentzelius (*r*), and even "above a thousand," as Grassecius (*s*) did formerly; so that it is surprizing, that some, speaking in general of the number of cystic calculi, should have stop'd at the number of Joach. Camerarius (*t*), that is at a hundred and forty-three. And what will you say to an instance, which is already publish'd by the celebrated Storchius (*u*), of an ancient nobleman, in whom "more than two thousand of these calculi were reckon'd up;" and another, in like manner, by Fasciulus (*x*), who, in the enlarg'd cyst of a certain man, "found three thousand six hundred and forty-six granules of concreted bile, which he even us'd to show as a curiosity." And although sometimes there are no more than one calculus, as was demonstrat'd just now, yet it is much more common to find a greater number.

And as to what relates to the figure, moreover, some of them, indeed, are nearly spherical, some almost oval, or of some other figure, that is not at all angular, as even the likenesses, which are made use of by observators to describe them, demonstrate; as, for instance, that of some species of nut, an olive, an egg, or other things of a similar kind: but they are for the most part angular. And these spherical calculi receive their form from the figure of the vesicle itself, whether this be natural or contract'd, or enlarg'd, and made more globular, by disease, especially when they fill it, and that whether there are no more than one, or more than one, provided they are as yet so soft (for even those that are pretty large, sometimes (*y*) preserve the softness of new cheese) as to allow of their being all squeez'd together into a form of that kind; as you see in the Sepulchretum (*z*), that instead of bile, "there was one orbicular stone, consisting of nine other triangular stones,

(*k*) Epist. supra cit. ad. n. 13. adnot. 2.

(*l*) Vid. Rhod. cent. 3. obs. med. 2.

(*m*) Epist. de rad. chin.

(*n*) N. 13.

(*o*) Obs. 1. modo cit. apud Schenck.

(*p*) Obs. 2. Rhod. modo cit.

(*q*) L. 3. cit. supra ad. n. 17.

(*r*) Eph. n. c. dec. 1. a. 9. obs. 181.

(*s*) Apud Schenck. in sine obs. 1. modo cit.

(*t*) In eadem 1. obs.

(*u*) Commenc. litter. a. 1735 hebdom. 59. n. 4.

(*x*) Vid. in obs. 68. tom. 5. act. n. c.

(*y*) Eorund. t. 3. append. n. viii. append. 1. ad obs. 10.

(*z*) L. 3. l. 17. obs. 14. §. 5.

“lying mutually upon each other, and easily separable by the hand.” A similar observation to which is extant (*a*), (except that it is much more surprising, on account of the exactly equal partition of weight, and, for that reason, almost incredible) “of a calculous globe weighing two ounces and “a half,” which, being taken out of a cyst that contain’d nothing else, “separated into sixty lesser calculi, obscurely yellow, and friable, each of “them having five surfaces, and being equal to the weight of one scruple “exactly.” But other examples of cystic calculi are also extant, which, resembling a pigeon’s egg (*b*), “seem’d to be made up of lesser calculi,” or were even “compact’d,” (*c*) or “compounded, of mere granules (*d*).”

Shall we then say that granules of this kind are the first beginnings of cystic calculi? They are certainly often found in the vesicle, for to those which I have here produc’d, you may add many and many other observations, of the same bodies, as in a virgin spoken of by the younger du Verney (*e*), and in a man mention’d by the celebrated Jo. Sebaſt. Albrechtus (*f*); as, in the former, the bile was concreted into so many little grumous corpuscles, and in the latter, was “like granulated sugar, or had the form of “blanch’d millet seeds,” and not to be too prolix, as in so many other bodies (*g*), in which there being calculi “of a granulated surface,” or “full of “tubercles, in the form of a mulberry,” the granules seem to have adher’d to the surface, and been form’d into one substance therewith. It is not to be doubted therefore, but these are the beginnings of those calculi, which consist of granules of concreted bile. But in the cyst, together with the calculi, a great quantity of “sandy and mucous matter (*b*), and a large quantity “of sand,” has been, more than once, found, so that the same person, to whom this occur’d, judg’d “that it was to be consider’d, without any “doubt, as the matrix of the calculi:” and this person was Bergenius (*i*). Therefore, if the bile be accreted to a grain of sand, as to a nucleus, you see that this is to be look’d upon as another beginning of these calculi. To these add others, which have been observ’d by me, at other times, and which I shall take notice of with more propriety below (*k*); and you will, at once, conceive that granules of concreted bile, cannot possibly be the beginning of every calculus.

But as I have said that these calculi are, for the most part, angular, perhaps you will ask, from whence I derive the origin of these angles? If many calculi which are as yet soft, and round, are compacted into one, either oval, or spherical, body, in the manner I have describ’d, in two instances just now produc’d, so that from the compression of one against the other, they acquire these new forms, and after that, from any cause whatever, are separated, it is very easy to conceive of the origin of these angles. Yet be-

(*a*) Act. modo cit. t. 5. obf. 129.

(*b*) Commerc. litt. a. 1745. hebd. 24. n. 1.

(*c*) Eph. n. c. cent. 8. obf. 20.

(*d*) Haller. opusc. pathol. obf. 33. hist. 13.

(*e*) Cit. supra ad n. 13.

(*f*) Act. n. c. tom. 4. obf. 49.

(*g*) Eorund. act. t. 1. obf. 20. cum tab. 3.

fig. 3 & 4. & eph. cent. 5 tab. 1. fig. 3. 4. 5 & 6. & Haller. obf. cit. hist. 5.

(*h*) Commerc. litt. a. 1733. hebd. 45. post. n. 6.

(*i*) Et a. 1739. hebd. 39. n. 1.

(*k*) N. 22.

cause examples of this kind very rarely occur, we generally account for these angles, from the friction of the round calculi, against each other.

For who can deny the existence of this friction, that observes the smoothness of their surfaces, or who looks upon those two cystic calculi, which are delineated in the works of Hildanus (*l*)? For one of them "is so greatly hollow'd out, that it can admit almost a third part of the other," which, says he, must have been done, "without doubt, by the continual friction of one against the other; and similar appearances to this, he might have sometimes seen, in calculi of the urinary bladder likewise, from a similar cause.

Consider also that large one, which is describ'd and delineated by the celebrated Bechmann (*m*), and which, consisting of three parts, had extended the cyst. When you see how much the middle part, in particular, enter'd into the lower part, and attend to the exact polish of the surfaces, which were contiguous to each other, you will, beyond a doubt, affirm that this was owing to friction.

20. But with how many angles these calculi have been furnish'd, of what kind these angles were, or in what manner they were plac'd, or what figure they, for the most part, have put on, it is not easy to determine from the observations of others, not only on account of the great variety, that there, frequently, is even in those which are contain'd in one and the same vesicle, but still more, by reason of the proper signification, and strict sense, of words being frequently neglected, in pointing out the figures, by those who ought by no means to have been thus careless, or by the description of those figures being neglected, which were proper to give an idea of their form. Indeed when I read Vesalius describing (*n*) eighteen calculi, which he had found in the cyst of a man, "as form'd in the manner of a triangle, with the sides and surfaces every where equal;" I seem to myself to have an idea of a tetradrum properly so call'd.

But on the other hand, when many others call them "triquetri," or "triangles," or "triangular," I neither know whether they saw them in the form of a prism, or a pyramid, nor, whichever form they saw them in, whether comprehended under equal or unequal planes. On the contrary, however, when Greifselius (*o*) says that he had found four pretty large "cubic" stones, together with an almost innumerable quantity of other smaller stones, all which, as far as he could distinguish, "resembled a cube;" I have no doubt of his idea: but I am much in doubt, when many others say that they were "square," or "quadrangles," or "quadrangular," for you see how many different species of parallepipeds may be signified by these words.

However when I examine, attentively, all the calculi which I have in my possession, and I have a great number, I perceive, in the first place, that it is very difficult to find any perfect regular figure at all, in angular calculi, and I cannot help believing that Vesalius himself, and Greifselius, rather meant to be understood a figure, which approach'd very near to that of a tetraedra, and to that of a cube: and in the second place, I think that

(*l*) Cent. 4. obs. 41.

(*n*) Epist. de rad. chin.

(*m*) Commerc. liter. a. 1742. hebdom. 32. n. 1.

(*o*) Eph. n. c. dec. 1. a. 3. obs. 45.

com tab. 2. fig. 10.

those who have call'd them triangular, or quadrangular, meant to point out a figure which comes near in some measure to that of a tetraedra, or a cube: and, finally, I suppose that as both of these forms, in consequence of not being perfect, if you so conceive of them, for the most part offer some surfaces to the eye, which, at first sight, seem more like the one, or more like the other, many have refer'd them to one class, and many also to the other; but if the calculi are examin'd accurately, in every part, I imagine that they will generally be found of that figure, which was formerly pointed out by me, in the first of the *Epistolæ Anatomicae* (*p*). And that they have very often more angles than either of these figures requires, that which I there describ'd sufficiently demonstrates: and Kentmannus (*q*) has formerly taught; that they have many more, and the more in proportion, as there are more calculi contain'd in a cyst; however, though I confess that the first supposition does sometimes take place, yet whether the second does I am greatly in doubt; and even if I attend to some observations of Greiselius, and of my own, I know that it is not always true.

But let us suppose what number of angles we please; wherever there are some very acute, or the surface of the calculi is very rough, they may, if a considerable weight is at the same time added, not only irritate the cyst, but sometimes also burst through it. A very extraordinary instance of which rupture you have in the Sepulchretum (*r*).

But irritation may excite inflammations, ulcers, and excrescences, which have been seen even by me (*s*), and, if with Wepfer (*t*), we compare the urinary and gall-bladder to each other, may at least bring on a preternatural thickness of the coats. For the urinary bladder "often becomes four times as thick as it naturally is, by the continual friction of the calculi upon it," as he says, and as we shall see, in its proper place (*u*). And he also found the coats of the biliary cyst "preternaturally thicken'd," and, as he thinks, from the same cause, as others also have sometimes, among whom are not only some of my disciples (*x*), but likewise the very learned Trew (*y*), who did not find it without a purulent matter, but, in particular, the celebrated Bezoldus (*z*), who describes these coats as being "harden'd, thicken'd, and, in a manner, cartilaginous," although he enquires after a different cause from the calculi, which the cyst, in his example, and those just now pointed out, contain'd; and certainly a different cause may, at other times, with some justice be assign'd (*a*). But the surface of these concretions is frequently smooth, as Vesalius saw in that lawyer, especially if they are in the number of those that are yellowish, which we perceive, even when dried, to have a kind of greasy smoothness, as if they had been smear'd over with soap, an unctuous smoothness of which kind, I have, sometimes, observ'd to be still more considerable, in those that are of a greenish colour (*b*).

(*p*) N. 44. in fin.

(*q*) Apud Schenck. obs. 1. cit. supra ad. n.

17.

(*r*) L. 3. f. 14. obs. 5. §. 4.

(*s*) Epist. anat. 1. n. 43.

(*t*) In auctar. ad obs. de apopl. hist. 13. in schol. n. 5.

(*u*) Epist. 42.

(*x*) Epist. ad Schrock. de quæ supra n. 18.

(*y*) Act. n. c. tom. obs. 140.

(*z*) Disp. de cholelitho §. 6.

(*a*) Vid. Sepulchret. l. 3. f. 21. obs. 4. §. 11.

(*b*) Epist. modo cit. ad. Schrock.

21. But as to what I have said of irritation, there is no doubt but this must take place then also, when the calculi are form'd within the coats of the cyst, provided they are rough, or large. And thus I suppose that the observation of Gendrotius (*c*), that is of a dysentery, from a continual discharge of bile into the intestinum duodenum, may be explain'd, whereas there were two pretty large, and unequal, calculi in the cyst, involv'd in a peculiar membrane. And you will suppose them to have been generated in the glands of the cyst, and that being increas'd therein, they had extended their situation between the coats, in which situation those glands, also, naturally lie. For you will remember that small biliary calculi were formerly found, and demonstrated, by me (*d*), in those glands which open'd by very evident orifices, and were, for that reason, less to be call'd into question. And that these had been very ingeniously found out, and acknowledg'd, by the celebrated Galeati also, in an observation very similar to mine, except that those orifices did not appear, I learn'd afterwards with pleasure, when the first volume of the commentaries of the Academy of Sciences at Bologna was publish'd (*e*). And I shall tell you below (*f*), that another very small calculus has been observ'd by me, betwixt the coats of the cyst.

For it is your business, now, to consider, whether in that observation of Greifselius, which I took notice of above (*g*), "the other coat that grew to the fund of the cyst, and contain'd a stone in the form of a cube, that was bigger than any of the others," is to be accounted for in the same manner. However, I have very little doubt, but the observation of the celebrated Ellerus may be thus explain'd, which, if I remember rightly I read some years ago, in the fourth volume of the Berlin miscellanies.

For I should readily suppose that the small, round, and yellowish calculus, which he found concreted in the fundus of the cyst, and surrounded with a membrane produc'd from the pellicles of that bladder, had been form'd in some one of its glands. And, indeed, I am also inclin'd to think it probable, that a calculus, which, from all its appearances, was biliary, had been form'd in no other place, as the thicker part of it lay hid in a certain sacculus, betwixt the coats of the cyst, and the other part stop'd up the neck of the cyst (*b*): so far am I from believing it to be prov'd by this observation, that the gall-bladder is not furnish'd with any glands. And, indeed, the cervix of this cyst cannot be stop'd up by a hard and thick body of that kind, but other parts must certainly be press'd upon, which are necessary to the actions of the cyst, or the cyst itself must be contracted, and crisp'd up, by the irritation; so that we need not be surpriz'd after this, if the secretion of its glands be either obstructed, or injur'd.

You may imagine me to have said nearly the same things, in regard to the experiments of those gentlemen also, who have tied up the meatus of the cyst, in the living animal. These glands, therefore, are not taken notice of by anatomists, but are known from certain observations, many of which

(*c*) Zodiac. med. gall. a. 1. maj. obs. 6.

(*d*) Epist. anat. 1. n. 56.

(*e*) Vid. in opusc.

(*f*) N. 29. in fin.

(*g*) N. 19. 20.

(*b*) Hist. de l'acad. r. des sc. a. 1735. obs. anat. 1.

kind are mention'd by me, in the first of the *Epistole Anatomicae* (i). In which, however, I have not, taken notice of "some glands that lie very "near to the cervix" only; unless, perhaps, the learned man suppos'd, at the time of writing, by a failure of memory, as frequently happens, that what I have there said of the urinary bladder, not under number ninety-six, but under number sixty-three, was said in relation to the gall-bladder.

22. Now since I have said more than I intended of the magnitude of cystic calculi, their number, figure, and situation, although many things, among others, that I have said may be useful in order to distinguish these concretions when they are discharg'd by stool; let us, at present, go on to consider the remaining marks, which are suppos'd to be more conducive to this purpose, I mean their structure, lightness, and propensity to take flame.

As to what relates to the structure, from the time in which Kentmannus (k) asserted that these calculi, if you broke them, appear'd, internally, to be "full of narrow circles surrounding each other mutually, so that any one "may observe, or, at least, any one who takes the slightest notice, in what "manner the viscid, and sluggish bile, had, by degrees, concreted, and "become adhesive, from the center quite to the surface," scarcely any one has risen up, who, speaking of their structure, and mode of accretion, did not agree with Kentmannus. Yet were there some things, which frequently, and in various calculi, ought, in part, to be corrected, by the help of repeated observations, and in part have others added to them.

For as to concentric circles appearing in sections, that may be true in round calculi, whether they are spherical, cylindrical, or oval, so that the section, in each of these figures, be made according to the perpendicular of the axis, as in the parts of the calculus, also, which are hemispherical, conic, or cylindrical, in their form, as you see, for instance, in the larger of those two represented by Hildanus (l). But if you dividé angular calculi into sections, the external strata, of which they are compacted, must of course be far different from the circular form, and the internal strata, likewise, as far as I have seen, will be nearly of the same kind: and this you may see in the figure which is given you by the celebrated Trew (m), whom I have often recommended.

For these reasons I imagine they have spoken with more propriety, who, omitting the figure, have only mark'd out strata lying upon strata, as Boscus (n), who has said that, out of nine calculi, "layers had been concreted to "each other, in every one of them, as they are in an onion;" as Hildanus (o), who has said that his "were concreted in laminæ;" and, not to be too prolix, as Malpighi (p), who has said "that they are made up of a number "of involucra, mutually enwrapping each other;" I say, they have spoken with more propriety, than those who, when speaking of angular calculi, have mention'd circles to us, which you will find from the Sepulchretum (q), was

(i) N. eod. 56.

(k) Apud. Schenck. obs. 1. sæpius cit.

(l) Obs. 44. cit. supra ad n. 19.

(m) Commerc. liter. a. 1754. tab. 1. fig. 5.

(n) De facult. anat. lect. 2.

(o) Obs. modo cit.

(p) Op. posth.

(q) L. 2. f. 1. obs. 74.

done by Otto Heurnius, where describing a calculus "of a triangular figure, extended into a pyramidal top, he says that cortical circles appeared there— in, lying upon each other."

Nor is it sufficient to correct these things in Kentmannus. For among the black calculi, both spherical, and angular, which I have by me, the greater part of them, now, show no strata at all; only some few of the angular, that are the most firm, have an external stratum, but somewhat obscure in its appearance: the remaining substance is of such a kind, that we must pardon the ancient authors, whoever lit upon them, and particularly Piccolhominus (*r*), for asserting, that "the bile being burnt in the cyst, like a coal, was converted into blackish calculi," and he even might have said extremely black, with justice, if he had seen these of mine. And I heartily wish the same indulgence could be given to men, in other respects very learned, who, in the great light of this present age, forgetting that, after so many diseases, join'd with very great heat, no stones are, generally, found in the gall-bladder, have imagin'd that some of these, which happen'd to be found without any bile, were to be ascrib'd to a violent fever that had preceded, which, having consum'd all the aqueous part of the bile, had converted the remainder into stones.

But it is not sufficient to except these black calculi, in order to reconcile with truth, the other things that Kentmannus has said, I mean that the others are, at least, full either of circles, or strata of a different kind, "from the center quite to the circumference," or as others, in general, say, of all the calculi hitherto known, that they are made up of concentric strata, which descend even to the smallest nucleus. For I would have you see what observations have been made by me in the *Adversaria* (*s*), in the first *Epistola Anatomica* (*t*), and in the letter sent to Schrockius (*u*), on the nature of the nucleus, its fineness, and its magnitude in particular, in so many and so various calculi, as I am not willing to repeat them here. You will, at least, perceive that I have found no small quantity of medullium, in proportion to their bulk, and so much the greater, in proportion as they were more increas'd, and that full of a soft, and moist bile, and consequently, that no small part of each of them, internally, is so far from consisting of these strata, that it is necessary to enquire, by what means the bile can penetrate inwards, through these strata which are already firm.

You will also perceive other things, that are purposely pass'd over here, as, for instance, that the cuboidal calculi, which I have cut into, do not consist of smaller calculi of the same figure, but, like the others of which I have spoken, of bile invested round about with strata: that these are of different colours from each other, and sometimes alternately so: and, finally, that they are, not uncommonly, seen to consist of a great number of small lines, going towards the centre.

23. This direction of the lines puts me in mind of a certain structure of these calculi, differing from that which Kentmannus has advanc'd. Nor has this great number of small lines only, which I just now mention'd, as being ob-

(*r*) L. 2. anat. prælect. 20.

(*t*) III. animad. 28.

(*s*) N. 47.

(*u*) Vid. supra ad n. 20.

serv'd in each of the strata (and which have certainly been taken notice of by others also before me, as, for instance, by Maurice Hoffmann (*x*), when he describ'd calculi "made up, of striated laminæ, as it were) been sometimes seen, but even still more evident lines, or such as went from the center itself, in one continued course, to the circumference, as by Baucminius (*y*), who saw, in calculi, which, in regard to the order of the colours, agree, in great measure, as he says, with some describ'd by me, "saline spiculæ, as it were," running from the center to the circumference, "in the manner of stria," or lines, so that they seem'd to be made up "not so much of lamellæ," as of stria.

So Trew (*z*), in like manner, asserts that in another calculus, "no lamellated structure could be found, but it rather seem'd that radii were running out from the centre, to the circumference, though in an obscure, and confus'd manner," which the delineation, that is added, confirms (*a*). But Maurice Reverhorst (*b*); not to omit those who wrote before; when he delineates the sections of one, or two calculi, out of a great number, that he had extracted from the gall-bladder of an old man, in one, indeed, shadows out a kind of cortex, in the form of a circle, but in both represents lines, of no inconsiderable thickness, going, in the manner of radii, from the center, to the periphery. And John Baptist Contulus (*c*), having given figures of stones, (such as they are, and like the rest of his performances) found in this cyst, and among them, of one found by him, "which was diaphanous at its extremities," gives a section, as it seems, of another, also, taken from I know not where, in which, indeed, are seen many circular strata, but a much greater number of lines, going from the center, to the circumference.

Moreover, I remember a peculiar species of calculi describ'd by Malpighi (*d*), which he suppos'd to have been form'd by concretion, "from a kind of mucous substance, that very much resembled soap, or, rather, resembled camphor," he says, therefore, "that they are of a surprizing structure, for that they resemble the lapis judaicus, and are made up, internally, of elegant lamellæ, drawn from the circumference to the center, which lamellæ are easily separated one from another." And although he suppos'd it to have been generated "in the liver, and in the porus biliaris," I believe because he had heard that a stone, which his friend Bonfilolus preserv'd, was found "in the liver" of a nobleman in Germany, yet he could not, for a certainty, know that another of this kind, which he says he had seen, "and which was discharg'd, together with the intestinal fæces, after great pains, and a long jaundice," by a matron with whom he was acquainted, had been generated in the same place. For that some calculi, which have come from the gall-bladder, have been, without doubt, discharg'd by stool, will be shown below (*e*), and that in this cyst also, concretions are sometimes form'd, of a structure very similar to that whereof we speak, may not only

(*x*) Eph. n. c. cent. 9 & 10. append. 1. obs.

35. (*y*) Commerc. litter. a. 1743. hebd. 28.

n. 2.

(*z*) Ibid. hebd. 36. n. 4.

(*a*) Tab. 1. fig. 26.

(*b*) Diss. de motu bilis tab. 2. fig. 3.

(*c*) De lapidib. & c. c. 11.

(*d*) Op. posth.

(*e*) N. 46.

be conjectur'd from what has been already said, but will be confirm'd immediately, by other observations.

For that transparent calculus of Vater, which is taken notice of above by me (*f*), had not only very slender, saline, and shining, striæ on its surface, but was also "concreted in the manner of striæ:" or if there should be any doubt about this, there certainly will be none in the description, and figures, of those two which I have pointed out from Morand (*g*). For both of these has splendid, and pellucid lamellæ, the one indeed with frata lying round them, but the other without any, and going, in the manner of radii, from the centre to the circumference. And, lately, the illustrious Haller (*h*) has propos'd others "which were shining like chrystal, and semipellucid," the substance of one of which calculi, that was spontaneously broken, "being almost like selenites, shining, and stretch'd out from a yellow center, in the manner of radii, to the investing cortex, was made into crusts; and small laminae." The other calculi, which "were smaller, were, likewise, internally laminated, in the manner of selenites, and shining."

24. All these observations, join'd with the others, which I have before mention'd, of shining and pellucid gall-stones (*i*), will certainly induce you to suspect that many of these calculi, which are discharg'd by stool, have been too hastily suppos'd not to have been generated in the cyst, but in the stomach, and intestines, and for this reason, because they seem'd to be too far distant from the more general nature, and structure, of cystic calculi. And one in particular which occurs to my mind, on this occasion, is that describ'd by Donatus (*k*), from Cornelius Gemma, and which show'd, "internally, a substance like the purest glass, or transparent chrystal, with many striæ, and radii, jointly running into one center."

It seems, indeed, to be an objection to our suspicion, that this concretion was "very large." But besides that it will be shown below (*l*), how much the biliary ducts may be dilated, and even how much they have been found to be dilated, I would have you believe, with Gemma, from the seat of long-contin'd pain, and tension, in the right *ilium*, under the false ribs, not that it had been concreted in the intestinum cæcum, as he imagines, but that being delay'd there, in its passage downwards, it had gain'd a fresh addition of substance, on its external surface, which was partly of a brown, and partly of a black colour, and by this means had grown into that considerable bulk.

So I would have you suppose, that another large calculus, which is describ'd, and delineated, by Bezoldus (*m*), had receiv'd additional frata in its passage, that were much fewer in number, where "an almost chrystalline nucleus," had been form'd, which seems to be very properly represented in the plates, not without some striæ being drawn from the center, to the circumference thereof. And the discharge of this calculus, had been preceded by pains of the right hypochondrium, of a much longer continuance: nor does Bezoldus, himself (*n*), fail to imagine it possible, that it might have come from the gall-bladder.

(*f*) N. 18.

(*g*) Ibid.

(*h*) Opusc. pathol. obs. 33. hist. 7.

(*i*) N. 18.

(*k*) Cap. 30. cit. supra ad n. 15.

(*l*) N. 46.

(*m*) Disp. de cholelitho cas. 2. & fig. 2 & 3.

(*n*) Ibid. n. 7.

In regard to the two observations, of stones discharg'd from the intestines, which he immediately subjoins, the one large, the other smaller, you will determine as you think most proper. For the first, certainly, points out no seat of the long-continu'd pain in the belly, and the second says not a word of pain. Yet when you read that a calculus is spoken of in the former, whose "internal shining substance show'd mere circles, intersected with striæ," and have examin'd the figures of Schroëckius the father, who was the observer (*o*), which agree very well with this description; perhaps you will not suffer even this calculus to escape your suspicion. But in regard to the lesser concretion, of which you will find no more said by the author, Brechtfeld (*p*), than by Bezoldus, if you enquire whether, as this calculus, like the three former, and that, moreover, which was seen by Malpighi (*q*), was discharg'd by a woman, it happen'd to be discharg'd by an old woman, as we know was the case in the three former observations; in regard to this lesser concretion, I say, it will perhaps be sufficient for you, that it was "internally "whitish, and shining, like chrystal," supposing, that in a very succinct, and close description, the structure might easily be omitted, which, as in other pellucid concretions, also, taken notice of above (*r*), would, if the stones had been broken asunder, probably have appear'd to be of the same kind, with that describ'd in the last.

But lest you should, perhaps, be liable to indulge your suspicions with too much freedom, call to mind, by way of contrast, the observation of the celebrated Chomel (*s*): who found a sacculus, in a decrepid matron, into which the coats of the intestinum duodenum had relax'd themselves, containing a considerable number of calculi, of which if you read the description, when examin'd externally, and, at the same time, know that they were made up, internally, of strata lying round each other, and, pretty near to the center, of striæ dispos'd in the manner of radii, betwixt which, white and shining particles were interpos'd, you may very easily consider them as biliary concretions. And yet you must of necessity acknowledge, with Chomel, that they were generated in the same intestine, unless you would rather chose to admit one of the hypotheses, which I shall mention: I mean, either that this sacculus had communicated with the ductus communis choledocus, where it pass'd obliquely betwixt the membranes of that intestine, and had receiv'd from this meatus, first one calculus, and then others, which had relax'd the membranes by their additional weight; or that the first calculus, immediately upon its destruction from the duct, and its entrance into the intestine, had, from some cause or other, been detain'd there, and by overloading the coats, and by forcing them outwards, and downwards, had prepar'd a sacculus for itself, and the other calculi, which were to come after.

But although you might, perhaps, confirm both explications, the former by the example of the sacculus wherein were the same kind of stones as in the gall-bladder, which sacculus seem'd, to the very experienc'd Galeati (*t*), to

(*o*) Eph. n. c. dec. 1. a. 9. obs. 90. fig. 3. (*s*) Hist. de l'acad. r. des sc. a. 1710. obs. 4. anat.
 (*p*) In act. med. Hafn. vol. 1. obs. 100. (*t*) Comment. de bonon. sc. insl. t. 3. inter medic.
 (*q*) Supra n. 23.
 (*r*) N. 18.

be in that part, where the ductus communis choledocus had, now, come near to its termination: and the latter by the authority of no other person than Chomel himself, inasmuch as he accounts for the formation of the facculus, from a calculus generated in the intestinum duodenum, nearly in the same manner as you account for it, from a calculus which had fallen therein: although, I say, you might, perhaps, make use of these arguments, yet I would not have you seem to be too suspicious.

25. And I could wish that those marks, which Reverhorst (*u*) has suppos'd to be quite sufficient, to distinguish cystic calculi, from calculi of the intestines, were, at all times, in effect, as sufficient for this purpose, as they are, at sometimes, really useful. His words are: "the proofs of these calculi, that is, whether they really come from the gall-bladder, or not, is that those which are biliary, not only take flame themselves, when applied to the flame, but, also, when thrown into water, by no means sink to the bottom, and even swim upon the surface, by reason of the oily particles of the bile, of which these stones are compos'd."

However, not to inquire here in regard to other biliary calculi, whether they are to be thus distinguish'd from cystic concretions; Bidloo (*x*), at least, when writing a few years after; "that calculi, arising from bile, swim on the surface of water, and are inflammable by being applied to the fire, of whatever colour, figure, or magnitude, they may be," has immediately added these words, *ut plurimum autem*: which must be suppos'd to signify that these marks, though general, are not universal, and without exceptions; though, whether this addition has been taken notice of, by any one of all that number, by whom these words of his are either quoted, or refer'd to, I do not very well know; I confess, however, that I myself have not attended to them, before this time.

Besides, to speak first of their lightness, as I shall speak hereafter of their inflammability; Scheffelius (*y*) admonishes us, that Reverhorst "is re-futed" by Valentine, "not only by a simular calculus not swimming upon water, but also by *ægagropoli*, or globular concretions, found in the intestines of wild-goats, swimming in water, although they are not generated in the gall-bladder." But I even find that Otto Heurnius has asserted, many years before all these (*z*), that three calculi, found by him in the gall-bladder, "had not swam upon the surface of water, when thrown upon it, as many affirm they will, but had subsided." There is no doubt but he had those authors in his eye, whom I have before mention'd (*a*), as Fernellius, Riolanus, and others, among whom was, also, Hollerius (*b*): Nevertheless, men of the most considerable reputation still continu'd to follow these authors, and Reverhorst, for a long time, out of whom it is sufficient to have mention'd Ruyfch (*c*), and Bergerus (*d*): nor are some persons wanting still to follow them, as they assert, without any exception, that these calculi all swim in water.

(*x*) Diff. de motu bil. §. 57.

(*x*) Vindic. contra Ruyfch.

(*y*) Dissert. de Lithiasi fell. §. 14.

(*z*) Obs. cit. supra ad n. 22.

(*a*) Animadv. ibid. indicata.

(*b*) De morb. intern. l. 1. schol. ad c. 48.

(*c*) Thesaur. anat. 5. n. 32.

(*d*) Physiolog. med. l. 1. c. 14.

And, indeed, such was the success of the experiments with them: as it was with others, likewise, either at that time, or afterwards, as with Cunradus (*e*), Tremelius (*f*), Trew (*g*), the Edinburghers (*h*), and others. But with some the experiments did not at all answer, as with Jo. Conrad. Fabricius (*i*), or did not answer wholly, though in part they did answer, as with Lancisi (*k*), who saw ten of them “subside in wine and water,” which very calculi, nevertheless, “swam in vinegar,” as with Weitbrecht (*l*), who, in making the experiment upon the same number, found, “that if thrown into water, immediately upon their being taken out from the cyst, they were specifically “heavier than water, but that when they were dried, they became lighter.”

I, however, having first observ'd some (*m*), and afterwards a great number, to sink down in water, resolv'd to inquire whether these exceptions could be reduc'd to any certain heads. And I soon perceiv'd (*n*), that no exception could be drawn from the colour. I inquired therefore, whether they could be taken from any other property. But it will be easy for you to see, from those observations which I have communicated to Schroeckius (*o*), how difficult it must be to determine any thing of this nature, in so great a variety, not only betwixt different calculi, but also betwixt the same, if you only change the time, or any other circumstance. Yet when you have read what I have written on this subject, upon more than one occasion, you will learn some hints, that are useful to prevent us from forming too hasty a judgment of the situation, in which calculi, that occur to us, have been generated; you will also find some observations, which have been since given almost in the same manner, even by an illustrious physician, whether he had read them in my works or not.

But when you inquire from whence it happens, that some of these calculi swim, and others subside, whether because in the former is a greater quantity, and in the latter, a less quantity, of the oleose particles, which, either by reason of their certain figure, leaving a great number of spaces betwixt each other, or from some different cause, are wont to swim upon water, as we see oils and resins in general do, or because the first mention'd kind of concretions, of whatever matter they consist, have more intervals of this kind interspers'd betwixt their component parts, that is, intervals fill'd up with air, a very great quantity of which, the celebrated Haller (*p*) makes no scruple to suppose, from the observation of Hales, is actually contain'd in bilious calculi; I say, when you inquire into this circumstance, then you will, perhaps, not be displeas'd with the observations, that I have made upon the bubbles which are discharg'd from, or adhere to, them in water, if they should happen to have any tendency to explain the return, in particular, of those which, having first fallen down, restore themselves again to the surface, or, at least, endeavour to restore themselves.

(*e*) Eph. n. c. dec. 3. a. 9 & 10. obs. 171. ad n. 7.

(*f*) Act. n. c. tom. 8. obs. 10. ad d.

(*g*) Loco indicato supra ad n. 23.

(*h*) Cit. supra ad n. 13.

(*i*) Propemptic. cit. supra ad n. 15.

(*k*) De subit. mort. l. 1. c. 20. n. 4.

(*l*) Cit. supra ad n. 17.

(*m*) Epist. anat. 1. n. 43.

(*n*) Ibid. n. 45. 46.

(*o*) Obs. indic. supra ad n. 20.

(*p*) Ad Boer. praefect. §. 250. not. 1.

It will also be of use in your inquiry, to compare my observations with those things, which my friend Stancario (*q*) has formerly hinted, of bubbles adhering to other immers'd bodies, and of their power in raising them up in the circumambient fluid, and which Petit, the physician (*r*), has much more copiously profecuted. In reading of whom, you will likewise learn the effect, which heat, added to the water, will have in causing those bodies, that would otherwise swim, to descend: and this circumstance being transferr'd to bilious calculi, shows another cause, moreover, from whence the experiments may vary, and would even render these experiments, which I, in general, made in the cold seasons of the year, after the publication of the first Epistola Anatomica, liable to suspicion with me, if I had not made them with water just warm, but not hot.

26. But the reason of their inflammability is too obvious to need our present inquiry. Yet I do not remember that any mention was made of this property, before the times of Cortesius (*s*), who says, "it is found by experience, that stones generated in the gall-bladder burn like fat." Who after him has affirm'd that this property is common to them all, which some even still seem to believe; and who has admonish'd us that this is true of them "in general" only, was shown you a little while ago (*t*). And what various observations I have made upon the burning of different calculi, and what kind I have seen take, cherish, and preserve the flame, and what I have seen do the contrary, is not only said in the Adversaria (*u*), and in that Epistola Anatomica (*x*), but also in the latter part of the other letter which I sent to Schroec-kius (*y*).

From these writings you will learn many things, but this in particular, that those remarks, which are delivered by a certain celebrated writer in medicine, in regard to "all" bilious calculi, even all that are in appearance of a certain nature, are not to be understood to relate to all, upon which I, and others, have made experiments, but to all, upon which he, himself, has made them. There is no doubt but under the same external appearance, a different nature, and number, of component particles may lie hid, in different calculi: nay they sometimes do not lie hid, if you examine them with great accuracy. To that illustrious man Haller (*z*), who chose to apply a great number of different calculi to the fire, instead of throwing them into water, it happen'd, that except those which he calls calcarious, all the others took flame, and among those the black ones likewise.

But were these internally black also? At least in describing them to be black, in the second, tenth, and eleventh histories, in the latter, and, in like manner, in the tenth, he mentions, nothing but an "external crust," or nothing but a "shell," which were "black;" and in the second, he says "that when the outer shell was taken off, which was black, and thin, a bilious yellowness succeeded." You find, therefore, from an accurate description, that the nature of those which were inflammable in his experiments, was different from the nature of others which, being black, not only externally, but internally also, or internally, in particular, very black, I have said did

(*q*) Vid. Vallisner. oper. t. 1. p. 6.

(*r*) Mem. de l'acad. r. des sc. a. 1731.

(*s*) Miscell. med. dec. 2. c. 9.

(*t*) N. 25.

(*u*) Ill. animad. 28.

(*x*) N. 49.

(*y*) Obf. indicata supra ad n. 20.

(*z*) Opuſc. pathol. obf. 33.

not take the flame, or when taken, did not preserve it, by which experiments, chiefly, it is made commonly known, that there are some calculi which are not inflammable. And to these I afterwards added others, though not black ones, which, in like manner, had not any inflammable principles; but of these there is no necessity to take notice here.

27. After making so long a discourse upon these calculi, particularly that they may be distinguish'd from other concretions, when discharg'd from the body, it becomes proper now, to say something of ascertaining their existence, if possible, when they lie latent within their vesicle, lest you should suppose that I have forgotten what it was that drew me into this long treatise. For it was the reprehension of him, who had pronounc'd that an obstinate, or returning, jaundice was a "certain" sign of the existence of these calculi, which gave rise to my discourse. But with how much more caution does Fernelius give his opinion (*a*), who only says, that we "ought in this case to be suspicious of these calculi;" and yet he laid this down, in particular, if both the cystic ducts, that is the hepaticus, and communis (*b*), were obstructed.

But, if even a jaundice of that kind, is no certain sign of gall-stones, it is not easy to say how much those gentlemen have been deceiv'd, who have imagin'd that they could not exist without a jaundice. And, in order to root out this notion entirely, from the minds of some physicians, where it yet remains, I can with the greatest certainty affirm, that notwithstanding the whole number of bodies, in whose gall-bladders I have found calculi, is nineteen, and the number in which Valsalva found them four, yet not one of all these had been affected with a jaundice. But as three of Valsalva's observations, and as many of mine, relate to letters which I shall hereafter write to you (*c*), you may, in the mean while, turn again to those fourteen which I have already sent you, in different letters (*d*), and join them with these three that I shall immediately subjoin.

28. A poor old woman had receiv'd a violent blow upon her head, by a fall: of which alone were all her complaints as long as she liv'd; and she liv'd not a few days, till at length she gradually sunk away and died. This patient had no inequality of the pulse, no traces of a jaundice. And the reason of my making this remark will appear, when I tell you what I observ'd in the heart, and the gall-bladder, while I was busied in pursuits of quite a different nature. For I did not even dissect the body, that I might know what detriment she had receiv'd from her fall.

The body was fat, and yet the skin very hard. In the thorax nothing occur'd to me that was worthy of remark; for to some of those who were present, it seem'd otherwise, in regard to a polypous concretion, that we found in the right auricle of the heart, which was whitish, and if you attempted to dissolve it with your hand, gave considerable resistance, as if we did not frequently see a crust of this kind lying on the surface of blood, which has been taken from a vein, and coagulated, or, as if this woman had been subject to

(*a*) Patholog. l. 6. c. 5.

(*b*) Vid. ejusd. physiolog. l. 1. c. 7. vid.

etiam infra n. 33.

(*c*) Vid. epist. 38. n. 20. epist. 49. n. 2.

epist. 56. n. 7. 9. 31. epist. 57. 10.

(*d*) Vid. ep. 3. n. 4. ep. 4. n. 13. ep. 5. n.

6. & 19. ep. 21. n. 2. 30 & 36. ep. 24. n. 16.

ep. 26. n. 21. ep. 27. n. 2. ep. 30. n. 14. ep.

34. n. 15. ep. 35. n. 16. ep. 36. n. 4.

an inequality of pulse, which they are so fond of attributing to polypi of the heart.

In the belly, the stomach appear'd to be almost double, so suddenly was that cavity contracted, before it came to the antrum pylori.

The gall-bladder was half-full of bile, and, being of a bright yellow like orpiment, had ting'd all the neighbouring parts with the same colour. In this bile were ten calculi, of an unequal magnitude, among themselves, but none of them small. Other circumstances which relate to them, you will read in the letter to Schroeckius (*e*); for this is that woman of whom I there spoke in the third place, showing where, and at what time, I dissected her.

And from thence you may also learn, in like manner, what relates to another woman, the remaining part of whose history I shall immediately add: for it is the who is spoken of, in the first place, in that letter.

29. A woman somewhat younger than the former, yet almost sixty years of age, who was not only far from having an icteric colour, but endow'd with a very good complexion, was much given to drinking, and had been seven times married: this woman having complain'd of no other disorder, but of an inflammation of the thorax, of which she died, was dissected by me, not on account of her disease, but in order to examine into the abdominal viscera, and had some appearances in the genitals, but still more in the gall-bladder, which are not unworthy of being transcrib'd here.

The uterus had a tubercle externally, on the upper part of its fundus, of the figure, and magnitude, of a small filbert, partly prominent, and partly latent within the substance of the uterus, of a scirrhus hardness, of a white colour, both internally, and externally, and consisting of many different small parts which, in some measure, resembled cells contracted into themselves. And within the cavity of the uterus, from the middle and anterior part of the fundus, rose up a soft, and almost gelatinous excrescence. But although the testes, as was to be suppos'd from her age, were much shrivell'd, and very narrow, yet the cervix uteri, and vagina, appear'd differently from what you would have expected in the wife of seven men. For in the latter part, were still a great number of rugæ, prominent, even to half the extent of it, longitudinally; and in the former, the figure approaching to that of a virgin-cervix, and the valves, which were preserv'd on one side, made me suppose, that she had been the mother of very few children, which was also confirm'd by the slender rugæ, in the lower part of the abdomen.

But as to the gall-bladder, although it was much shorter than in proportion to the magnitude of the liver (which was, in other respects, of its usual found appearance) for it did not reach, with its fundus, so low as the edge of the liver, but was distant therefrom by almost two inches; it nevertheless contain'd, together with a small quantity of bile, at least three hundred and thirty calculi, which were chiefly very small, as the shortness of the cyst, that I have describ'd, would of itself argue. As to the other remarks I made upon these calculi, I have said just now (*f*), where they may be met with: although in that letter, not only many typographical errors are admitted, but in the part, in particular, to which I refer, more than one whole line is omitted. Besides

(*e*) Vid. in act. n. c. tom. 2. ob. 167.

(*f*) N. 28.

the great number of calculi which I have mention'd, and which occupied the cavity of the cyst, I discover'd one with the knife that lay hid between the coats of this vesicle, which, in the blackness of its colour, and the smallness of its size, was very much like those that I took notice of above (g), as having been found in the glands of the cyst, at other times; yet the orifice of the gland was not so evidently laid open here.

30. The body of a very old man, who had been by trade a shoemaker, and who, by reason of his great age, was almost toothless, and had died partly of old age, and partly of a catarrh, within the space of three days, but without a fever, as was said, and certainly without a jaundice, as was manifest from the whiteness of his skin, was brought into the college about the end of January, in the year 1744, when I was teaching anatomy. As the whole of his body therefore, was carefully dissected, I will here relate all the præternatural appearances which I saw, beginning with those that were observ'd last of all.

The upper part of the cranium being taken away with difficulty, by reason of the very close adhesion of the dura mater, so that the external lamina of this membrane remain'd fix'd to the os frontis, the cerebrum and cerebellum were both of them found to be pretty soft, and somewhat brown in the medullary substance: the three ventricles of the cerebrum were full of pellucid and pure water: the plexus choroides were pale: the pineal gland was distended into the form and magnitude of a middle-siz'd grape, by a watry humour, as it seem'd: but the glandula pituitaria, if you look'd down upon it from above, was contracted, and sunk in its situation. The arteries that run upon the basis of the cerebrum, though they were not distended with blood, like the sanguiferous vessels within the ventricles, but were even empty, appear'd nevertheless, both in their trunks and branches, to be wider than they naturally are.

In the cavity of the thorax was a small quantity of turbid and brown water: The lungs were collaps'd, and fallen down to the back, in consequence of their being almost quite disjoin'd from the pleura. As the heart was larger than it naturally is, so the trunk of the aorta was also wider. And the valves prefix'd to this vessel, at the *aggeres*, as Valsalva call'd them, were become bony; and even one side of one of them consisted of a bony scale. But although through the whole trunk of the aorta, on its internal surface, and even the iliac branches of it, a whiteness was much more frequently propagated, here and there, than bony scales, yet I saw one of these in the curvature, and another near the third pair of lumbar nerves, neither of them very small, and both intercepted, by the internal membrane of the artery on one side, and on the other, by the fleshy annular fibres: and indeed there was a perfect ossification at the division of one iliac artery, into the external, and internal.

Besides, as the trunk of the aorta itself began to bend its course towards the left side, below the emulgents, and return again to the right side, before it gave off the iliacs, so the same kind of disorder, or unusual appearance, was continu'd into the iliac vessels, to such a degree, that, by their

frequent flexions, they nearly resembled the splenic artery. Nor were the carotids, and vertebrae, entirely free from this irregular disposition. And these flexions of the branches prevented me from attributing the incurvation of the trunk, just now describ'd, altogether to the contiguous exostoses of the lumbar vertebræ, the appearance of which was as follows.

Those thick ligaments, that are interpos'd betwixt the bodies of all these vertebræ, except the lower, were so prominent on their anterior surface, and especially on each side, like an air-bubble, that these prominences, on the right, and on the left side, were almost equal to the breadth of my little finger. All the prominences on the left side, whether because they had begun to be form'd before the others, or from what other cause soever, were bony. But of the right, that only seem'd to be bony, which corresponded to the interval betwixt the third and fourth vertebræ; yet it was not so; but a bony lamina, that form'd the surface of the body of the fourth vertebra, lifted itself above the level of the vertebræ, and in its elevation was also produc'd upwards, by which means it cover'd that prominence over with a bony crust: under which crust the nature of the prominent ligament was preserv'd. When I cut asunder one of the prominences on the left side, with a chisel, and the ligament, that was continued therefrom, with a knife transversly, those concentric lines it is true appear'd as usual; but every thing was ting'd of a pale and almost cineritious colour.

At length, the other contents of the belly offer'd the following things that were worthy of observation. The omentum was annex'd, on the right side, not only to that part of the intestinum colon, which is nearest to the beginning of it, but also to the small intestines, that lie in the neighbourhood of that part, and to the peritonæum. The stomach was not only more narrow than usual, but even was not a good figure. And the ring of the pylorus was somewhat swell'd in two places. Near to the other orifice, a certain roundish, and small kind of gland, was internally prominent, into the cavity of the stomach, which, when cut into, was found to be an encysted tumour; inasmuch as it was made up of a substance that was white, firm, and compacted into one body, of the same figure; but this body could be very easily disjoin'd from the thin membrane, in which it was contain'd.

The orifice of the stomach which was nearest to this tumour, that is the *stomachus*, as the ancients call'd it, was extremely large, as the gula which is continued therefrom was also, to the height of, at least, four inches above the stomach, in the whole of which tract it was more red, internally, than the other parts. And indeed I saw that the foramen, which is open'd in the septum transversum, in order to transmit the œsophagus, was much bigger than usual, particularly in its breadth, and that it terminated, at its upper extremity, by a right line transversly, instead of an angle.

When I examin'd that part of the omentum, which adheres to the stomach, with diligence, I observ'd, on the left side, not far from the fundus of this viscus, a kind of very small spleen, like a gland, receiving its sanguiferous vessels from the omentum, in which it was, and very much similar to the spleen in its colour, its coat, and the modification of its substance, unless that this last was somewhat more moist than that of the spleen, and of such a figure, and magnitude, that it might be compar'd with the spleen of a middle-siz'd hen. Besides this, another spleen was not wanting, which was
found,

found, and corresponded with the size of the liver, that was, likewise, found, and of its usual magnitude, or perhaps a little less.

In the gall-bladder, together with a small quantity of viscid bile, were six or seven calculi of no very small size, the largest of which was not less than a middle siz'd grape, pretty nearly round in its figure, yet of an unequal surface, as if from other very small calculi adhering to it. If you except some very small points of a yellowish colour, that were scatter'd up and down, through this surface, they were all, both internally, and externally, extremely black, and resembled a char-coal, not only in their colour, but even in their very substance. Most of these, after they were dried, fell into fragments spontaneously. And although they, before, seem'd to be light, yet those which were thrown into water, immediately sank to the bottom; and those which were applied to the flame, could neither by any means be made to partake of that flame, nor yet be dissolv'd in any part of them. One of the lesser of these calculi was in that part, where the vesicle begins to contract itself into the duct; yet it had not prevented the discharge of the bile, as we observ'd by compressing the cyst before we cut into it.

Finally, there being nothing in the kidneys worthy of attention, we open'd the urinary bladder, on the posterior surface of which, above the orifice, appear'd a kind of white protuberance, like a small inverted pylorus, somewhat larger, in its size, than the feminal caruncle was, to which it extended itself; yet the lower part of that protuberance, being contracted into a low and slender line, was prominent into the beginning of the urethra, and continu'd to the prostate gland; so that as it was of the same substance of which this gland, consist'd, it seem'd, beyond a doubt, to every one who was there present, and very much practis'd in the dissections of these parts, that it was an excrescence of the prostate glands.

31. I heartily wish, as I have remark'd all the preternatural appearances, which were in the body of that old man, (for this reason, at least, that nothing should escape you, which, sometimes, may happen to be the occult cause of a considerable disorder) that we were not in the dark as to the effects of them, or the greater part of them, which had preceded in the living body. But it is sufficient, at present, to have known this, that although the gall-bladder contain'd these calculi, the man had, nevertheless, not been icteric, any more than the women I have before describ'd, and so many others pointed out above (*b*). Which, if it had happen'd to me only to observe it, I could the more easily forgive those who still hold a contrary opinion, for neglecting, or affecting not to know.

But besides the observations of men of gravity, and authority, which I have produc'd in a former work (*i*), and those of Valsalva, that I have refer'd to (*k*), there are so many others over and above, that I believe it is scarcely possible for me to enumerate them all. Let it be sufficient therefore, to have added some to those formerly taken notice of. Lælius a Fonte (*l*) says, that in the body of a bishop, who was an old man, "the gall-bladder was found full of light stones, and yet that he had never been at-

(*b*) N. 27.

(*i*) Epist. anat. 1. n. 50. 51.

(*k*) Supra n. 27.

(*l*) Consult. med. 139. in fin.

“ tack’d with a jaundice.” Pechlinus (*m*) testifies the very same thing of an old woman, and of a woman who was publicly executed at Leipsic, Etmuller (*n*), as she had “ in her gall-bladder, great plenty of large, and small “ stones,” and our Vallisneri (*o*), asserts that he had, at one time, found many bilious calculi, and, at another, one large calculus, in the carcases of many persons who had “ never” been affected with a jaundice.

How many cystic calculi Baeumlinus (*p*) found in that woman, in whom “ any thing icteric” had not appear’d; how many Fabricius (*q*), in a woman who “ in all appearance was healthy;” and, finally, how many Haller (*r*) found in another, who seem’d to be “ very healthy,” and, likewise, in an old woman, in whom were “ no signs of jaundice,” you may yourself see: nor indeed will you suspect, I suppose, that in a great number of other histories, given by this author, wherein there is no mention of the jaundice, this disorder, probably, might not have been wanting, when you observe that, where he collects the substance of them together, he says, these calculi “ were, for “ the most part, unattended with a jaundice, as was certain from his own “ experience (*s*).”

Others, and among these Vaterus (*t*), I purposely pass over, since to the authors that I have nam’d, it is necessary not only to add those whom I shall presently (*u*) bring to bear witness, that they had seen no kind of disorder whatever, join’d with these calculi, but those also who, in describing, or making mention of, other symptoms, or disorders, of persons in whom were cystic calculi, have pass’d over the jaundice entirely, though a disorder that must have occur’d to their eyes, even in spite of themselves: and in the number of these do not imagine there are only Reverhorst (*x*), Contulus (*y*), Riedlinus (*z*), Hoffmann (*a*), Bassius (*b*), and others of the more modern. Do but turn to the Sepulchretum. You will find Bonetus (*c*), Morton (*d*), Greifelius (*e*), Kentmannus (*f*), Huldedreichius (*g*), Cnoffelius (*h*), and others; for I have not time to refer you to every one of them, in particular, in reading of whose histories I could not suffer myself to suppose, that they would so readily have pass’d over the jaundice, if their patients had been affected therewith.

32. How is it then, you will say, that there are so many witnesses on the other hand, and produc’d even in the Sepulchretum itself, that have seen this disorder join’d with cystic calculi? Not for this reason, certainly, that if these are suppos’d to exist, the other must necessarily be suppos’d to exist also. For if so, this disorder must have been seen attending upon those calculi by all. It must therefore be for some other reason. Thus, for the sake of ex-

(*m*) Apud Scheffel. diff. cit. supra ad n. 13.
§. 16.

(*n*) Prax. l. 1. f. 17. c. 3. art. 4.

(*o*) Adnot. cit. supra ad n. 13.

(*p*)

(*q*) Loc. indic. supra ad n. 23.

(*r*) Opusc. pathol. obs. 33. hist. 7. & 11.

(*s*) Ibid. hist. 10.

(*t*) Diff. supra ad n. 16. cit. thes. 9.

(*u*) N. 38 & seq.

(*x*) Diff. supra cit. ad n. 16.

(*y*) Loc. supra ad n. 23. cit. c. 25.

(*z*) Eph. n. c. cent. 3. obs. 45.

(*a*) Cap. supra ad n. 15. cit. obs. 1.

(*b*) Dec. 4. obs. anat. 9.

(*c*) L. 2. f. 4. obs. 35.

(*d*) S. 7. obs. 43.

(*e*) S. 11. obs. 46.

(*f*) L. 3. f. 7. obs. 33.

(*g*) S. 14. obs. 36.

(*h*) S. 17. obs. 14. §. 5.

ample, and not to depart from the Sepulchretum, you have in the observation of Helwigius (*i*), a jaundice with these calculi, and with a liver, at the same time, lank, shrivel'd and putrescent: you have them also in the observations of Vesalius (*k*), and Verzascha (*l*); but then you have also, at the same time, a liver that was enlarg'd, hard and green, or scirrhus, yellow, and pallid.

There is, at one time, instead of this kind of diseases another disease, as when Beckerus (*m*) describes calculi, found not only in the gall-bladder, but in the pori choledoci, in like manner. And at other times there are both of them. Thus Deodatus (*n*), and Dobrzenskius (*o*), relate that there was an indurated liver, at the same time that there were calculi, both in the cyst, and in those ducts. And it is not surprizing, that the matter of the bile should remain in the blood, and produce the regius morbus, when the liver can neither secrete it, nor discharge, from its own substance, that which is secreted, without preventing the secretion of the rest. And that to this class also, the old observation (*p*) ought to be refer'd, which was taken from the mother of a professor at Bologna, you would readily perceive, if the whole of it were produc'd.

You however must read this, as you will that of Vesalius which I just now pointed out, twice over in one and the same section; for it is that very observation (who would at first believe it) which is produc'd even below (*q*): as you will easily find out by comparing one with another, and by comparing them both with that which had been given in another section (*r*), or rather with the passages of Coiterus (*s*) relative to this subject, who is the author that took the observation; for although it is so many times repeated in the Sepulchretum, yet the doubt of the author is always neglected, which for many reasons ought not to have been omitted; for he did not say "she had labour'd under the jaundice" but "she had, if I am not mistaken, labour'd under the jaundice."

You see, therefore, that the testimonies produc'd are weaken'd, if any one attends to them rightly, and that their number is, at the same time, diminish'd, when it is demonstrated that one single testimony is produc'd twice over, as if it had been a double attestation. Thus you will also find the observation of Timæus (*t*) repeated, just as you will that of Guarinoni (*u*), and others perhaps: but in none will you be more surpriz'd, than in that of Fontanus (*x*), which, having been just before given under number twenty-two, is immediately given over again in every sense, and effect, and indeed almost in the same words, under number twenty-three.

Yet the two last observations relate to quite another class, than that of cystic calculi being join'd with the jaundice indeed, but, at the same time, with either a considerable disorder of the liver, or an obstruction of the bi-

(*i*) Ibid. f. 7. in additam. obf. 1.
 (*k*) S. 18. obf. 8. §. 4. cum obf. 20.
 (*l*) Ibid. in addit. obf. 6.
 (*m*) Sect. ead. obf. 8. §. 1.
 (*n*) Ibid. §. 10.
 (*o*) S. 16. obf. 5.
 (*p*) S. 18. obf. 8. §. 5.

(*q*) Ibid. obf. 25. §. 6.
 (*r*) S. 8. obf. 36.
 (*s*) Obf. anat.
 (*t*) S. 18. obf. 8. §. 11. & obf. 25. §. 4.
 (*u*) Ibid. obf. 33. & in additam. obf. 5.
 (*x*) Sect. ead.

liary canals, to which the two former, and some others much more recently publish'd, belong. And one of these, if it be produc'd, may easily have its testimony lessen'd in a different manner; as when Vaterus (*y*) says that a matron, in whose cyst he found thirty calculi, had labour'd under the jaundice. For this we confess; but we at the same time attend to what he immediately subjoins, that being freed from the jaundice, she had liv'd about three and twenty years in a state of perfect health, and was at length carried off by an apoplexy. For if she had been attack'd with the jaundice, merely as the effect of calculi, lying hid in the gall-bladder at that time, she would not have pass'd so long a space of time as three and twenty years, during which the calculi not only exist'd, but were even increas'd, without being troubled with the jaundice.

And an answer of the same kind you will naturally give to them also, who would object the observations of Weitbrecht (*z*), and Galeati (*a*). For both of them found calculi in the gall-bladder after a jaundice which had long preceded: although you may also give this answer, that by the first the liver was found to be somewhat hard, at the same time; that by the second it was found to be considerably hard, and crowded with a great number of tubercles; to say nothing of those things that I hinted at above (*b*), from whence you may perceive, that different calculi may have been formerly in different situations, so as easily to prevent the bile from flowing into the intestines at that time.

But if any one should oppose to these examples, others, in which not only a preceding jaundice, but a present one, was join'd with cystic calculi, as those of Lanzonus (*c*), du Verney (*d*), Van Swieten (*e*), Haller (*f*), and other celebrated men, you have wherewithal sufficiently to reply, from what has been just now said. For the first saw the liver, at the same time, "beset with a great number of hydatids;" the second so dried up, in one half of its substance, that it did not equal the thickness of a thumb, the third, "pallid, hard, without moisture, and rough with scirrhus tumours;" and the fourth, finally, although in so many histories he only exhibits two of icteric bodies, the second, and the ninth, yet in the former describes the same viscus as being "diseas'd, and ulcerous," and in the latter, as being "in great measure putrid, the gall-bladder being wholly consum'd, so that the calculus was found in the midst of a putrid jelly as it were." And I suspect that if other observations, of some authors, that are produc'd, had not been made hastily, and by-the-by as it were, but had been taken, and communicated to the public, with great accuracy, it would have happen'd frequently, that we should read of other marks of disease being found in the neighbouring parts, and particularly in the liver, within which, unless you search after them, they may even lie hid.

Observations that are still less recent, are sometimes produc'd likewise; but to confess the truth, to very little effect, as, for instance, that of our Domi-

(*y*) Thef. 9. cit. supra ad n. 31.

(*z*) Cit. supra ad n. 17.

(*a*) Cit. supra ad n. 24.

(*b*) Ibid.

(*c*) Eph. n. c. dec. 3. a. 3. obs. 36.

(*d*) Cit. supra ad n. 13.

(*e*) Ad §. 950. cit. supra ad n. 15.

(*f*) Opusc. pathol. obs. 33.

nic de Marchettis (*g*), as if he had said that he had seen a jaundice from cystic calculi. But he, when he says “the vesicle being obstructed by any matter, or by a stone, (for I have sometimes found in this vesicle, three or four “stones of the bigness of a vetch) a yellow jaundice is brought on;” says, indeed, that stones had been found there by him; but that he had found them in such a situation as to obstruct the meatus of the vesicle, and for that reason bring on jaundice, he certainly does not say.

33. But setting aside all these, and other similar observations, on account of those animadversions which I have hitherto hinted at, as some still remain to which none of these objections can, perhaps, be made, you will enquire of me, in what manner calculi of the gall-bladder may, sometimes, bring on a jaundice in human bodies, and whether in that manner which Marchettus and others have imagin’d, if they obstruct the vesicle, or rather the duct which is proper to it, that is the cystic duct.

For that the cyst has been obstructed without a jaundice, is certain even from the observations which I took notice of above (*b*) for instance, when it was full of stones. And altho’ when it is full of these it can discharge no bile, and consequently it comes just to the same thing, as if the meatus were really shut up; yet to satisfy you I will produce, below (*i*), observations of that meatus being stop’d up, without a jaundice; but here I will only call to mind what is demonstrat’d above (*k*), that it is not through the ductus cysticus, but through the hepaticus, and communis, that bile is sent from the liver to the intestines; so that unless these passages be obstructed, either by an excrescence, or by some constriction, or by a viscid, and thick matter, or by calculi, generated either in these passages, or in the liver, or even in the cyst, but push’d down into these passages, the bile cannot be retain’d in the liver, on account of the biliary passages; and therefore the matter, by which this fluid is constantly supplied, cannot be retain’d in the sanguiferous vessels, in order to bring on a jaundice.

Yet we must be cautious, lest at any time we fall into errors, in regard to the words which are us’d by ancient observers, to signify the ductus hepaticus, or communis, and suppose them to mean the cystic duct instead of the other. For they, according to the tenor of the opinions of their times, took either one or the other of these ducts for the meatus of the cyst, as I have even shown before (*l*), in explaining a passage of Fernelius; and the cystic duct, as you may see in Mundinus (*m*), they call’d by the name of *collum vesiculæ* or neck of the gall-bladder, and not by the name of pore, meatus, or duct.

Therefore, when you read in Donatus (*n*), of Albucaſis having taught, and Nicolus having confirm’d, “that a fleshy excrescence arises in the meatus of “the gall-bladder, which, by stopping it up, is the cause of an incurable “jaundice,” although I have said (*o*) that this has even been found by me formerly, in the vesicle itself, yet do not be hasty to believe that the excrescence, of which they speak, was suppos’d, by them, to be form’d in this

(*g*) Anat. c. 4.

(*b*) N. 31.

(*i*) N. 39.

(*k*) N. 10.

(*l*) N. 27.

(*m*) Anat. ubi de kyſti fell.

(*n*) De med. hiſt. mirab. l. 5. c. 3.

(*o*) Supra n. 20.

vesicle, or in the cystic duct, inasmuch as it must have stopp'd up some other passage besides this, in order to have been the real cause of a jaundice.

Thus when Gentilis, as is hinted at above (*p*), has asserted that he had found a stone "in the pore, or meatus, of the gall-bladder;" you must consider what you are to understand thereby. The very reading of the Sepulchretum will render you cautious in this respect, where Camenicenus (*q*) writes thus to Mathiolus: "the meatus which goes from the gall-bladder, into the liver, was quite free and open," that is the hepatic duct. And he had said a little before, "the meatus going from the gall-bladder, and terminating in the intestine, was obstructed by a stone;" and that this was not the ductus cysticus, but the communis, you may be assur'd not only from what has been said, but also from this circumstance, that in the icteric body in question, "the gall-bladder was extremely full of bile."

Nor will you understand differently, these words in the observation of Coiterus (*r*), "in the passage from the gall-bladder, to the duodendum, was a large calculus, which totally obstructed that passage, on all sides," especially when you observe that the folliculus fellis is so describ'd by himself (*s*), in another place, that without making any mention of the cystic duct, he says "it is provided with two pores, or passages, one by which it draws bile from the liver, the other by which it transmits the bile, from itself, into the intestinum duodendum." For there is no doubt but he has follow'd the dogmas of his preceptor Falloppius (*t*), in that point, so as to consider the ductus cysticus in the manner the ancients did, that is as the neck of the bladder; yet not so far as to acknowledge, that the bile was carried from the liver, to the intestine, by one meatus, and that a strait one, "on which meatus, about the middle of its course, nature has planted a bladder with its neck."

34. It is not the cystic duct, therefore, but the hepatic, which (for though we acknowledge it to be one, yet for the sake of custom, and more clear doctrine only, we divide it into the hepaticus and communis) I say it is not the cystic, but the hepatic, which we require to be obstructed, either by an excrescence, or by a calculus, which has even been frequently observ'd there by Falloppius (*u*), or by a thick and viscid matter, in some other manner, in order to make us confess, that the jaundice has arisen from the disorder of the more considerable passages of the bile. For that they may be obstructed, not only by viscid, or thick matter, but even by the bile itself, I do not doubt, as I formerly found, in a dog that had been much disorder'd, the extremity not only of the pancreatic duct, but, also, of the ductus communis, shut up by means of a kind of gypseous, and yellowish matter, concreted there: and we read Etmuller (*x*) describing, in an icteric body at Leipsic, "the lower pore, or meatus, entirely obstructed by a viscid pituita, so that after cutting away this biliary meatus, not so much as a drop of bile flow'd out, because the bile, which was contain'd there, was very thick, and tenacious.

(*p*) N. 15.

(*q*) L. 3. f. 18. obs. 8. §. 12.

(*r*) Ibid. f. 8. obs. 36.

(*s*) Tab. intern. hum. corp. part.

(*t*) Obs. anat.

(*u*) Ibid.

(*x*) Art. supra cit. ad n. 31.

But I know that you may take occasion to interrupt me here, and enquire why then the noble Frenchman, whom Scultetus (*y*) dissected, as he had “the porus biliaris, in that part where it is inserted into the duodenum, so far obstructed with a stone, equal to a large pea in its size, that not the least quantity of bile could be thrown out thereby,” had not, nevertheless, been affected with a jaundice? And in so singular a case, unless I should choose to have recourse to those constitutions of the blood (*z*), in which the matter that supplies the bile, and even the bile itself, can scarcely give any tinge of yellowness, I am under a necessity of supposing that there was some peculiar disposition of the biliary passages: such, for instance, as Fallopius (*a*) asserts had been seen by him, two or three times, that is to say, the ductus communis “divided into a double canal,” a little above the intestinum duodenum: which division, but betwixt the coats of the same intestine, “into two considerable branches, that open’d by separate orifices, within the intestine,” was once seen, likewise, by Abraham Vater (*b*).

For supposing one of these orifices to be obstructed, a passage still remains open through the other, for the bile to go to the intestines. There also might be some other more uncommon duct, like that which Veslingius found, and was examin’d by Bartholin (*c*), in a woman “of a good habit, fat, and pretty healthy,” when the cyst was stuff’d up, and obstructed, by calculi, and which “went from the liver, in the neighbourhood even of the porus biliaris, that was fill’d up with calculi, and terminated in the intestinum jejunum,” or that which Bezoldus describes, as being seen by him (*d*), and which, according to the figure he gives of it, is very similar to that of Veslingius, provided it did not go to the ductus communis, but to the intestines; or those that the same author takes notice of (*e*) as having been demonstrated by Diemerbroeck, which were produc’d, separately from the ductus communis, betwixt the vesicle and the intestines, so that a great part of the bile might either be carried immediately to the intestines, in a direct passage, or through the more general passage of the ductus communis.

But as to the observations of Andreas a Lacuna, which he immediately subjoins, and which, in part, relate to those observations that I have refer’d to above (*f*), of stones being form’d, by concretion, in the cyst, without a jaundice, and, on that account, produc’d in the first of the *Epistolæ Anatomicæ* (*g*), if he could have read them rather in the words of the author himself, than in those of Riolanus, he would have chosen to make use of the words of the former, in preference to those of the latter, inasmuch as Riolanus, by a slip of his memory, has related three things in three lines, that by no means agree with those which Andreas had said. But let us omit these considerations, and go on to others.

35. As I advanc’d four kinds of causes above (*b*), by which the common, or

(*y*) Obf. cit. supra ad n. 18.

(*z*) Vid. supra n. 9.

(*a*) Obf. cit.

(*b*) Dissert. qua nonum bilis diverticulum &c. thes. 7.

(*c*) Cent. 2. hist. anat. 54.

(*d*) Diff. de cholelitho §. 6. & fig. 1. litt. f.

(*e*) §. cit.

(*f*) N. 31.

(*g*) N. 50.

(*h*) N. 33.

hepatic, canal may be obstructed, but produc'd examples of three only, you may perhaps wonder why I have produc'd no observation of the fourth, that is of constriction. But you will cease to wonder, when, in reading over again the present very prolix letter, you observe this to have been done already (*i*), as far as was possible, by examples pointed out from the Sepulchretum. But if you inquire after other instances, from different authors, they are by no means wanting. That is a very famous one, by reason of the eminence of the patient, which was taken from Andrew Mauroceni, a noble Venetian, who was illustrious both as a senator, and as an historian, and which is given us by his learned physician Aurelio Palazzoli (*k*). For the cause of the jaundice, of which Mauroceni died, was an insuperable constriction of the passages; inasmuch as "the duct by which the bile is, chiefly, carried to the intestines, had become callous."

Mead (*l*), also in a body that had been troubled with an obstinate jaundice, saw the same meatus, where it makes a coalition with the cystic duct, so contracted, as if a ligature had been made upon it, that "it would not admit a probe;" nor could any portion of the bile, with which the gall-bladder and liver were distended, pass on, by this way, to the intestines: and this contraction seem'd to have been brought on by a scirrhus, and even a cancerous, tumour of the neighbouring pancreas. And in the acts of the Cæsarean Academy (*m*), an observation is extant of an icteric body, in which, by reason of a scirrhus pancreas, the same common canal was shut up at its termination, not without "a firm concretion."

Examples of the more rare causes therefore, which, either by condensing the tube into a solid body, or by pressing upon it externally, constrict the common duct of the bile, I have neither been backward to produce above, nor in this place, and should do the same in regard to the more frequent causes of constriction, if the effects of these were as easily observ'd by the senses, after death, as they are probable from reason, and agreeable therewith. I speak of spasmodic *crispatures*, by which, at least, the orifice of the common duct, or the greater part of the small branches of the hepatic, are constring'd: unless we should suppose that the observation of the celebrated Jo. George Maurerus (*n*) relates to this subject.

An illustrious man, after a wound receiv'd in the region of the liver, which did not penetrate, being seiz'd with a bilious tertian fever, and a jaundice, and after that with other disorders, yet giving hopes of recovery, and in regard to the jaundice itself, being almost quite recover'd, but having a violent, repeated, and long uneasiness of mind come on, which a sudden inflammation of the fauces and lungs succeeded, not without "fears, and anxieties, about approaching death," really underwent this change, in the space of three days. And he had, to omit other things, within the cyst, three calculi of a considerable size, but "the orifice of the ductus choledocus, and the whole of this canal, was so far obliterated, or constricted, that it would not allow the least probe, or bodkin, to pass, and much less any drops of bile."

(*i*) N. 10.

(*k*) Vid. in adnot. a Cathar. Zeno additis vitam hujus Mauroceni ab Nic. Craffo scriptam.

(*l*) Monit. med. c. 9. f. 1.

(*m*) Tom. 8. obs. 30.

(*n*) Ibid. obs. 70.

There is no doubt but the cavity of this duct was so constricted, when the skin was yellow, and the intestinal fæces “were white,” and discharg’d “slowly and difficultly.” But it certainly was no longer in that constricted state, at the time when the skin was restor’d “to a quite natural and florid colour,” and the fæces were discharg’d “in a great quantity, and ting’d as they naturally are. It may, therefore, seem not absurd to suppose that a spasmodic constriction, which a quiet state of the mind, and a proper regimen of cure, had lately relax’d, return’d, within those three days, from new commotions of that kind, together with the whole train of deadly symptoms.

But be this as it will, if you, in the mean time, acknowledge what I have said of crispatures, which are brought on by a spasm, in consequence of certain passions of the mind, or excited by irritations, and pains, of various parts (*o*), but particularly of those that are the most near to the liver; I say, if you acknowledge these things to agree with probability, and attend a little to what relates to irritations, you will, doubtless, find out the reason which you ask’d of me (*p*), why, supposing calculi in the gall-bladder, the jaundice may sometimes arise, although there be no other cause, at the same time, of all those which I mention’d above, from whence this disorder could be accounted for.

This was formerly allow’d by me, when I said (*q*) “whether the calculi found by me, were not yet of that magnitude, or weight, or figure, by which the cyst could be much injur’d, or whether they were never driven into such a situation, as to have in their power to obstruct the bile,” it might have been for these reasons, that in those bodies, wherein I found them, “they had brought on no peculiar disorder, or, at least, none that was evident, and indeed not so much as an icteric colour.”

For I did not doubt, but if the cyst were irritated, either by the magnitude, or the weight, or, in particular, by the figure of the calculi, and chiefly when they are forc’d into the streights of the neck of the bladder, by the bile which they thus retain therein; and at the time when this cyst is compress’d by the stomach, and intestines, forc’d on still farther and farther, that a spasm may then arise, with contractions, and crispatures, which are propagated through the larger and continu’d ducts of the bile, on the one hand, to the intestinum duodenum, and on the other, to the liver: and I did not doubt but that the passages being thus contracted, a jaundice might be form’d, in the manner afterwards particularly explain’d by Hoffmann (*r*). Therefore the jaundice, as it can then only be the consequence of gall-stones, and as what these then do by irritating, may be done, at other times, by different causes in different situations, and even by the passions of the mind themselves, this will, therefore, not be the constant, and proper, sign of these cystic concretions.

36. And if the jaundice is not a constant sign, is there any other that is perpetual, and peculiar? I very much fear lest that, which was the case in the time of Fernelius (*s*), is also the case at present, and will be so, for the future; I mean that “no manifest marks, by which the existence of these stones may, certainly, and easily be known,” can be found out, but that

(*o*) Supra n. 10.

(*p*) N. 33.

(*q*) Epist. anat. I. n. 50.

(*r*) C. 3. supra ad n. 15. cit. §. 19. & p. 4.

f. 12. c. 12. §. 10.

(*s*) C. 5. supra ad n. 13 & 27. cit.

we must dwell upon "suspicions" only, as we have seen of the jaundice. It does not, however, escape me, that there have been celebrated men, both among the ancients, and moderns, who have attended to these marks with a very laudable industry, and have endeavour'd to approve them to every one.

For, in the first place, I see that Coiterus (*t*), has publish'd some observations of his own, of these calculi, with an intention "that therefrom might be learn'd the symptoms, which are the consequences of this disorder." But these are reduc'd to a long-contin'd jaundice, and in one, wherein even the common canal was obstructed, to a continual vomiting of food. In regard to the first of which I have said enough already. And in regard to the second, which is likewise taken notice of by others, how often it is absent, and by how many, and how various causes, besides this, it may be brought on, is certainly manifest to every one.

Others have since added different symptoms, the consideration of which I shall not particularly prosecute, as it naturally appears, that the same thing must be said of colic pains, and other symptoms of that kind, which I have already said of vomiting. And what shall we say, when we see such symptoms advanc'd, as are diametrically opposite to each other, as for instance, those of costiveness, and laxity of the intestines? Nor does it affect me, to find it asserted in the Sepulchretum (*u*), that "it is scarcely possible to conceive" of this latter symptom taking place: for it is very clear to me, that when the vesicle is entirely fill'd up by a calculus, all the bile must, of course; flow continually to the intestines, and if it be acrid in any considerable degree, must, of course, stimulate them pretty strongly. But I only remark this circumstance, that if sometimes one, and sometimes the other, is true, which I do not doubt, neither of them, consequently, can be the perpetual, and peculiar symptom, of these calculi.

37. But if we omit these symptoms which are common to other disorders, and enquire what the calculus can of itself effect, we shall come back nearly to those things, which, as I have just now taken notice (*x*), have been already said by me in the first anatomical epistle. "The calculus, of itself," as Boerhaave also says (*y*), "while it remains quiet, produces no disagreeable symptom, except a sense of weight, but irritates by its bulk, its weight, and its roughness." If we transfer these things, which he says of the urinary bladder, to the gall-bladder, do you suppose that this calculus, which is lighter than that of the urinary bladder, and is gradually increas'd, will discover itself to exist by a sense of weight? We must wait a long time then, till it, at length, acquires a greater weight. But will the sign, which we shall be in want of so long, and in most cases always, be then, at length, sensible at least, and plac'd beyond a doubt. It was certainly sensible in the noble count of whom Hildanus speaks (*z*), since, "for many years, as often as he turn'd himself from one side to the other in bed, he could perceive a great, and troublesome weight, opposite to the liver, that fell from one side to the other."

(*t*) Obs. anat.

(*u*) L. 3. f. 10. additam. in schol. ad obs. 1.

(*x*) N. 35.

Vol. II.

(*y*) Prælect. ad instit. §. 790.

(*z*) Obs. supra cit. ad n. 22.

But the calculi, contain'd in his gall-bladder, were so large as to weigh eighteen drachms and a half, and that when in a dried state, for when recent from the body, they were much heavier. But do you suppose these to have been heavier than that great number of calculi, which were found, at one time, by Greifelius (*a*), all of which, taken together, weigh'd thirty drachms? For he has not remark'd that the man, in whose body he found them, had ever perceiv'd any weight therefrom.

Yet perhaps you will say, that the vast quantity of fat, which was found in his belly, might possibly obtund this sensation. Were all the bodies extremely fat then, in which these calculi have been found to a considerable weight? At least the woman (*b*), in whom the calculi were equal to the weight of twenty-four drachms, does not seem to have been very fat, nor yet the priest (*c*), whose calculi weigh'd twenty drachms, nor the illustrious man (*d*), in whom they weigh'd almost as much. Yet we read of none of these, what Hildanus asserts of the count, when he turn'd himself in bed, nor do I ever remember to have read the same of any person, whose gall-bladder was loaded with calculi. To this case of the count, I should suppose, from comparing the times together, Stieberus (*e*) refer'd, when to an observation of that kind, he objected another "of more than two hundred stones," in the gall-bladder of a man, "who had never made any complaint of an oppressive pain " in the right side."

But suppose that many have complain'd of that same sensation, of which the count above-mention'd complain'd. Yet at the same time call to mind those faculi, which hung from the liver, and were loaded with calculi (*f*), or call to mind even the gall-bladder itself, which has been found more than once to be distended with a large quantity of thick bile; to a surprizing degree. You will, by this reflexion, clearly perceive, that the same sensation may sometimes arise from other causes, besides calculi, or if it arises from calculi, not only from those which the gall-bladder contains. And it is manifest from these, and other examples, that even the distention, which not only the patient, but the physician, also, by applying his hand to the part, perceives, and, consequently, the effect of the bulk of calculi, affords but an ambiguous mark of their existence.

The roughness remains. Of which I say first, as I have already said of the weight, and might have said of the bulk, that it is not always such as can irritate, and discover itself by irritation. And, in the second place, I say, that even when it is of such a kind, the vesicle is, at one time, defended by the quantity, and at another time by the thickness of the bile, from the irritation it has a tendency to create; for that happens very rarely here, which happens almost always in the urinary bladder, that all the contain'd humour being discharg'd, nothing remains but the calculus, by which the bladder is prick'd, and stimulated, especially as the gall-bladder cannot contract itself like the other, and closely embrace the stone: and although this could hap-

(*a*) Obf. supra cit. ad n. 19.

(*b*) Eph. n. c. dec. 3. a 7 & 8. obf. 123.

(*c*) Act. n. c. tom. 5. obf. 129.

(*d*) Commerc. litter. a. 1742. hebd. 28.

(*e*) Sepulchr. l. 3. f. 17. obf. 14. §. 3. cum schol.

(*f*) Vid. supra n. 13.

pen, yet the sense of both bladders does not seem equally exquisite; and this I say, lest you should have recourse to the turgescency of the stomach, and intestines, which, however, does not always subsist, in order to make us conceive how the cyst may be press'd close upon the calculus.

Finally, I say that in these very viscera, in the part where they can press upon the contiguous vesicle, that same sense of pricking may happen to exist from another cause, which would be, in the gall-bladder, from a calculus; and even that it may be in this vesicle itself, from the very acrid quality of retained bile, or from some spasm; so that irritations may be either suppos'd to exist in this receptacle, which are not there, or those which are there, may arise from a cause quite different from calculi.

38. What I have said on both sides of the question then, hitherto, goes so far as to give you to understand, that there is no perpetual, no peculiar, sign of these calculi. But lest you should chance to suspect, that there may be some fallacy in reasoning, as there often is, let us confine ourselves to experience. I set aside all my own observations, and those of Valsalva (*g*), in none of which there was any sign of those calculi, that we, nevertheless, found in the gall-bladder. I also set aside those which I have produc'd in former work (*b*), from Gerbesius, and Lospicklerus, who assert of men troubled with calculi of the gall-bladder, "that they had liv'd a long time in health, and had been free from complaints."

But if others testify the same thing besides, is it but just that you should call to mind, all those observations which we now set aside. Rolsinc (*i*), therefore, a physician of great eminence in his times, when he describes what kind of calculi he found in the cyst, says, in general, "that stones of the gall-bladder very often lie latent in that cyst, for some years, without doing any injury, sometimes bringing on pain, and sometimes being without. L'E-mery the father (*k*), affirms it to be well known, that these stones not only do not cause death, but even "frequently cause no inconvenience whatever." And I have already said above (*l*), that Vaterus had observ'd in a woman, who had thirty of them in the gall-bladder, a long-continu'd, and "perfect health," even to the end of her life.

Galeati (*m*), in like manner, affirms, that in a woman, whose body he dissected, "nothing had happen'd, either in the disease whereof she died," (which was a dropfy) "nor before that time, as far as he could learn, that show'd the gall-bladder to be affected;" yet in this vesicle, nevertheless, were four calculi, the largest of which "being angular, had obstructed the orifice of the cystic canal." Themelius (*n*), also, when he takes notice of "some biliary calculi, worthy of remark," that were found by him, in the cyst of a strumpet, expressly says, "that they had not been attended with any injury to health."

Finally, Roncallus (*o*), for I am not willing to mention any more here, than naturally occur to me as I write; gives an account of seven calculi, of

(*g*) Vid. supra n. 27.

(*b*) Epist. anat. 1. n. 51.

(*i*) Dissert. de gutta ser. corollar. 4.

(*k*) Hist. de l'acad. r. des sc. a. 1703. obs. anat. 1.

(*l*) N. 32.

(*m*) Cit. supra ad n. 21.

(*n*) Act. n. c. tom. 5. obs. 10. prop. fin.

(*o*) In epist. addit. ad hist. morbor.

the size of a small walnut, being found, by him, in the gall-bladder of a woman, who died in the eighth month of her pregnancy, and who, in the whole of that time, and long before, “had been endow’d with a very good habit of body, was well nourish’d, and had a good colour;” so that it was manifest, unless these concretions had been form’d in an instant of time, which cannot be suppos’d, “that health may continue,” even when these are present.

If am not by any means deceiv’d then, it is sufficiently demonstrated, that there is no perpetual sign of cystic calculi, and, consequently, that there is none proper, and peculiar.

39. How is it then, you will say, that Wepfer (*p*), a very experienc’d physician, has written these things to Verzascha: “I do not think that the neck of the gall-bladder is stop’d up, because there is not the least complaint of a cardialgia, or pain with tension, near to the cartilago ensiformis, the seat of which might be cover’d with a silver penny?” Did not he, at least, think this an inseparable sign, where the calculus had stop’d up the neck of the gall-bladder?

But I would have you attend to this, that he has not made mention of calculi in particular, and that there are other causes besides a calculus (*q*), which are capable of obstructing the cystic duct, as well as the other biliary ducts. And in the second place, even when a calculus obstructed this duct, Galeati, as was just now said, did not only not observe a jaundice, which alone was found to be absent, at that time, by Bezoldus (*r*), and was prov’d to be so, in many cases, by Pechlinus (*s*), but even remark’d that nothing was the consequence of it which could show the cyst to be affected: and the same remarks, nearly, were made by Reverhorst (*t*): and by Phil. Jac. Hartmann (*u*), in two bodies: nor has Haller (*x*) any thing contradictory thereto, in the dissection of three bodies: nor, finally, he who could have related with accuracy all the symptoms of a patient, I mean the celebrated Trew (*y*).

And although Tacconus (*z*) says, that very great pains, in the hypogastric region, had been join’d with a quartan fever, yet he not only says, that the jaundice had not attended, at the same time, but even that there had not been those pains which reach to the cartilago ensiformis, as he had expressly signified, in another woman, a little before, where he suppos’d the existence of calculi, in the ductus communis. You see therefore, that not even when the meatus cysticus is obstructed by a calculus, as it was in all the bodies I have refer’d to, is that pain, which has been describ’d by Wepfer, a constant and perpetual sign of its existence.

40. And although our original enquiry, here, was after the symptoms of a calculus, not only when thrust down into that passage, but, in general, when existing in the gall-bladder, yet it will not repent me, that I have examin’d whether the sign describ’d by Wepfer, be proper to a calculus, that is fallen

(*p*) Sepulchr. l. 3. f. 17. in schol. ad obf. 6. in additam.

(*q*) Vid. supra n. 33 & 34.

(*r*) Diff. de coelitho cas. 1. n. 6.

(*s*) Vid. act. erud. Lipf. a. 1691. m. maj. in recens. l. ejus 1. obf. 58.

(*t*) Diff. de mot. bil. §. 57.

(*u*) Eph. n. c. dec. 2. a. 5. obf. 72 & 77.

(*x*) Opusc. pathol. obf. 33. hist. 4. 13. 14.

(*y*) Commerc. litter. a. 1743. hebdom. 32. n. 3.

(*z*) Cit. supra ad n. 16.

down into the ductus communis, since it cannot be proper to that which remains in the vesicle, as was sufficiently demonstrated above (a), when I treated slightly of the sense of distention. For as to an observation occurring in the Sepulchretum (b), to which this title is prefix'd, "a pain about the cartilago ensiformis, from calculi in the stomach, and gall-bladder;" take care how you suppose that the observation corresponds with the title: for in reading over the case, you will find, indeed, that many calculi adher'd very closely to the fundus, and substance, of the stomach; but that there was any calculus in the gall-bladder, or in any other part, you will not find.

From this observation, therefore, you will rather learn, that it was not a proper symptom of calculi existing in the ductus communis, which show'd calculi to be adhering to the stomach. And, indeed, if besides these, others had also existed in the ductus communis, yet there would be room for doubt, to which of these two kinds, this pain ought to be ascrib'd, just as when in a history of the same kind of pain, calculi are describ'd in that duct, and the liver is said, at the same time, to be almost full of deprav'd matter, and to have very considerable disorders, and in another, many tumours are said to have existed throughout the liver, and this meatus to have been much compress'd by one of them: although, if the compression, or obstruction, of the ductus communis be suppos'd, of itself, to bring on the cause of that pain, whereof I speak; it, of course, cannot be consider'd as the peculiar mark of stones sticking therein, as it is sufficiently shewn above (c), that this canal may be both compress'd, and obstructed, without calculi, and as nothing forbids us to imagine, that bile may be sometimes confin'd therein, in a very great quantity, and that it is sometimes naturally so acrid, or becomes so by stagnation, that it has a power to distend, and to stimulate, the canal in the same manner with calculi.

Do not imagine, however, that the industry and skill of those who enquire after truth, and endeavour to increase medical knowledge, are less esteem'd by me, than by the celebrated man, who proves the explication of the pain in question, by the firm connection of the ligamentum suspensorium of the liver, to the peritonæum, where it covers the ensiform cartilage: but influenc'd by the same love of, and desire after, truth, that influence me at present, he soon after subjoins the following words: "and not in calculous affections of the liver only, but in inflammations, or other tumours of the same viscus, which have their seats not far from the roots of this ligament, these things are proper to explain the various symptoms of this kind, that arise from thence, and, particularly, the pain of the cartilago mucronata, of which we speak, and which, in similar circumstances, is frequently found to attend inflammations of the liver."

41. And this symptom is not only common to other disorders that are taken notice of, whether they be seated on the outside of the liver, or within the liver, or in the ductus communis itself, but does not always occur, even at the time when there are stones in this duct. For all biliary calculi, whatever, that are discharg'd from the intestines, must, of necessity, have pass'd through the streights of this duct to the intestines: and yet, notwithstanding

(a) N. 37.

(b) L. 3. f. 7. obs. 32.

(c) N. 10 & 34.

so many observations are extant, of stones of this kind being discharg'd with the stools, how few are there in which we read, that a pain at the cartilago eniformis had preceded the discharge?

It does not, however, escape me, that all the stones, thus discharg'd, are not to be suppos'd to have come from the liver. And, indeed, I readily confess, that although from the time in which they first began to be observ'd, which was before Galen (*d*), to this very time, almost innumerable observations of these concretions have been collected by Donatus (*e*), by Schenck (*f*), by Rhodius (*g*), by Schrockius the father (*h*), and by others, it seems to me that many of them have been generated in the intestines, or the stomach, itself.

For that they may, also, be generated in the stomach, ancient examples prove, the first of which is related by Donatus (*i*), when my fellow-citizen. "Mr. Jo. Juliani, of Forli, sent a stone to Gentilis, which was thrown up " by vomiting, equal to the size of a nut, after a pain of the stomach, which " in its hardness exceeded that of gypsum, and was, in its shape, like that of " an egg:" and one similar to this, except that it did not exceed the size of a jubeb, was of a whitish colour, and not furnish'd with evident strata, I formerly saw in the place of my nativity, which a woman had thrown up by vomiting, in like manner, after long-continu'd pains of the stomach.

But though others have lately thought that they have prov'd them to be generated in the intestines, by examples which, perhaps, are not very proper for the purpose, to me that seems more suitable to the present occasion, which you will find in Ballonius (*k*), " of a stone in the intestines, which was " perforated so as to suffer the more liquid matter to pass through it;" for it seems to have been form'd, by degrees, of earthy, and viscid, particles adhering, round about, to the intestines: the other particles passing through the middle of it, and keeping the passage open.

Who will venture to deny, that stones which are the largest of all, and universally made up of one, and the same, matter of this kind, had not their first beginning in the intestines, as they certainly had their increase? And indeed although I read that some were of such a kind, either in their magnitude, or colour, or their figure, that any one might easily refer them to the class of cystic concretions, as, for instance (*l*), those which were " at one " time smaller, and at another time larger, than peas," or " than filberts, " those which were of a yellow colour," or " in great part yellow," those which were " triangular," or otherwise " angular;" and, finally, to comprehend many examples in one, " those which in their shape, colour, and magnitude, " were like to the seeds of melons;" yet I will readily omit all these, especially as the symptoms which had preceded, are either not related with the necessary accuracy, or not related at all.

I will go on to those which the authors who describe them, or other men of eminence, have consider'd, and not without reason, as cystic, or, at least,

(*d*) Vid. apud Schenck. obs. med. 1. 3. ubi de intestin. lapid. obs. 1.

(*e*) Cap. supra ad n. 15. cit.

(*f*) Obs. 1. modo cit.

(*g*) Cent. 2. obs. med. 74.

(*b*) Obs. supra ad n. 24. cit.

(*i*) Cap. modo cit.

(*k*) L. 2. consil. med. 24.

(*l*) Vid. apud Schenck. obs. 1. modo cit.

biliary concretions. But Fernelius, whom I have mention'd in a former work (*m*), says no more than that he had found "after a long jaundice, succeeded by a diarrhoea, innumerable calculi of this nature, like peas, or barley-corns, to be discharg'd by most persons." Coiterus, in like manner (*n*), says that he knew a woman, "who was freed from a very troublesome, and long-contin'd jaundice, by a discharge of a calculus with her stools." That Solomon Alberti, "had often observ'd calculi to be discharg'd with the fæces, after a very long jaundice," I know very well from the celebrated Haller (*o*): but whether he said more than this I know not, inasmuch as I have not his second "oration," which he there quotes; not that which is among the three publish'd in the year 1585, but that which is with the four publish'd in 1590, for that that is what he refers to, I do not doubt, as I see it is entitl'd in Linden (*p*), *de felle ad intestina restagnante, &c.*

I have said above (*), that Malpighi has asserted a stone to be discharg'd by a matron, "after great pains and a long jaundice." That Ruysch (*q*) preserv'd "a calculus, which came from the gall-bladder, and was discharg'd *per anum*," I have read, but not what symptoms had preceded the discharge. And others I purposely omit, who have either said no more than Ruysch, of what had preceded, or have not mention'd so many symptoms as Malpighi.

42. It is better, therefore, to pass over to those who have made mention of the seat of the pain which preceded. Hoffmann the father, as the son relates (*r*), has said that there had been "very acute pains of the right hypochondrium." Dillenius (*s*), that after pains which had, "for a very long time," occupied the same hypochondrium, "colico-nephritic pains had succeeded." Bartholin (*t*), from the observation of Tinctorius, "that there had been many complaints of a pain in the right side, which extended to the intestines." Lentilius (*u*), "a very great pain about the region of the liver, with a tumour; of which pain, however, the patient had already complain'd, for the space of ten years." Wolfstrigelius (*x*), who has spoken more fully on the subject than the others, that pains had, at several times, preceded, "which resembled colico-nephritic pains, and which, though they frequently grew milder, yet as often return'd with violence:" that upon a relapse into this disease, as frequently happens, "there was a pain of the loins, and a rending pain about the right hypochondrium, at the place where the ductus choledocus is inserted into the duodenum:" that the disease returning again, "there was a pain which, indeed, rather resembled a colic pain, as it was not felt about the loins, and right hypochondrium, but chiefly towards the navel."

In fine, our Valisneri (*y*), who prosecuted every inquiry, himself, with accuracy, having observ'd similar cases, first in the place of his nativity, and after that here at Padua also, has said nothing more in regard to pains, than

(*m*) Advers. 3. animad. 28.

(*n*) Obf. anat.

(*o*) Ad Boerhaav. prælect. §. 348. not. (m).

(*p*) Renovat. de script. med. l. 1.

(*) N. 23.

(*q*) Præf. ad thes. animal. 1.

(*r*) Medic. rat. t. 4. p. 2. f. 2. c. 3. in fin.

(*s*) Eph. n. c. dec. 3. a. 9. obf. 246.

(*t*) Cent. 4. hist. anat. 49.

(*u*) Eph. n. c. dec. 2. a. 7. obf. 136.

(*x*) Earund. dec. 1. a. 2. obf. 89.

(*y*) Epist. supra ad n. 13. cit.

“ that they had been very violent in the region of the liver, and had extended themselves towards the navel.” The cases propos’d by Vaterus (*z*), and still more by Bezoldus (*a*), I purposely pass over, on account of the magnitude of the calculi, which, though they certainly had their beginning in the gall-bladder, yet, as they might seem to have receiv’d their increase in the intestines, should have been then said to have come from thence, rather than from the common biliary canal. And Vaterus says that there had been “ very violent, and excruciating pains of the belly, which first occupied the region of the navel, and at length settled in the lumbar region.” And Bezoldus, that after the patients “ having been surprizingly harass’d for six years and more, with pains of the right hypochondrium,” a stone was at length discharg’d by the intestines, but “ not without griping pains.” You see then, that in all these observations, no pain is taken notice of, which had its seat about the ensiform cartilage.

Nor is any thing hinted in regard to such a pain, by the two Hoffmanns, Maurice, and Frederic. For the former (*b*), though it is true he mentions “ the anterior parts,” yet mentions them in such a manner, as to say that there had been “ a long-contin’d vellicating pain, with tension, under the right hypochondrium, which was troublesome towards the anterior parts.” And although the latter (*c*), besides “ an intolerable pain in the right side, and under the false ribs,” adds the following words; “ about the scrobiculus cordis was a violent oppressive pain, which even extended itself into the umbilical region;” yet the scrobiculus cordis does not comprehend the ensiform cartilage, or if you would have it comprehended in these words, you must then call to mind, that in this observation, the question is not of a “ calculus,” but of “ bilious fordes stopping up the ductus choledocus;” so that by this means those things might rather be confirm’d, which I have advanc’d above (*d*), in regard to the ambiguity that must be the consequence of this symptom, which is certainly, also, the consequence of other symptoms, in the next observation of Hoffmann (*e*).

However, in the last (*f*), where the question is of calculi obstructing that duct, he mentions “ an acute, and almost intolerable pain, deeply fix’d in the region of the liver, with pains of the intestines, which were troublesome now and then, and remitted at intervals.” Finally, turn to those things that are written by the very skilful archiater Van Swieten (*g*), where he tells us what he has observ’d to happen at this time; you will find not a word of pain at the ensiform cartilage. And as upon duly considering all the observations that I have produc’d, you will observe that the pain was never extended to that cartilage, but to the navel, or the umbilical region, more than once, if you should happen to prefer taking the explication, not from the intestinum jejunum, into which the duodenum is continu’d, but from that part of the ligamentum suspensorium of the liver which is better known to Eustachius (*b*), than to Reverhorst (*i*), and accompanies the umbilical

(*z*) Differt. qua obs. rariff. calcul. obs. 3.

(*a*) Diff. de coelitho cas. 2.

(*b*) Eph. n. c. dec. 2. a. 7. obser. 244.

(*c*) Paulo ante cit. capite 3. obs. 4.

(*d*) N. 40.

(*e*) C. eod. 3. obs. 5.

(*f*) Ibid. obs. 6.

(*g*) Comment. supra ad n. 15. cit. §. 950.

(*b*) Tab. anat. 2. fig. 3 & 4.

(*i*) Diff. de motu bilis. fig. 1.

ligament, or even from this ligament itself, you are at the same freedom to do it for me, as from the other part of the ligamentum suspensorium, when the pain shall, at any time, extend itself to the ensiform cartilage, as has been observ'd by others.

43. If, therefore, biliary calculi, as has been demonstrat'd hitherto, and will be confirm'd presently (*k*), do not discover themselves, by any constant, and peculiar symptoms, even when they are so far from being in a state of rest, that they are endeavouring to procure a discharge for themselves, how much less will they be able to do that, when they are in a perfect state of rest, in their vesicle?

But you will say that the symptoms of calculi, inherent in the kidneys, and urinary bladder, also, are very frequently ambiguous, and yet not held in contempt by physicians, in so great an obscurity of things. Nor do I despise the symptoms that have been advanc'd, as marks of the existence of cystic calculi; but I complain (*l*) that they are more proper to make us suspect their existence, than to convince us that they actually do exist. Yet if we are to insist upon suspicions, I not only commend those who endeavour to add some weight to these suspicions, by increasing the number of the symptoms, but, amongst them, I also take the liberty to mention myself.

Therefore, although I know that stones of the cyst are not always join'd with bile, which resembles fordes, nor always with urinary calculi, yet I believe that the suspicion of Sylvius, which you even have in the Sepulchretum (*m*), is not altogether to be despis'd, who fears lest those that vomit bile of this kind, should have concretions in the gall-bladder; and that another suspicion of my own ought not to be concealed. For I having, besides those that I formerly mention'd (*n*), as seen by me, seen others also, and read of others, that have been subject to bilious, and urinary calculi, at the same time: and as in turning over the observations, which I have in part made use of in this letter, I met with a great number likewise; I easily perceiv'd that these things did not happen by chance. Of those who I have read were thus affected, I will not omit one, who deserves to be taken notice of, in preference to the rest, on account of his merits in the medical faculty, I mean Michael Mercati (*o*). This gentleman having died of nephritic tortures, and having two stones, of a considerable size, sticking in his ureters, and in his kidneys sixty-three, which were all pretty small, or some of them only, as his preceptor Cæsalpinus has written, large, had, also, in his gall-bladder (although, as they take notice, he had never been attack'd with the jaundice) six and thirty of an obscure colour, angular in their figure, and of the bigness of a vetch.

And who is there, that; reading these things of Mercati, and in that great number of observations moreover, that the bishop, mention'd by Lælius a Fonte (*p*), was wont frequently to labour under the stone of the kidneys, that the count of Hoehstetter (*q*) had a stone, and fabulous formations therein, that the cooper of Wepfer (*r*) had a small stone,

(*k*) N. 44. & seq.

(*l*) Vid. n. 36.

(*m*) L. 3. f. 18. obs. 9.

(*n*) Epiſt. anat. 1. n. 48.

(*o*) Vid. ejus vitam & testimonia, metallothecæ ejusd. Vaticanæ præfixa.

(*p*) Conf. cit. supra ad n. 31.

(*q*) Caf. cit. supra ad n. 17.

(*r*) Hist. cit. supra ad n. 20.

in a papillary caruncle of one kidney, that the woman of Borrichius (*s*) had discharg'd calculi from both bladders, that another of Morton (*t*) had one kidney fill'd therewith, that the old man of Reverhorst (*u*) had the same in his kidneys, and urinary bladder; will not suspect the causes to be similar?

And lest you should be inclin'd to suppose that this happen'd only in old persons, take notice, I beg of you, that a virgin of eighteen years of age, spoken of by Bonetus (*x*), had a stone taken from her by the lithotomist, of the bigness of a goose's egg: add to this that Bergerus (*y*) had found calculi in both the bladders of a counsellor at law; Lancisi (*z*), also, in the kidney of that excellent man Horatio Albani, both a large stone, and many small ones; and, finally, that Hoffmann (*a*) found one, which was not small in its size, in the kidney of a gentleman, and one much larger in the urinary bladder.

For I shall, designedly, take no notice of a great number of other authors, and among these Jo. Bapt. Contulus (*b*), Christophor. Cunradus (*c*), Vitus Riedlinus (*d*), Tob. Ferd. Pauli (*e*), Jo. Caspar. Grimmus (*f*), Jo. Sebastian Albrechtus (*g*), Jo. Jacob. Trelyngius (*h*), Christoph. Jac. Trew (*i*), who observ'd the same in two bodies, Jo. Storck (*k*), and Isr. Cregutus (*l*): these, I say, and others (*m*), I shall omit; since besides Baglivi (*n*), who so far considers this as what generally happens, that he has enquir'd into the reason, "why, when there are calculi in the gall-bladder, they also are generated in the urinary bladder, and vice versa," the testimony of Abraham Vater alone (*o*) may pass for many, who expressly affirms, "that calculi have, beyond a doubt, been very frequently observ'd in the gall-bladder, in those who have, at the same time, labour'd under a calculus of the urinary passages."

Who then can read such testimonies, and attend to so many similar cases, without immediately conceiving with Vaterus, "that the causes" of both species of calculi are, in a great measure, "evidently common to each other?" And if you take this for granted, you will, doubtless, begin to think with me, that when to the other marks of bilious calculi, this also shall be added, that the patient is subject to calculi of the urinary passages, some weight will be given to the other suspicions; especially if, according to what has been observ'd above (*p*), this patient is neither an infant, nor a child, but is already in a middle age, or advanc'd in life: which remark, drawn from the age of the patient, may, if join'd with others, help us to distinguish intestinal calculi, that have been discharg'd by stool, from such as are generated in the liver.

Thus the celebrated Carlius (*q*), when he had not believ'd that a certain

(*s*) Vid. Bartholin. act. Hafn. vol. 5. obf. 65.

(*t*) Phthisiolog. l. 3. c. 14. hist. 5.

(*u*) Diff. supra ad n. 42. cit. §. 56.

(*x*) Sepulchr. l. 2. f. 4. obf. 35.

(*y*) Physiolog. l. 1. c. 14.

(*z*) Oper. tom. 2. diff. 10.

(*a*) Cap. 3. supra ad n. 42. cit. obf. 1.

(*b*) De lapid. c. 25.

(*c*) Eph. n. c. dec. 3. a. 9 & 10. in obf. 171.

(*d*) Earund. cent. 3. obf. 45.

(*e*) Earund. cent. 9. obf. 76.

(*f*) Act. n. c. tom. 1. obf. 20.

(*g*) Eorund. t. 4. obf. 49.

(*h*) Eorund. t. 5. obf. 129.

(*i*) Commerc. litter. a. 1734. hebd. 6. n. 5. & a. 1743. hebd. 32. n. 3.

(*k*) Commerc. litter. a. 1735. hebd. 52. n. 4.

(*l*) Differt. de calc. in corp. hum. generat. & c. §. 31. in fin.

(*m*) Vid. epist. 57. n. 12.

(*n*) De experim. circa bilem.

(*o*) Diff. cit. supra ad n. 16. thes. 8.

(*p*) N. 15.

(*q*) Commerc. litter. a. 1731. specimen. 51.

n. L.

calculus, which was reckon'd among cystic calculi, and which had been discharg'd among the fæces, by a boy of eighteen years of age, did really belong to that class, for this reason "in particular, because such an age does not naturally bring on a disposition of that kind" (and it certainly does not, except very rarely, which is one point, wherein bilious, and urinary, calculi do not agree with each other) knew afterwards, that the liver of this young man, who had died of a dysentery, was found to be as found as that of the most "healthy young animal can be:" whereas the calculus "of two ounces and a half in weight," for such it was, though it might have receiv'd the greater part of its increase in the intestines, would, at least, have left some trace of its former residence, and passage, in the gall-bladder, and the ducts affix'd to the liver.

44. But although the marks of bilious calculi, which I have taken notice of, are, as appears from those things that I have hitherto said, as Hoffmann admonishes (*r*), "to be taken and consider'd collectively:" and as all these marks cannot exist in all persons, the greater part of them, at least, and among these the principal are to be attended to (by the principal, I mean those which are wont to be the more frequently observ'd, as, for instance, when stones descend into the ductus communis, there is certainly a pain seated on the right side, a jaundice, vomiting, anxiety, relapse; for so I have in general observ'd, in many of those observations that are pointed out above (*s*)) although, I say, we must proceed in the manner I have said, yet we ought never to forget, how easily a deception may happen.

For if you compare with the greater part, or the principal of these marks, these two observations of Hoffmann, which I even refer'd to before (*t*), you will find that my surmises are not without foundation. And you will perceive the same thing, when, after having said (*u*) "that there are some symptoms which prove the existence of calculi, in the biliary ducts, that are by no means fallacious," and enumerated the chief of them, he presently (*x*) produces the signs of a very large calculus, sticking in the gall-bladder; but especially, when he describes the symptoms (*y*) of a jaundice, which was not brought on by any calculus, but only by a spasmodic "stricture."

Yet it not uncommonly happens, that as in urinary calculi, so in biliary also, we have a mark of their existence which is much more to be depended upon than the others; I mean when any one of these concretions, or some fragment of them, at least, is discharg'd. And as this very sign, which is evident even from the natural light of reason, was mention'd by others before, and among these by Vaterus (*z*), but particularly, and fully, by Vallisneri (*a*), it may seem very surprising to any one, why it is omitted by Hoffmann, among those signs that are "by no means fallacious;" especially as, five years before, this very author had taught the following things (*b*),

(*r*) Cap. 3. supra ad, n. 43. cit. §. 15.

(*s*) N. 42.

(*t*) N. eod. id. est. obs. 4 & 5.

(*u*) Ejusd. tom. 4. p. 4. c. 12. §. 13.

(*x*) §. 17.

(*y*) Obs. 1.

(*z*) Diff. supra ad n. 16. cit. thes. 12.

(*a*) Epist. supra ad n. 13. cit. adnot. 1.

(*b*) Tom. 4. paulo ante cit. p. 2. c. 3. §. 18.

“ but among all these signs, which I have already admonish’d you of, there
 “ is none more certain, whereby to judge of violent affections proceeding
 “ from the biliary calculi, than the discharge thereof, together with the in-
 “ testinal fæces; and then, just as it happens, in the case of renal calculi,
 “ when they have been carried down from the ureters, into the bladder, all
 “ the pains, together with the other violent affections, instantly and totally
 “ cease, and expire, at least if you except the jaundice, which does not im-
 “ mediately, but gradually disappear.”

When, therefore, the signs of calculi having intruded themselves into the biliary ducts, and endeavouring to procure an exit for themselves into the intestinum duodenum, have preceded; if among the fæces discharg’d from the intestines, which ought then to be carefully wash’d by servants, and, according to the admonition of Vallisneri, pass’d through a kind of sieve, any biliary calculus be found, it is not to be doubted, but this sign must throw such a light upon the case, as could not be hop’d from so many other marks, that are, at best, but uncertain, and, in some measure, obscure.

45. But there is need of caution, lest we should happen, at any time, to take an intestinal calculus for a biliary one, or, that all the ambiguity of words may be avoided here, for an hepatic calculus, that is a stone which is generated in the canals of the liver, or its appendage the gall-bladder.

There is a certain observation in Hoffmann (*c*), of twenty stones being discharg’d by vomiting; in regard to which, although he did not think it altogether incredible, that they should have proceeded from the biliary ducts, he, nevertheless, rather suppos’d them “ to have been generated from the succive, and alternate, concretions of very viscid, and earthy bile, in the flexure “ of the intestinum duodenum itself:” for they were angular, and of a yellow colour inclining to green; and of such a magnitude, that without excruciating pains in the right side of the belly, none of which had preceded, it did not seem possible for them to have pass’d through the ductus communis.

Yet a jaundice had preceded the discharge of these stones, and “ immedi-
 “ ately” after this discharge, which ought to seem very astonishing to those who attend to the exception of Hoffmann, just now mention’d (*d*), “ was remov’d.” If, therefore, as they prevented the passage of the bile into the duodenum by their obstruction, so the bile either naturally, or by stagnation, was made acrid, or these calculi had very acute angles, you readily perceive, that not only a jaundice, but pains in the right side also, and other symptoms that are the consequences of them, might have been previously caus’d by them, and even have been remov’d by their discharge.

But it is rather possible that these symptoms may be join’d together, than frequent: and no pains of the right side having preceded, in the observation in question, might have render’d the physician sufficiently cautious. The absence of which, or of the jaundice, and still more of both, ought in like manner to render him cautious, when calculi, which might otherwise seem to be cystic, are discharg’d from the intestines, as in those examples that will be immediately pointed out. And first, three calculi occur to my mind

(*c*) Ibid. obs. 2.

(*d*) N. 44.

(*e*)

(e) (f) (g), that were discharg'd in the manner I have mention'd ; of which, whether you attend to the globular, or oval figure, to the external, or internal colour, and some other circumstances, you certainly will not be forward to deny that they might be cystic calculi, particularly if you call to mind that some very similar have been, at times, found in the gall-bladder : yet when you read that there had been gripings and pains of the belly, but none in the right hypochondrium, and even that, in one instance, there were oppressive pains in the iliac region, you will believe that they were intestinal calculi, and that so much the more readily, as you will see that not a jaundice, but a volvulus, is taken notice of, in each of these three cases.

Three other instances succeed. In regard to the first of which (b), if it made any mention of the jaundice, and did not say that the stones were discharg'd "without any pains," their description would so much the more incline us to take them for cystic calculi ; as, in their size, they were by no means to be compar'd with those that are mention'd in the three former, and in as many subsequent, examples. The second of these (i) mentions colic pains indeed ; but not in the right hypochondrium, nor join'd with a jaundice. For which reason I should more readily suppose, with the observer of this instance, that the calculus, although furnish'd with concentric shells, as the figure shows, and internally, and externally, yellow, had been generated in some intestine, pretty near to the entrance of the bile.

So in the third example (k), I agree with the celebrated Albrechtus, who supposes the calculi to have been form'd in the intestinum colon ; which calculi he, nevertheless, describes, of a triangular figure, swimming in water, and inflammable : I agree, I say, not so much because they contain'd, under an obscure external yellowness, a very white matter which was, however, solid, "like pretty hard soap," as because a violent pain was not wanting in the right hypochondrium. But, to take no notice of "the odour of impure lard," which proceeded from them in burning, and other circumstances, I do not see that any thing is any where observ'd in relation to the jaundice.

Finally, out of the four examples which I, at present, chuse to add, if the calculus which is so slightly mention'd by the celebrated God. Guil. Muller (l), as to call it "bilious," and to represent it as being form'd of strata, which inclos'd each other, could have been describ'd more fully, and we could have known with what previous, or concomitant, symptoms it had been discharg'd, perhaps I should admit it without any doubt : as I do certainly admit those, that the celebrated Jo. Phil. Burggrave (m) describes, as being discharg'd after violent, and those returning, pains of the right hypochondrium, not without an icteric colour, both in the face and in the urine. And some that were seen by the celebrated Brunnerus (n), although they were without a jaundice, we must, of course, admit for this reason, because by dissection, he found them already begun in the liver.

That is to say, a man having been troubled, almost ten years, with a con-

(e) *Commerc. litter. a.* 1740. hebd. 19. n. 2.

(f) *Eph. n. c. dec. 3. a. 3.* obf. 21.

(g) *Act. n. c. tom. 7.* obf. 100.

(b) *Eorund. t. 3.* obf. 82.

(i) *Eorund. t. 8.* obf. 121.

(k) *Eorund. t. 3.* obf. 57.

(l) *Eorund. t. 6.* obf. 69. circa medium.

(m) *Eorund. t. 5.* obf. 78.

(n) *Commerc. litter. a.* 1738. hebd. 18. n. 1.

stant pain of the belly, and particularly of the right hypochondrium, which at first was heavy, and obtuse, though attended with tension, but afterwards, at times, became acute, and, at length, very severe, nor chang'd its situation from the right hypochondrium, so as to be at last intolerable, discharg'd light, and yellow calculi, which were of a lamellated structure, and angular in their figure. This man dying after three days, had in his gall-bladder, which was enlarg'd, a mass of a dark red colour, inclining to blue, and green, and soft in its consistence; and in the middle of the cystic duct, and in the common duct, where it opens obliquely into the intestinum duodenum, a matter adher'd, which was somewhat less soft indeed, but, nevertheless, form'd by those ducts, into two "oblong and rounded" globules: finally, in the colon were found fifteen calculi compacted into one globe, but easily separable, and not yet so hard as those which had been discharg'd by stool.

It could not, therefore, be denied that these had been begun in the biliary ducts; and that having become, by degrees, less soft, they were, at length, harden'd by their abode in the intestines. And if "through the whole of the disease, no sign of a jaundice manifested itself," either suppose that the matter was certainly more soft in the living body, than on the third day after death, when it was found in the ducts; and that therefore it not altogether obstructed the discharge of the bile, and had, perhaps, created pains by its acrimony, more than by its obstruction: or call to mind those things which I have hinted above (o), in a singular case of this kind, in order to conceive, that even when the common duct is obstructed, a jaundice may sometimes be absent. And in consideration of this it was, I just now said that the absence of the jaundice, but still more the absence of both jaundice, and pain, on the right side, ought to render the physician cautious, and make him attend to all the other symptoms, united, before he pronounces any thing.

Wherefore, to subjoin the fourth example, I shall not very readily exclude from the number of hepatic calculi, those which Fr. Slare (p) saw, and which were discharg'd by a noble woman, "who had been very much excruciated with "hepatic pains," at two different times, and in a few hours after the pain: for although in writing the case with brevity, as frequently happens, he has, perhaps, omitted what related to the jaundice, yet he has not omitted the odour of the calculi (that is when burnt) their colour, their taste, agreeing with that of bile, and besides these their lightness in water, and their inflammability. And I could wish that these two last-mention'd marks were either never at all observ'd in intestinal calculi, or at least always in hepatic; it would certainly be much more easy for physicians to take care, lest the one, as Matthiolus formerly fear'd (q), should be taken for the other.¹

But it has been shown, that those two signs, which most physicians made use of, with Reverhorst (r), are frequently fallacious. And if Vallisneri admonish'd us to beware (s), lest any calculi should be hastily thrown out from the number of hepatic calculi, for this reason, because they neither

(o) N. 34.

(p) Vid. commerc. litt. 2. 1735. hebd. 5. in
2dnot. ad n. 2.

(q) L. 5. epist. med. 3.

(r) Vid. supra n. 25. 26.

(s) Adnot. 1. cit. supra ad n. 44.

swam in water, nor were inflammable; and this at a time when we had begun to weaken the credit of these signs, by a very few experiments only; how much more does it behove us to beware at present, when the experiments have multiplied upon us, to such a degree, that it does not seem possible to reduce the exceptions to any certain heads (*t*).

And how much cystic calculi may vary, not only in colour, and form, but even in the very external, and internal structure, and in the mode of their substance likewise, so as to be even sometimes pellucid, has been accurately remark'd above (*u*); left if any should, at times, occur, which differ in some respects, or even considerably, from the common appearance of biliary calculi, you immediately pronounce that they are not hepatic; and that you may previously, and particularly, consider the other properties, and well weigh all the symptoms, which have preceded, accompanied, or been the consequents of their excretion.

46. Nor indeed need the magnitude itself, to say nothing of the immense number, always deter you from supposing them to be hepatic. That the calculus was, without doubt, "of a surprizing magnitude," which a certain woman had discharg'd by stool, Vaterus (*x*) testifies: and yet the woman dying a little after its discharge, five others, of a lesser size, were found in her gall-bladder, being "of such a figure that it might be seen how they had " adher'd to that larger one," which resembled a little heart. You see, therefore, that this had all been in the cyst with them; and that its magnitude was no hindrance to its being discharg'd from thence, and coming down into the cavity of the intestines.

That also was large, inasmuch as it "equal'd the joint of a man's thumb," which the mother-in-law of the celebrated Van Swieten (*y*), who was liable to periodical paroxysms of the jaundice, discharg'd from the intestines, at the end of two days, after very severe, and excruciating, pains in the seat of the duodenum itself; and which was hollow'd out into two cavities on its surface, that shew'd two calculi still to remain, which were, themselves, also discharg'd afterwards, being not much less in size than the former. And yet the great bulk of this calculus had not prevented it from struggling through the narrow passages of the ducts.

Nor is it to be wonder'd at: for although the ductus choledocus is narrow, although the cystic is still more narrow, and the passage of it impeded by valves, they are nevertheless membranous, and, for that reason, can bear almost incredible dilatation. And from this cause it was that Bezoldus (*z*), found the cystic duct "eight times larger than it generally is, so as to equal " the thickness of a man's thumb; and in the middle of its length, a calculus of a remarkable size." And I myself, as is said elsewhere (*a*), have seen, "the common and cystic ducts, and the hepatic quite within the liver, " so dilated as to have a circumference equal to two inches," in an old man, in whose cyst, but particularly in the branches of the hepatic duct, I found calculi.

(*t*) N. 25. 26.

(*u*) N. 16. & seq.

(*x*) Diff. supra ad n. 16. cit. thes. 3.

(*y*) Comment. supra ad n. 15. cit. §. 950.

(*z*) Diff. de cholelitho cas. 1. n. 5.

(*a*) Epist. anat. 1. n. 43.

But in a woman whose gall-bladder contain'd a large calculus, although not yet quite indurated, the orifice of the common canal, where it opens into the duodenum, which is, at other times, very narrow, was seen, by Heister (*b*), to be so dilated, "that it could with ease admit the little finger of a man." And Hen. Albertus Nicolai (*c*), having found the same canal expanded quite to the gall-bladder, "in a very extraordinary manner," found the orifice no less open than it was found by Heister. But the younger du Verney (*d*) had even seen it larger. And Trew (*e*) had seen it very lax in a body, wherein the biliary ducts were equally dilated: the diameter of which, was found to be three times larger than it naturally is, by Kniphofius (*f*).

Other observations of this kind, which were at hand, I omit to mention; for these that I have mention'd, are not only sufficient, but I shall produce some presently (*g*), among which there will be one instance of a much greater dilatation. Since, therefore, these canals may be so dilated, and are found to be so dilated, there is no reason why we should doubt that gall-stones, even when they are of a considerable size, may pass through them; except when those pains in the right hypochondrium, which are the natural effects of such a dilatation, have not preceded. Wherefore as I commend Hoffmann, when speaking of those twenty stones of a remarkable size (*b*), for not supposing it altogether incredible, that in the ducts whereof I speak, "very small bilious calculi might first adhere, and, by degrees, get an increase from the bile which flow'd by them, and a great dilatation of these ducts being successively made, be obstructed there, for a long time;" so again I commend the same author, even still more, because he has shown himself to be doubtful, and even more inclin'd to the contrary opinion, for this reason, because these stones had been discharg'd, "without any violent pains of the right side having preceded."

I also set down as commendable in Bezoldus (*i*), that though pains of the right hypochondrium had, for the space of six years and more, preceded the discharge of a gall-stone; and although he, himself, and not without reason, judg'd it to have proceeded from the biliary ducts; yet he profess'd that he would "not obstinately adhere to the opinion," I suppose because there had not been an unusual severity of pain in that part, and greater than at any other time, when the stone, having, at length, overcome the narrow passages of the orifice of the ductus communis, suddenly burst forth into the intestine; or, at least, because there had been no exacerbation of pain, in proportion to the great bulk of the stone: and if it had been confin'd in these ducts so long a time, it certainly could not but have brought on a jaundice, unless some extraordinary disposition of the ducts be suppos'd; yet there is not a word said of either of these appearances.

I wish I could speak equally in commendation of Abraham Vater (*k*), in other respects a learned, and sagacious physician, who does not doubt but two calculi "of a considerable magnitude," that were discharg'd by stool,

(*b*) Aët. n. c. tom. 1. obs. 181.

(*c*) Commerc. litt. a. 1732. hebdom. 33. n. 11.

sub. 4.

(*d*) Loco indicat. supra ad n. 13.

(*e*) Aët. n. c. tom. 4. obs. 140.

(*f*) Eorund. t. 8. obs. 30.

(*g*) N. 47.

(*h*) Obs. supra ad n. 46. cit.

(*i*) Diff. modo cit. cas. 2 & §. 7.

(*k*) Obs. 3. supra ad n. 42. cit. §. 2. & seq.

“ came quite from the gall-bladder, although “ neither pain, nor any other “ troublesome symptom, had been previously perceiv’d from them,” and though, even at the time, the excruciating pains of the belly were not seated in the right hypochondrium, but “ had first occupied the umbilical region, “ and, at length, fallen upon the region of the loins.” Yet he is not without his weight of reasons. But while among these, he produces examples of the very great dilatation of the very narrow osculum uteri in child-birth, and of the great distention of the slender ureters in calculous patients, it is surprising, it never occur’d to him, that neither the one, nor the other, is ever dilated, without severe pains.

47. However, let us see what may be said for Vaterus. An observation of Traffelmann is extant in Schenck (*l*), in which he describes “ the meatus of the bile, where it is inserted into the duodenum,” as he himself had found it, “ wide, inflated like a stomach, and fill’d on every side with “ calculi,” some larger, and some smaller. If you ask what was the proximate cause of the patient’s death (who was a man of princely rank); it was a coma vigil, degenerating into an apoplexy. If with what symptoms he was previously troubled, you will find nothing at all, beside an incredible thirst, wherewith he had been tortur’d all his life-time. And can you suppose, that the physician who made this observation, and who appears to have been a diligent man, would, if a jaundice, or any pain in the right hypochondrium, or if any other symptom, which related to the meatus of the bile being so distended with calculi, had afflicted his own prince, either have been ignorant of it, or have pass’d it over, in an observation which was not very short? But if you do not believe this, you must of course acknowledge, that besides another duct by which bile might be carried to the intestines, and a jaundice prevented, it is possible that the meatus choledocus may, by means of calculi, which were before very few, being gradually increas’d therein, both in number, and magnitude, be immoderately distended indeed, but so slowly, and gently, that the patient may not at all complain of it.

Yet whatever you may think of this case, you will always be of opinion with me, that these things are very rare, and will, at the same time, observe, that quite a different judgment is to be form’d of quiescent calculi, and of those which have pass’d through the streights of the whole cystic, and common duct, even to its termination, by force. I do not, however, require, that as in the observation of Tinctorius (*m*), after a pain of the right side, which was extended to the intestines, there be discharg’d, together with the calculi, “ a bloody and purulent matter;” it is sufficient for me, as it was for Bartholin (*n*), “ that the ductus choledocus alone was dilated,” which was seen by him, on a similar occasion; and as, sometimes, during this dilatation, when the calculi are confin’d in the narrow parts of the ducts, and begin to be mov’d from thence, the ducts are hurt by the angles of the calculi, and the discharge, at length, happens not without the rupture of an abscess, which was thus brought on, and an excretion of blood and pus by stool, so, for the

(*l*) Obs. med. l. 3. ubi de cholidocho meatu
obs. 3.

(*m*) Vid. supra n. 42.

(*n*) In ead. obs.

most part, this dilatation happens with much less violence, but scarcely ever without pain.

I have already describ'd in a former work (*o*), and taken notice of, even in the preceding letter (*p*), an observation of Valsalva, in which the upper part of the ductus choledocus communicated with the large cavity of an hepatic abscess, and the other part of it was enlarg'd so as to admit the finger, and, by this means, shew how in a living body, it could transmit more than two hundred vesicles, with which even then that abscess abounded, to the intestine. Of the many which had formerly been discharg'd by that meatus, it is probable that some had been obstructed in the narrow part of the duct, by coagula of blood, and that the bile, the passage of which was restrain'd, had by forcing from above downwards, together with the blood, dilated the canal.

This, however, is certain, that the morbus regius, vomitings, and pains, in particular, had preceded, which pains were so violent in the right hypochondrium, as frequently to excite the most severe distentions of the nerves. Which symptoms, and others there advanc'd, though you may in great measure refer to so very considerable a disease of the liver, yet if any one should choose to refer some part of them to the dilatation of the meatus choledocus, you certainly cannot deny the plausibility of his opinion. And if you do not deny that this may happen without pain, in a duct which is not irritated by angular, rough, and large stones, but even relax'd by blood, and ichorous matter, often flowing through it, consider whether you can possibly suppose, that the same can happen without pains when the lower streights of this duct have not been previously relax'd, but even contracted, from the irritations of the calculi?

48. Do not expect that I should make this letter, which is already too long, still longer, by adding many things in regard to the cure of this disease. Of which it will be sufficient to hint a few things. I have already said (*q*) that this disorder often recurs, nor is certainly known, unless when some calculus has been discharg'd, which previous pains about the region of the liver, had prov'd to have proceeded from thence. Therefore, one part of the cure will be to endeavour, when very sharp pains of this kind shall return, that the calculus may be dislodg'd from these streights. A second part, that if any other calculus remains, after this has been dislodg'd, it may, if possible, be dissolv'd. A third, to prevent the generation of new calculi. And each of these parts of the cure are to be attended to separately, and distinguish'd according to our position, nor ought the times, which belong to every one of them, be rashly confounded, as some seem to do, who heap up remedies promiscuously upon their patients; but the nature of the case, and the analogous cure of the urinary calculus, which is distinct in like manner, ought to be set before our eyes.

49. When the patient, then, is attack'd with these violent pains, we must do all in our power to appease them, not only to prevent his being rack'd, and falling into danger of inflammation, or distention of the nerves, but also

(*o*) Epist. 3. anat. n. 10.
(*p*) N. 10.

(*q*) N. 42 & 44.

that the calculus may get through the narrow passages. For the more this concretion, like a heterogenous body, irritates the ducts, the more the ducts are contracted upon the calculus, for which reason they both increase their own tortures, and prevent the passage of the stone. For this reason it is necessary to relax again and again: and to those things which are, of themselves, relaxing, and emollient, must be added, for the same end, diluters, demulcents, anodynes, and the most temperate antispasmodics, and, if intolerable pain compels you, even opiates.

Nor is it necessary to relax, only by internal remedies, but also by remedies externally applied, as far as it is in our power; I mean by the use of clysters, unctions, fomentations, and baths. To all which, where there is a fulness of blood, I do not see why venæsection should not be premis'd, not only to prevent the chance of an inflammation being brought on, but also to prevent the passages from being streighten'd, by the turgescency of the small vessels. Moreover, as I recommend every thing that may relax, so I violently suspect every thing that can irritate. For the detriment which they bring, by forcing the ducts to contract themselves, and become still narrower, is certain; and the advantage which many expect from the impulsion, and extrusion, of the calculus, uncertain.

Yet there are, you will say, instances of calculi reported, which powerful impellents, or strong emetics, and purgatives, have dislodg'd. I grant it. But who dares, purposely, to imitate the happy rashness of a case, without knowing (and who can for certain know?) that the passages are, already, sufficiently relax'd, so that nothing but the last impulsion, and agitation, is wanting; and that the case, at present, is not quite the reverse, so that by this rash and hasty method, the calculus must be thrown into streights, from whence nothing can dislodge it; by which, not only the pains become more excruciating, but the danger is greatly increas'd.

And indeed I see Hoffmann asserting (*r*), that emetics "are often found to be highly pernicious, if a calculus, inherent in the ductus cysticus, produces very grievous anxieties about the præcordia;" and Reverhorst (*s*), "readily confessing," that emetics "are a doubtful kind of remedy," whatever duct is obstructed by the calculus; and, finally, Scheffelius (*t*), purposely to omit others, for the sake of brevity, expressly says, in regard to purging medicines: "this I certainly would not imitate, as I should fear lest the calculi were so situated, at the same time, that they could not be expell'd, but might be disturb'd in their situation, and the pains from thence, exasperated," which even anger alone, as he immediately shows, and not only the stimulus of purging medicines, easily excites.

50. You perceive that he speaks of purging medicines, at the time, also, when the pains have ceas'd, by reason of the calculus being discharg'd: which is the second part of the cure. And I would, even then, abstain from purgatives, for the reasons just now mention'd, and would rather cleanse the intestines, by more mild remedies, lest the calculus that has been thrown into their canal, should happen to be obstructed there, and get such an in-

(*r*) C. 12. supra ad n. 44. cit. in cautel. §. 1. (*t*) Diff. supra ad n. 13. cit. §. 30.

(*s*) Differt. supra ad n. 16. cit. §. 66.

crease of bulk, as would make it, some time or other, hurtful to the patient. And I would have you beware of calling me a too timid practitioner, for this reason, or if you choose it, even call me so; for I am less afraid of this, than of being call'd a very bold one, or, at least, in this species of disorder, in particular, wherein, as is demonstrated above (*u*), frequently no kind of inconvenience is perceiv'd, when the calculi are in a state of rest. For which reason I would have you cease to wonder, that in this second part of the cure, I have omitted the consideration of impellents, and have only propos'd this one thing to be done, I mean that if any calculus should happen to remain, it may be dissolv'd, provided it be possible to dissolve it.

It does not, however, escape me, how little the remedies, recommended for this purpose, generally answer the expectations of the patient, or the promises of the practitioner, whether they are of a mild kind, which I would willingly admit,¹ or of a very acrid nature, or in any measure irritating, which I would shun. Nor is it to be wonder'd at; since even out of the body, the calculi which are long preserv'd in those fluids, by which, within the body, they are suppos'd to be dissolv'd, are by no means dissolv'd, unless they happen to be of the softer kind, such as Borrichius (*x*) saw "almost wholly dissolv'd in warm water," and after him Hoffmann (*y*); and I, even in water which was not warm, have seen them contract fissures, and burst into fragments, as I have written to Schroeckius (*z*). And they even sometimes, of themselves, break asunder into small pieces, as I have observ'd in some black ones; or even melt into a moisture, as that which Lanzonus (*a*) observ'd "to be spontaneously dissolv'd, into a green liquor."

For although, in order to describe this calculus, he says that "he had found the whole of the bilious juice to be stony," he has either abus'd the word "stony," in order to say that the bile was converted into a calculus, or the crust seem'd in great part to be stony, whereas the internal substance was very soft. On the contrary, the juncture may be very soft, and the substance, nevertheless, extremely compact. Thus Platner (*b*) saw that the fragments of a calculus, which, not being very close, "had soon fallen into pieces, could neither be dissolv'd by warm water, nor by spirit of wine, although they were steep'd in these liquors, for several days together, in a warm place." So also Bezoldus (*c*), having left little pieces of calculi, both in warm water, and spirit of wine, even rectified for some time, did not see that they were "entirely dissolv'd." Nor did Hoffmann (*d*) see "that gall-stones, which were of a more solid texture, and saturated colour," were dissolv'd in this manner.

Vallisneri (*e*), on the other hand, has experienc'd that they are dissolv'd by no liquor more easily, than by rectified spirits of wine made hot, and the spirit of turpentine. And in regard to the spirit of wine, he has the author of whom Haller (*f*) speaks agreeing with him; but some dissent from him in regard to the other spirit, and amongst these Tacconus (*g*), who entirely

(*u*) N. 37. 33.

(*x*) Apud Bartholin. cent. 3. epist. med. 85.

(*y*) Cap. 3. supra ad n. 44. cit. §. 6.

(*z*) Obs. supra indic. ad n. 20.

(*a*) Eph. n. c. cent. 3. obs. 62.

(*b*) Progr. supra ad n. 17. cit.

(*c*) Diff. de cholelitho §. 5.

(*d*) §. 6. paulo ante cit.

(*e*) Epist. supra ad n. 13. cit.

(*f*) Nota "i" supra ad n. 25. cit.

(*g*) Supra ad n. 16. cit.

differs in respect to them both. The same author; not to be too prolix, since you may, of yourself, see in the authors, whose names I have mention'd, and in others also, such experiments made with these and other liquors; the same author, I say, although he had seen one of those calculi, of which he has first spoken, that he had thrown into spirit of nitre, "become very tender," nevertheless affirms of those which he speaks of last, that they "were not at all chang'd" by that spirit, which both Vallisneri (*b*), and Bezoldus (*i*), had, in like manner, observ'd.

From these varieties you will, moreover, learn this circumstance, that we should not know what lithontriptic we ought to use, in this, or in that particular case, if it were certain, that these calculi, as they are, for the most part, less hard, and more friable, than the urinary calculi, so they are more easily dissolv'd by their peculiar lithontriptics: although in comparing both together, not only the substance, and the adhesion, or joining, of the parts are to be consider'd, but also how much sooner the dissolvent liquor, and how much greater a quantity of it, is carried to the urinary passages than to the biliary.

And on account of this animadversion it was, that, although in the first part of this cure, very large draughts of warm water are propos'd by many, I said nothing thereof, which is a subject I should not have been silent upon, if the same were propos'd, when a calculus was confin'd in the kidneys, or ureters. Yet if you ask which I would select in particular, out of such a number of different remedies, that are promiscuously recommended by many, in this second part of the cure; no others more readily, I shall answer, than those which are the most incapable of doing harm; as, for instance, the juice of taraxacum, since with this Boerhaave is said, by his disciple Scheffelius (*k*), "to have often cur'd the calculus of the liver successfully," or of fresh grass, which has been celebrated by every body, since Glisson (*l*), and Sylvius (*m*), for this purpose. And certainly the illustrious Van Swieten (*n*), has shown what may be done in such a case, by this one herb alone, from the example of a certain pauper.

This author, also, having overcome this disorder in others, likewise, by decoctions of grass, and taraxacum, and by other things taken constantly, for a long time together, says, "that he had then always found calculi, or, at least, calculous coagula, in a very considerable quantity, in the stools." And although he confesses, that he was not, for this reason, certain that these were "the parts of comminuted calculi," rather than the small beginnings of new calculi, such as I have more than once demonstrated, above (*o*), to be found in the cyst; yet the observations of Glisson, which he himself also allows of, sufficiently show that those calculous tubuli (*p*) which are form'd in the biliary passages, of oxen, in the winter, are dissolv'd by feeding on fresh grass; for otherwise, he would not have found these tubuli frequently "about the time of Lent, or Easter only, or before," but afterwards equally.

(*b*) Epist. cit.

(*i*) Diff. cit. §. 6.

(*k*) Dissert. supra ad n. 13, cit. §. 31.

(*l*) Anat. hepat. c. 7.

(*m*) Prax. med. l. 1. c. 45. n. 13.

(*n*) §. cit. supra ad n. 46.

(*o*) N. 19.

(*p*) Vid supra, n. 12.

51. Finally, the third part of the cure will prevent new calculi being generated, in the first place, if it shall be able to amend whatever disorders there may be in the liver, and, in like manner, in the blood, upon which the production of calculi depends: in the second place, if it remove those things by which these disorders are us'd to be brought on. These disorders in the liver, are a weakness, laxity, obstruction, and other things of the like kind; and in the blood a quantity of viscid and earthy particles, and a slow propulsion thereof, especially through the liver. Moreover, these disorders are brought on by the too frequent use of unwholesome meats, and drinks; by the bad digestion of the same; by the quantity of diluting liquors not answering to the quantity of food taken in; by too much sleep; by a sedentary life; especially by bending the body too much forwards; by violent passions of the mind, and any other causes which you see plainly, of yourself, ought to be remov'd by the physician.

But, without doubt, this part of the cure is sufficiently treated of by many. Yet as it very often happens, either by the conformity of the patient not being sufficiently continu'd, or by the difficulty of bringing back the liver to its perfect sound state, just as we see in the case of urinary calculi, that new ones are generated; nevertheless, it will, at least, be worth while to endeavour, that, as far as is possible, the canals of the bile may be preserved soft, and lax, that they may not give great resistance to the new calculi which are to pass through them, but may easily yield; and this will be brought about, by means of a continual, but moderate, use of diluters.

52. As to the lithotomy which has also lately been thought of, in the gall-bladder, do not be surpriz'd that I made no mention of it above. For, in the first place, the pains which are excited by gall-stones, that are endeavouring to discharge themselves, are not only brought on by those which come from the cyst, but also by those that come from the hepatic duct. In the second place, those cystic stones which are the largest, and on account of which this lithotomy seems, to some persons, to be chiefly desirable, neither endeavour to disengage themselves, nor create any great uneasiness; or, at least, for the most part. And to these we may add, that unless some accident has united the gall-bladder with the peritonæum, the cutting of it is destructive; and although this connexion has taken place, in some bodies, from the effect of disease, in which chance gave occasion to suggest this new species of lithotomy, as it often has suggested other things, yet how seldom such a connexion is met with, even in a morbid state of these parts, is well known to anatomists: and surgeons know very well, how difficult it is to be certain when it does really exist.

Last of all, although there were no danger in cutting, can you suppose there would be no great difficulty in healing the wound? We have, before our eyes, examples of three women, one of Bologna (*q*), of Francfort (*r*), and of Gottingen (*s*), in whom a tumour, having arisen in the epigastrium, and being open'd, either by art, or spontaneously, discharg'd cystic calculi at its aperture. I read that the first was cur'd: that the second had a fistula left, by which a thin and chylous kind of liquor, but of a yellow colour, distill'd:

(*q*) Vid. Taccon. supra ad n. 16. cit.

(*r*) Act. n. c. tom. 6. obs. 69.