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Received December 22, 1902.



~~Dr Gerard van Swieten~~
THE
COMMENTARIES
UPON THE
APHORISMS

OF

Dr HERMAN BOERHAAVE,
The late Learned Professor of Physick in the
University of LEYDEN;

CONCERNING

The KNOWLEDGE and CURE of the several
DISEASES incident to HUMAN BODIES.

By GERARD van SWIETEN, M. D.
Principal Physician to the Queen of HUNGARY.

V O L. VI.

Of febrile Thirst, Loathings, Flatulencies, Vo-
mitings, Weakness, Heat, Delirium, Coma,
Convulsions, Sweats, Diarrhœas, and Eruptions.

Translated into ENGLISH.

L O N D O N :

Printed for J. KNAPTON, in Ludgate-Street.
MDCCLVII.



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THE

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COMMENTARIES

UPON THE

APHORISMS

HERMAN BOERHAAVE,

CONCERNING THE

KNOWLEDGE and CURE of DISEASES.

Of Thirst in FEVERS.

SECT. DCXXXVI.

THIRST has for its cause a driness of the body, an imperviousness of the fluids, a saline, alkaline, bilious, and oily acrimony of them, or putrid excrements retained in the primæ viæ.

Persons are said to be thirsty when they have a strong appetite or desire for liquids, the sense of which appetite every one knows, but the distinct idea thereof no one can describe: But in the mean time no one doubts, but that when another person is thirsty, they perceive the same sensation, as when they feel drought in themselves. But thirst requires rather cold than hot drink, and generally subacid. Hence when people thirst in the sum-

met heats, or in a febrile heat, they have a strong desire for the sour whey of milk, the juice of citrons, and the like, and have an aversion for bitters, sweet and spirituous liquors, &c. But as hunger arises when there is a necessity for restoring the solid and fluid parts which have been lost by the actions of life in health, the person being admonished by this sense to take in food; so thirst by a healthy necessity obliges people to take in watery liquors, to supply the deficiency of those which have been exhaled, or to dilute and discharge by the usual emunctories, such parts of the humours as tend to a destruction of the machine. Hence the Adorable Creator has conjoined the uneasy sensation of hunger and thirst, and has at the same time ordered that a pleasure shall be perceived by people when they take food to allay their hunger, or drink to quench their thirst; for that pleasing and displeasing sense which accompanies ideas perceived, has a much greater influence upon us than what ought to be done or omitted by the most exact reasoning. For neither prayers nor the threats of approaching death, can oblige stubborn patients sometimes to take the medicines which are ordered by the Physician; but there is no need of persuading a hungry or thirsty person to take food or drink. Hence it seems to be a just conclusion, that when the idea of thirst is perceived in the mind, there are causes existing in the body which require the taking in of liquors. We are now therefore to consider what changes in the body are the causes of thirst, agreeable to what we are taught by observations.

Driness of the body.] In a healthy person the whole surface of the external skin of the eyes, nostrils, and internal parts of the mouth, with the tongue, fauces, &c. are moist, which is a circumstance

circumstance necessary to the natural functions of these parts; for since the whole body is perspirable in every part, the most thin humour, which is expelled through the extremities of the small exhaling vessels, moistens the whole. When therefore this perspirable moisture is either absent, or from some cause is hindered from passing through these small vessels, driness attends, because by the heat of the body, and of the ambient air, all the present moisture is soon dissipated. This driness is easily known, when there is a scaly roughness of the skin, tongue, fauces, nostrils, &c. after being deprived of their usual moisture: But at the same time such a driness is accompanied with thirst. For when the most healthy person travels through a sandy country in the summer heats, he soon perceives his whole mouth, nostrils, &c. become dry, and is at the same time thirsty, because the integrity of the functions requires a restitution of the humour, which had been exhaled from the body thro' the greater heat, by the taking in of liquors. Nor is it any objection to this that dropsical people, who have so great a collection of water in them, are nevertheless thirsty. For in these indeed a water is collected in the larger and smaller cavities of the body, but then in the mean time the other parts are deprived of their natural humidity. Thus we see that when the tumour of the abdomen increases daily in those who have an ascites, the other parts of the body are emaciated, and as it were wasted by a true marasmus; and in such also the tongue, mouth, and fauces are commonly very dry. And hence thirst is by the ancient Physicians esteemed a very bad sign in a dropsy, as we shall declare hereafter, because it either denotes a putrefaction formed, or that all the water

of the blood is escaped out of the vessels, and collected in the cavities of the body.

An imperviousness of the fluids.] The fluids of the body are said to be impervious, when they cannot pass freely through those small vessels, which they ought to pervade according to the laws of health. But this imperviousness depends chiefly upon the cohering together of the particles of the fluids, into larger masses, though they were before separated into much less parts (see § 115.) But among the causes which separate the concreted particles of the blood, the principal are dilution, and a resolution by the attenuating liquor, which is conveyed thereto, intimately mixed and shook together with them (see § 132.) Hence where there is such a condition of the humours, thirst is always perceived, whereby the person is admonished from a healthy instinct of nature to take in some diluent and attenuating drink. This is the reason why thirst is reckoned among the effects of inflammation (see § 382, No. 8.) And for the same reason, intense thirst seems to attend in the cold fit of intermitting fevers, because the blood then stagnates about the extremities of the vessels (see § 577.) and frequently hesitating in the pulmonary artery at the same time, it often occasions the most intolerable anguish.

A saline, alkaline, bilious, and oily acrimony] All our healthy humours (as we said before upon another occasion) are insipid, or without acrimony, if we except the bile and urine, &c. which are partly excrementitious; and whatever parts of the humours degenerate much from this mild nature or disposition, are not only useless, but even pernicious to the body; and therefore by a natural law such are expelled from the body, by the intestinal, renal, and other emunctories; and perhaps likewise
by

by insensible perspiration. By stool are naturally discharged the compact and figured excrements, which remain out of the indigestible parts of the food, and humours flowing into the cavity of the stomach and intestines. For by urine and perspiration a great quantity of watery liquor is discharged from the body, together with such oily and saline parts of the blood, as are become acrid by too great an attenuation: And water seems to be the vehicle whereby they are diluted. Therefore as soon as a greater acrimony arises in our fluids, either from acrid substances taken into the body, or from a spontaneous degeneration of the humours themselves, thirst ensues, which calls for some thin watery drink, that so the acrimony may be diluted, and safely expelled when diluted from the body, by the usual passages. Thus if any person has eat a great quantity of any thing very salt for dinner, he will be very thirsty during the afternoon, until the muriatic acrimony is washed out of the blood by the diluent drink. The same thirst is also experienced by those who have taken a great quantity of strong pickles, or sauces of garlic, onions, mustard, horse-radish, &c. things which are already alkaline, or at least inclined to degenerate into an alkaline acrimony. But as these acrid substances are either easily diluted and washed out, or not, so the thirst differs in its intensity and duration: And therefore when acrimony is wrapped up in an oily tenacity, it is more difficultly washed out by watery drinks, and occasions the most obstinate thirst, as is evident in those who have eat fat bacon, or the best sorts of flesh preserved with much salt. But oils also, how mild soever they may be in themselves, may nevertheless by the heat of the body be changed into the very worst rancid acrimony, and then the most intense thirst

follows. They who eat too much fat meat, more especially if the stomach is weak, and the body not addicted to hard labour, will belch up a mere oil some hours after dinner, which being spit into the fire raises a vivid flame; but at the same time it offends by its nauseous bitterness, and often burns the fauces by its acrimony, which is almost suffocating. This is called a bilious acrimony, because it much resembles the bitterness of bile, even though it be very different from the bile itself, which is never merely oily, but saponaceous. Thus also the sweetest butter by frying in a pan turns bitter, and acquires the like oily and bilious acrimony. But as such acrid oils cannot be diluted by watery liquors only, and as they are confined in a great tenacity, therefore the most obstinate thirst arises from thence, incapable of being allayed, but by saponaceous, and especially acid substances, such as oxymel, the juices of garden fruits, jellies, or inspissated juices of them, syrups, &c.

Putrid excrements in the primæ viæ.] By the first passages in the human body, as they are usually called, we understand those which first receive, contain and alter the aliments, and afterwards draw off from them nourishment for the whole body, while the remains which are useless are retained, and expelled from the body by another part of the same passages. By this denomination *Willis*^a seems to have called the œsophagus, stomach, and the intestines, with their appendages: But by the appendages he understands the biliary and pancreatic ducts, with the mouths of the mesaraic vessels^b; for from these the humours may directly flow into the cavities of those viscera. But that
author

^a Pharmaceut. Ration. Part. I. Sect. I. cap. 2. pag. 5.

^b Ibid. cap. 1. pag. 3.

author being about to treat concerning the action of medicines in the human body, so calls them, because here the medicines first begin to operate. But it frequently happens that while a fever attends, putrid excrements are accumulated in these first passages, either from the innate humours of the body, which are conveyed thither, or from the ingested aliments spontaneously inclining to putrefaction; and while such putrid matters lie in these passages, or are continually conveyed thither from the adjacent viscera, a very intense thirst tortures the patient, as we are assured from practical observations; altho' there may be no greater acrimony, nor any putrefaction in the blood and other humours, nor even any signs observable, denoting great driness, or an imperviousness of the humours. Even sometimes a fever is kindled from putrid matters lodging in these parts, though it did not exist before (as was observed in the comment to § 586.) But among all the humours, the bile most frequently, and the soonest inclines to putrefaction, and is the sooner corrupted, because the air has always access, when the bile is propelled into the cavity of the stomach and intestines; and together with thirst it excites other febrile symptoms of the worst kind, all which are soon removed, when the corrupt bile, here stagnating, is discharged by a vomit. In this case intense thirst arises from a salutary instinct, that the putrid mass may be washed out by plentiful drinking, or by irritating the stomach, to expel by vomit after taking a large quantity of some liquor, for generally a nausea or sickness of the stomach attends in this case. But this cause of thirst is known from a foul tongue, from a putrid, bitter, and disagreeable taste, with a sickness at the stomach, and a loathing of food: But it is removed when this putrid matter is dis-

charged either by vomit or stool; or else corrected by acids. *Helmont* very well remarks this cause of thirst, where he argues in opposition to the opinion of the schools, who pronounced the essence of a fever to consist in heat; and while no sense of heat was perceived by the patient during the cold fit, they would nevertheless have it that a great heat lay concealed in the interior parts of the body, though insensible: They endeavoured to prove this wonderful paradox from the intense thirst in the febrile cold, which they ascribed to driness, and proportionable to which they supposed the heat to be always existing in living people. But says *Helmont*, *At nesciunt hanc sitim, non a calore, ut neque a siccitate manare, prout alias contingit in siti naturali. Ideo enim nec exhibitio potu sedari, quod regulariter fieri deberet, si a sicco vel calido sitis ista oriretur. Fallax ergo sitis, non autem frigus. Oritur namque sitis ab excremento, quod facultatem istam sensitivam, ejusque organon, male affectat, illuditque non secus, atque si repente magna siccitas advenisset. Nam solet acidum sulfuris (quod in se siccissimum & corrosivum) ejusmodi fallacem sitim delinire, non secus atque aqua ignem extinguit.* “ They know not that this thirst does
 “ not proceed from heat, nor from driness, as o-
 “ therwise happens in natural thirst, which is e-
 “ vident, because it is not allayed by the giving
 “ of drink, which it regularly ought, if the thirst
 “ arose from heat, or driness. The thirst there-
 “ fore deceives, and not the cold fit. For the
 “ thirst arises from an excrement which greatly
 “ injures this sensitive faculty and its organs, as
 “ if they were suddenly affected with great dri-
 “ ness. For the acid of sulphur (which is in itself
 “ very dry and corrosive) usually extinguishes this
 “ falla-

“ fallacious thirst, even as water puts out fire c.” For although (as was said a little before) thirst in the cold fit of a fever is occasioned from the imperviousness of the humours, yet it is sufficiently evident, from the text aforesaid, that excrements lodged in these passages may be the cause of febrile thirst. For that organ the stomach, and especially its orifice, which is continuous to the intestine called the pylorus, is by *Helmont* esteemed the seat of the sensitive soul, as is evident from many passages in that author.

S E C T. DCXXXVII.

HENCE therefore thirst almost constantly denotes the presence of one of these causes, (§ 633.)

When therefore thirst attends in febrile patients, we ought always to suspect that one or more of the forementioned causes are present; and it must then be carefully enquired what that is which produces thirst in the patient, that from thence the cure may be directed so as to remove the known cause of the thirst. For although there may possibly be other causes of thirst in general, yet in febrile thirst, concerning which we are here treating, we have not been able to observe more causes than those beforementioned. Thus we read of the serpent disphas, that a slight and scarce painful bite of it raised so great a thirst in the young standard-bearer *Tyrrhenus*, who followed the camps of *Cato*, so that it could not be allayed by any kind of drink: Hence the poet:

Non

*Non decus imperii, non mæsti jura Catonis
 Ardentem tenuere virum, quin spargere signa
 Auderet, totisque furens exquireret agris
 Quas poscebat aquas sitiens in corde venenum, &c.
 Scrutatur venas penitus squallentis arenæ,
 Nunc redit ad syrtes, & fluctus accipit ore,
 Æquoreusque placet, sed non sibi sufficit, humor.
 Nec sentit fatigue genus, mortemque veneni,
 Sed putat esse sitim, ferroque aperiri tumentes
 Sustinuit venas, atque os implere cruore^d.*

It is indeed true that the stupendious effects of the like poisons are sufficiently apparent, but the manner in which they act upon the human body is concealed from us.

But sometimes there have been sufficient causes observed in diseases, without producing any thirst in the patient; but then this is always a very bad presage, because in such a case the common sensory, being oppressed by the violence of the disease, is no longer affected; whence the greatest danger is threatened. For as *Hippocrates* says (see the comment to § 1.) those people are disordered in their mind who do not perceive pain, when the causes of it exist in the body; and the same is also true of thirst. For the same reason he likewise affirms, *Sitis præter rationem soluta in acutis malum*. “That the thirst being extinguished without any manifest cause in acute diseases, is a bad sign^e.” And in the second patient of the third book of his epidemics^f *Hermocrates* who perished on the twenty-seventh day, he observes that he had no thirst, although he had a very

^d M. Annaei Lucan. Pharsal. Lib. IX. ^e Prorrh. Lib. I. Charter. Tom. VIII. pag. 739. Coac. Praenot. No. 60. ibid. pag. 855. ^f Charter. Tom. IX. pag. 218.

very dry tongue, but then he was comatose, or insensible at that time: For in this patient the thirst went off without any manifest cause, the driness of the tongue remaining; for if the tongue had appeared moist afterwards, it would have made one of the best presages, since the cause of thirst, namely the driness, would then have been diminished.

S E C T. DCXXXVIII.

THIRST therefore points out those ill consequences which may be presaged to follow, as the possible effects of those causes which we thereby know to be present (§ 636, 637.)

Since therefore febrile thirst supposes some of the causes before mentioned (§ 636.) it is evident that all those disorders are to be feared which may be expected as the consequences of those causes. For the prognosis here varies according to the causes which produced the thirst, and cannot be known barely from considering the thirst only. Thus driness denotes a deficiency of the thinner humours, whence the course of the rest through the smaller vessels becomes more difficult; and at the same time the small absorbing vessels of the venal kind being contracted by too much driness, do not so easily admit the ingested humours; and the extremities of the exhaling arteries being likewise affected in the same manner, do not discharge the humours which ought to be by them expelled from the body, and hence all the functions hereon depending will be disturbed. But if the thirst proceeds from an imperviousness of the fluids, the disorder will manifest itself chiefly

chiefly about the extremities of the pulmonary artery, or vessels of the encephalon, and hence anguish, difficulty of breathing, delirium, &c. may be justly feared. If the blood is infected with a saline acrimony, there is danger of the smallest vessels being dissolved, while the humours, charged with the very acrid saline particles, are forcibly drove through them with an increased velocity by the fever, and hence hemorrhages, pains, &c. are so frequently observed in the muriatic scurvy. If the first should arise from an alkaline, putrid, oily, or bilious acrimony, &c. all those ill consequences may be foreseen (as we enumerated at § 85. and 86.) where we treated of the effects of a spontaneous alcali both in the first passages, and in the blood.

S E C T. DCXXXIX.

FOR these reasons before mentioned, this symptom ought always to be immediately relieved, more especially in acute diseases.

Since therefore thirst often proceeds from such malignant causes, and the very worst disorders are to be justly feared from hence, it is sufficiently evident, that this symptom ought to be immediately relieved; more especially is this necessary in acute fevers, where the driness, imperviousness of the humours, and putrefaction are increased by the disease itself.

But there has been another question controverted amongst Physicians; namely, whether or no the thirst in febrile patients, ought to be allayed by giving drink in as great a quantity as it may be desired;

desired; or whether neglecting this symptom, a disease from whence it arises, namely the fever, may be subdued, and consequently the thirst itself removed, while in the mean time the patient is often to be prohibited from the use of all drink, or else only a very small quantity of drink allowed; namely, lest the efficacy of the remedies taken should be diminished, by being diluted with the quantity of the liquors drank plentifully. But we have seen before, in the history of fevers, that Asclepiades acted the part of a torturer during the first days of the disease, as he thought that the patient's strength ought to be weakened by watchings, intense thirsts, &c. insomuch that he would not allow them even to wash their mouth the first days: but at the same time, we also proved how much this cruel method of cure ought to be condemned. Celsus indeed would have the patients treated in a milder manner; but yet he did not believe that it was useful to give drink during the whole time of the fever, and seems rather to incline to the opinion, that it is better for febrile patients to abstain from drink. For after having said that abstinence from food may be more easily imposed on such patients, because their stomach generally refuses it, he adds as follows; *De potione vero ingens pugna est, eoque magis, quo major febris est. Hæc enim sitim accendit, & tum maximè aquam exigit, cum illa periculosissima est. Sed docendus est æger, ubi febris conquieverit, protinus sitim quoque quieturam: longioremque accessionem fore, si quod ei datum fuerit alimentum: ita celerius eum desinere sitire, qui non bibit.* “ But concerning

“ drink, there is a great controversy, and the

“ more as the fever is greater. For the fever

“ kindles thirst, and calls most powerfully for

“ water, when that liquor is the most dangerous.

“ But

“ But the patient is to be informed, that when the
 “ fever is allayed, the thirst will also immediate-
 “ ly cease, and that the paroxysm will be longer
 “ if aliment is given to him : thus the thirst will
 “ leave him sooner who does not drink ^f.” How-
 ever, he believed it necessary to indulge the pa-
 tient a little, because even healthy people support
 hunger better than thirst, but for the first day,
 he would have no liquor given, unless the pulse be-
 comes so moderate, that food may be also given.
 And in another place ^g he would rather have the
 thirst deceived than drink given. For he orders the
 patient to be so managed, *Neque potet, neque nimium
 siti crucietur. Os etiam ejus elui potest, ubi &
 siccum est, & ipsi foetet, quamvis id tempus aptum
 potioni non est. Commodeque Erasistratus dixit, sæpe,
 interiore parte humorem non requirente, os & fauces
 requirere : neque ad rem, male haberi, ægrum,
 pertinere.* “ As not to drink, nor yet to be tor-
 “ tured with too much thirst. For his mouth may
 “ be washed when it is dry, and smells fetid to
 “ himself, although that time is not suitable for
 “ drinking.” And it is properly said by Erasistra-
 tus, “ that often the mouth and fauces require
 “ moisture when the interior parts do not ; nor
 “ is it a thing of any consequence, that the pa-
 “ tient is uneasy on this account.” But when the
 mouth is dry and fetid, the stomach and in-
 testines labour under the same indisposition, and
 equally require to be washed and moistened by
 taking in drink ; for there is none of the causes
 of thirst before mentioned (§ 636.) but what
 may be corrected by watery drinks, under such a
 regulation as will be prescribed in the next aphorism.
 For thus the dry parts will be moistened, the im-
 pervious

^f Cels. Lib. III. cap. 6. pag. 128.
 pag 119.

^g Lib. III. cap. 4.

pervious humours will be thinned, and divided by the interposition of the diluent water; all acrimony will be absterged, and wholly enervated by diluting with the watery liquor. Hence Celsus has notwithstanding been obliged to confess, *Ne illud quidem, ab Heraclide Tarentino dictum, ratione caret: ubi aut bilis ægrum, aut cruditas male habet, expedire quoque per modicas portiones misceri novam materiem corruptæ*; “That what was said
 “ by Heraclitus of Tarentus, is not without its
 “ reason; namely, that when the patient is indis-
 “ posed from bile or crudities, it will be also pro-
 “ per by moderate drinking to mix new matter
 “ with that which is corrupted ^h.”

But the method used by Hippocrates for the cure of fevers, was very different from this; for he not only assures us, that a moist diet is useful to febrile patients, but he likewise gave thin acidulated drinks of ^amed. oxymel, barley water, &c. as is evident from his book concerning diet in acute diseases, and concerning which, we spoke more at large in the general history of the cure of fevers.

But yet this method of Celsus, was unhappily again brought into practice by the Physicians of the past age, who boasted that they could subdue all diseases either by their secret chemical medicines, or by sweats, exhibiting the warmest sudorifics, at their first undertaking the cure of every fever. But they prohibited their patients from all manner of drink, lest the efficacy of the medicines should be weakened by their diluting in the watery liquors drank. But it is evident enough, how miserable the condition of the patients must have been, who were treated in this method. For although the body was torried with the febrile

^h Lib. III. cap. 6. pag. 128.

heat, and fuel was added to the fire by the exhibition of the warmest medicines; yet they were not allowed even to wet their lips with any kind of drink. Nor yet (which may seem wonderful) did the Physicians depart from this method, though they knew that many of their patients, despising the threats of death, were obliged by their intolerable thirst to take in great plenty of drink, which they extorted from their keepers, either by force or by intreaties, being attended with very good success. Helmont, although he boasted of being able to subdue all kinds of fevers in a few days time by secret medicines, was yet wiser in this particular; *Et detestabatur in febris abstinentiam a potu. Nam si febris sit calida, Et siticulosa, privetur autem potu humentante, depopulatur cruorem, Et solidarum partium alimenta, cum viribus. Et enim, uti licet vesicam exonerare, quoties urget etiam importuna necessitas, ad hoc non petita a Medico venia: pariter quoque est bibendum, quoties monet necessitas: cum unum non sit magis naturæ consonum quam aliud: sitis autem stricta lex, Et rupta mandati obedientia, jam millies Medenti opprobrium attulit.* “ And abhorred abstinence from drink
 “ in fevers; for if the fever is hot, and attend-
 “ ed with thirst, by depriving the patient of
 “ moistening drink, the blood is impoverished,
 “ and the solid parts deprived both of their sense
 “ and nourishment. For as there is a licence to
 “ empty one’s bladder whenever there is occasion,
 “ without asking the leave of the Physician for
 “ that purpose, so likewise ought the patient to
 “ have the privilege of drinking whenever he
 “ has a necessary occasion; for one of these is not
 “ more consonant to nature, than the other: Add
 “ to this, that keeping to the rule of drinking
 “ whence there is drought, and breaking through
 “ the

“ the orders enjoined on them for abstinence, has
 “ a thousand times disgraced those who undertook
 “ the cure ⁱ.” But at present, at least in these
 countries, this cruel method is rejected almost
 by every Physician, and drink enough is allowed
 to the thirsty patients. But what is more parti-
 cularly to be observed concerning this symptom,
 will be explained under the following aphorism.

S E C T. DCXL.

THIS symptom is relieved, 1. by the
 drinking of watery, subacid, nitrous,
 and emollient liquors made warm, and taken
 frequently in a small quantity at a time. 2. By
 fomenting, washing, and gargling the no-
 strils, mouth, and fauces, with liquors of the
 same kind. 3. By fomentations, epithems,
 and cataplasms of the like kind applied to
 the hypochondria, and secured round the
 body. 4. By injecting clysters of the like
 kind, and causing them to be retained for a
 considerable time.

1.] Patients who are thirsty desire drink, but by a
 natural instinct they have always an appetite to such
 as is thin and watery, and an abhorrence to strong
 ale, rich wine, &c. And even in healthy people
 it is observed, that when they are thirsty in great
 summer heats, they are delighted only with thin
 drink; and therefore it is no wonder if they have
 the same inclination in the heat of the fever. Per-
 haps for this reason Hippocrates ^k was unwilling
 to give milk alone to allay thirst, but mixed with

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thres

ⁱ Helmont. De Febribus cap. 12. No. 3. pag. 772.

^k Aphor. 64. Sect. V. Charter. Tom. IX. pag. 237.

three or four times as much water, it very well allays the thirst of febrile patients. But as in fevers by the increase of the circulation, the salts and oils of the blood become more acrid, and incline to putrefaction, and even frequently putrid excrements are lodged in the *primæ viæ*; therefore subacids are very well added to watery liquors, which resist all putrefaction, and are the best remedies against thirst from that cause: hence the juices of citrons, oranges, cherries, currants, &c. are so successfully mixed with watery liquors as a drink, and are very much desired by those who are thirsty in fevers. To these add nitre, and the various preparations thereof which are kept in the shops, because they likewise resist all putrefaction, and conduce much to dissolve the inflammatory imperviousness of the humours. But to remedy the too great driness, and alleviate the acrimony of the humours, barley, oats, or the like farinaceous grain are boiled in water, which are likewise opposite to putrefaction, as they spontaneously turn sour.

But almost every one who is thirsty in a fever desires cold drink, and as the natural instinct of patients in diseases is with reason much regarded, it would therefore seem that in this particular, the patient ought therefore to be indulged sometimes with cold drinks, which they so much request. It is indeed true, that cold drink is the most pleasing and refreshing, but then it has many bad consequences, as appears from the most certain observations. For if it be considered that cold drink, especially if drank plentifully, constricts the adjacent intercostal and diaphragmatic vessels, as it passes down through the *œsophagus*, and that when it is arrived into the stomach, it may by its coldness do great mischief to the liver, which is
incum-

incumbent on the stomach with the vena cava, and venous sinus, which are so near, since our blood immediately congeals from being put into cold water, the reason is sufficiently evident why cold drink is to be condemned as so pernicious. For if the cold air being suddenly admitted, so much injures the body when heated, that Sydenham thence¹ judges more have perished than by the sword or plague, what dangers may we not fear, when cold drink is immediately applied to the internal parts greatly heated in a fever; but as air grows hot so much sooner than water, and yet often tends to introduce an inflammatory thickness in the blood, by its coolness in acute fevers, much more readily will the blood be congealed by the sudden cold of watery drinks. The most fatal pleurifies, peripneumonies, and sudden death, have often followed, when people being much heated, have drank liberally of cold liquors, as we are assured from the numerous observations in the history of physic. Nor yet can it be denied here, that the drinking of cold water has been sometimes very serviceable in febrile patients. For thus upon another occasion in the comment to §. II. it was observed, that Galen had frequently seen more than a few immediately freed from an ardent fever, with which they were afflicted by the drinking of cold liquors; but Galen adds, that this happened when the humours were moderately concocted, and therefore at a time when the violence of the disease was going off. But Celsus^m advises a great quantity of cold water to be given even in the greatest increase of an ardent fever, *bibat etiam ultra satietatem, & cum jam venter & præcordia ultra modum repleta, satisque refrigerata*

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¹ Sect. VI. cap. 1. pag. 325.
pag. 135.

^m Lib. III. cap. 7.

refrigerata sunt, vomere debet. Quidam ne vomitum quidem exigunt, sed ipsa aqua frigida, tantum ad satietatem data, pro medicamento utuntur. “ So
 “ as to let the patient drink beyond a moderate ful-
 “ nefs, and when the belly and præcordia are thus
 “ over filled, and sufficiently cooled, the patient
 “ ought to vomit. But some do not insist upon a
 “ vomit, but only give cold water itself, ’till the
 “ stomach is full, and use it as a medicine. But
 “ soon after he advises only to make use of this
 “ remedy:” *In quibus præter ardorem nulli dolores,*
nullus præcordiorum tumor; nihil prohibens, vel in
pulmone, vel in faucibus, &c. “ In those who have no
 “ pains more than an ardent heat, nor any tumor
 “ of the præcordia, and without any obstruction
 “ either in the lungs or fauces, &c.” Thus Schel-
 hammer ⁿ says, that he had seen a servant afflict-
 ed with an ardent fever, with the most intense
 heat, who not being well looked after, greedily
 drank above ten pounds of cold water, and by
 that means did what no Physician could easily
 effect; namely, so far extinguished the fever, that
 he was perfectly well the next morning. He
 even testifies, that he had heard from the cele-
 brated Meibomius, that the greatest part of the
 inhabitants of a whole town, being afflicted with
 an acute fever, and destitute both of Physician
 and medicines, extinguished the febrile heat by
 drinking cold water, and soon after raising the
 oppressed native heat which remained by vinous
 spirits, by which means they all recovered. But
 it sometimes happens in continual fevers, especially
 those which are called putrid, that the blood tends
 to a putrid dissolution, and therefore there is less
 reason to be afraid of coagulating the blood; and
 perhaps

ⁿ De genuina Febres curandi Methodo, Parte 3. Sect. III.
 §. 36, 37, pag. 186, 187.

perhaps in such a case, the drinking of cold liquors would not be so injurious. Moreover, in the commentaries to § 599, it was observed from Sydenham, that sometimes a greater compliance ought to be made with the patient's desires in the cure of diseases, than is consistent with the more fallacious and doubtful rules of art. And therefore if the patient sometimes strongly desires cold drink in fevers, having an aversion to every thing else, it seems not at all unreasonable to comply with it; but it can never be amiss, rather to give it in small quantities at a time, and repeated often, instead of drinking great draughts at once, because the patient's desires will be satisfied, and in the mean time many bad accidents prevented, which might be reasonably feared. But as all that has been said before, only proves that drinking of cold liquors in fevers has been sometimes useful, and that more especially when the patient has desired them with the strongest appetite, it is sufficiently evident, that we cannot reasonably conclude from these extraordinary cases, that cold drink ought to be administered to febrile patients; no more than one can recommend salted herrings, bacon, and the like, in the diet of febrile patients, because sometimes fevers have been cured by the taking of these, contrary to the advice of the Physician, when the patient has had a very great desire for them. But from what has been said, it is evident that warm drink, or at least such as is not cold, may be the more safely administered to allay thirst in fevers.

It is moreover highly necessary for the drinks to be taken in a small quantity at a time, as soon as made warm. For when thirsty patients indulge themselves by drinking too much at once, the stomach is often so far distended, that its orifices

being contracted with a convulsive force, deny all passage to the ingested drink, whence great anguish, and many more bad symptoms follow. (see §. 586. No. 1.) Frequently also sickness and vomiting ensue, whereby all the ingested liquor is thrown up again. But moreover, as an imperviousness of the blood is often the cause of thirst, diluent drink taken frequently, and in small quantities at a time, mixes with the blood in the veins, and is as it were ground and shook together with it; and by that means all the impervious particles are extremely well divided. But when there is a great quantity of water poured into the veins, and mixed with the blood at once, it will not be so easily, nor uniformly diluted, but soon after the whole quantity is expelled again from the body, either by urine or sweats, before it is capable of an intimate mixture with the blood, by the action of the vessels.

Various forms may be seen in the *Materia Medica* of our author, adapted to this number of the present aphorism, according to which, most agreeable drinks may be composed for allaying thirst in fevers.

2.] This admonition is of the greatest moment in the cure of fevers. For then the thirst often proceeds from dryness and an imperviousness of the blood; and then there is the greatest danger from such a disposition of the blood to be feared in the vessels of the encephalon and lungs. When therefore the patient contains such warm drinks in his mouth, they wash clean the fauces, moisten these dry parts, and relax the lungs with a warm vapour; more especially if the vapours of hot water are drawn through the nose. But also, at the same time, the external branches of the carotid artery distributed through these parts, are thus relaxed,

laxed, and by that means the impulse and pressure of the blood is turned off from the internal parts of the head. Add to this, that the continual moistening of these parts, most happily allays the thirst. Hence Celsus orders the patient to wash his mouth, to prevent the torture of too great thirst, even though he advises abstinence from drink in fevers, as we said before at §. 638. For the thirst will continue if the tongue and internal parts of the mouth remain dry, though the patient drinks ever so much; and at the same time by fomenting these parts, the bibulous veins will be relaxed, so as to be able to draw in the liquors applied, and the exhaling arteries will be disposed to transmit their most thin vapours, with which all those parts are naturally moistened. In dropical patients, the troublesome thirst is usually best allayed by frequently washing the mouth with water, and a sixth part of vinegar, or juice of citrons.

3.] Namely, that these parts may be fomented, and the viscera there placed so disposed, as to give the humours a very easy passage through the vessels; for from driness and an imperviousness of the blood may follow many disorders in these parts. But thus also, much liquor may be absorbed by the bibulous veins of the external skin, by which the thirst will be lessened. But how much warm bathing will conduce to allay thirst, has been said before upon another occasion in the comment to §. 333. For Galen, in order to prove that the whole body is perspirable, says it appears by experiments, that people who have travelled in the scorching sun, have their mouth very dry, and are tortured with the most troublesome thirst; but upon going into the warm bath, they instantly perceive relief; for the mouth becomes moist, and the body, which was before

rough and dry, becomes soft and moist, and all the thirst has been thus extinguished. But when fomentations, epithems, or cataplasms prepared of the like materials, have been retained to the hypochondria, and at the same time care is taken not to let them grow cold; in that case all those parts are kept in a warm bath, and the same effects may be expected.

4.] Clysters may be useful here two ways, either by washing out the putrid excrements, which being lodged in those parts, may be the cause of thirst (as was said before at §. 636.) or else clysters are sometimes injected, with a view of their being retained and absorbed by the bibulous veins of the intestines; and by that means they conspire by their effects with the other remedies; concerning which, we have been speaking under the present aphorism. But what is to be observed in the use of such clysters, has been said before in the comment to §. 634. where we treated of their efficacy in the cure of febrile anguish.

S E C T. DCXLI.

BUT if the intense thirst is also accompanied with great weakness, then may rich wines, and often spirits, be safely mixed and administered with the former. (§. 640.)

All the remedies mentioned in the preceding aphorism, mix a great quantity of water with the blood; but if now great weakness attends, the ingested liquors cannot be propelled by a due force through the vessels of the body; whence the weak person will be overloaded and oppressed with great anguish, while the mass of fluids to be mov-
ed,

ed, is so much increased by these liquors; otherwise the ingested water will be collected in the larger and smaller cavities of the body, so as to cause a dropsy; nor yet will the thirst be allayed here, since all the ingested water will thus again escape from the vessels. The best method of all in this case, is to add such a quantity of wine to the watery drink, as will suffice to renew the powers, and not in the mean time prove injurious by too great a stimulus. Why the wine may be safely given to patients diluted with water, we have already seen in the comment to §. 605 No. 2. and in this case a greater quantity of wine may be used on account of the weakness. Even spirits themselves, such as the spirits of wine, or the compound aromatic spirits of the shops will not be here offensive, if they are mixed with watery drinks; and it is observable, that thirst is then better allayed by these, than by the use of watery drinks only. In those dropsical patients who are thirsty, great relief is perceived from such additions; and even laborious people who are thirsty from their hard work, usually take a small quantity of spirit of wine, and then they observe that their thirst is much more easily allayed by common drink; for the sweats with which they are then so much dissolved, are moderated by these spirits, and by that means the ingested liquor is prevented from flowing out again immediately through the body. Forms of the like drinks, which may serve for these purposes, may be seen in the *Materia Medica*, at the number corresponding to that of the present aphorism.

Of Loathings in FEVERS.

S E C T. DCXLII.

AN AUSEA, loathing, or a sickness at stomach, signifies an endeavour to vomit without effect, with horror, a sense of dread or trembling; it has therefore for its proximate cause a slight convulsion in the fauces, œsophagus, stomach, intestines, and muscles of the abdomen; which convulsion is raised, 1. from a putrid, bilious, acrid, propelled into the cavity of the stomach, and ascending into the fauces, and by vellicating or irritating both, the rest of these motions follow; and this is known from previous abstinence, and a stinking breath, with a foul mouth, tongue, and fauces; or, 2. it arises from a thick viscid, fluctuating matter, vellicating those parts where it swims, and is known, from the signs of glutinosity preceding; (§. 169. to 175.) or 3. from a slight inflammation in the stomach, œsophagus, intestines, or adjacent viscera, which is known from the signs proper to inflammation in each of these parts; 4. from the remembrance of a thing which being formerly taken, occasioned a like sickness and aversion; 5. and lastly, it may be from an irregular motion of the nervous fluid, from whatever cause excited, which is known by a delirium, vertigo, convulsion, giddiness, and trembling.

Those

Those were said primarily to have a nausea who were sick at stomach, either in a ship or in sailing; but afterwards it was customary to apply the word to others thus affected from different causes °, *Nauseare dicti sunt primum, quibus in navi ac inter navigandum stomachus langueret: deinde consuetudo obtinuit, ut vox ea quocunque modo sic affectis tribueretur*, and for this reason it seems to have been called *ναυτία* & *ναυσία*, by the Greeks. But the disorder consists in a fruitless endeavour to vomit. For those are said to labour under a nausea by Galen P, who have a vellication or uneasiness only, without any discharge of humours. Hence Seneca being in a ship tossed by the waves, and himself not accustomed to these disturbances says, “ This
 “ dull nausea has tortured me, without making
 “ any discharge; which therefore moves the bile,
 “ but does not expel it 9.” *Nausea enim me, segnīs hęc, & sine exitu torquebat: quę bilem movet, nec effundit.* Indeed vomiting frequently follows after a nausea, and is almost commonly preceded by a nausea in some degree; but yet properly speaking a person is said to have a nausea, who perceives a fruitless inclination to vomit without any discharge following. But this endeavour to vomit is always accompanied with a sense of horror or trembling, and while any one has a nausea, they have an aversion to all food and drink. If any one who is hungry unwarily swallows a small quantity of the putrid marrow of a bone, the rotten liver of a fish, or corrupted flesh, he will instantly have a nausea and a trembling throughout his whole body, ’till the corrupted matter is either discharged by vomiting, corrected by the taking in of acid liquors, or else washed out of the body by diluent drink.

A nausea

° Plutarch. Symposiac. Lib. VI. Quęst. 8. pag. 694.

P De Locis Affectis Lib. 1. cap. Charter. Tom. VII. pag. 391.

9 Senec. Epist. 53. pag. 472.

A nausea then seems to differ from a vomiting only in degree, and therefore all the causes which produce loathing, may also produce vomiting if they are increased; and on the contrary all the causes of vomiting in a less degree, will leave behind a nausea, as their effect. Since therefore vomiting (as we shall declare hereafter §. 652.) is a violent expulsion chiefly of what is contained in the stomach by a convulsion of the muscular fibres in the fauces, œsophagus, stomach, &c. therefore the same seems to take place, but in a less degree, in a nausea; and therefore the immediate cause of a nausea will be a slighter convulsion of these parts, which may indeed excite an irritation to vomiting, but without being able to effect that forcible expulsion of what is contained in the stomach, which we observe in vomiting. If the most healthy person introduces a finger into his fauces, so as to touch the root of the tongue, the moveable part of the palate, or beginning of the pharynx, he will soon after have a nausea or inclination to vomit; and if at the same time he applies one hand to the abdomen, he will perceive the abdominal muscles then begin to contract, only from the mechanical irritation of these parts. It now remains therefore to see what are the remote causes which may be able to excite this very slight convulsion of these parts, as the proximate cause of a nausea: And these causes we may commodiously divide into five distinct classes, concerning each of which we shall treat separately.

1.] This is a very frequent cause of reaching or sickness at stomach; for the liver, which is a viscus of so great a bulk, separates a great quantity of humours by its fabric, from the blood which is brought into it, and those humours it discharges by an excretory duct into the duodenum. But when the stomach is empty, the pylorus is
open,

open, and therefore the humours collected in the duodenum from the pancreas, liver, and gall-bladder, may regurgitate through the relaxed pylorus into the stomach, only by the pressure of these parts in respiration, and this more easily than they can pass along through the intestinum jejunum, which is closed with so many folds or wrinkles. Hence therefore a great quantity of such a humour is collected in the stomach of a healthy person. After long fasting there is often belched up wind, especially upon bending the body forward. But at such a time there is always found a humour frothy, brackish, and a little inclined to bitterness in a healthy person. If now the bile becomes more than usually acrid, or is conveyed in a greater quantity into the stomach, such an irritation may thence arise, as will be sufficient to produce a nausea; as also if such a humour contained in the stomach regurgitates into the fauces. But since the bile naturally inclines to putrefaction, and as the air has a free access to the bile and other thin humours in the stomach, with which the internal heat of the body also conspires, it is very evident that a putrefaction in the stomach ought to be feared from these causes in a little time. This seems to be the principal reason why those who have fasted too long lose their appetite, and have a sickness at stomach. But when by too long a stagnation the cystic bile, already in some measure putrid, or exalted and corrupted by the febrile heat, is conveyed into the stomach, it is evident enough that it must increase all these disorders. But in the mean time it is not necessary for a great quantity of corrupt bile to be lodged in these parts, to excite a troublesome and continual nausea. Hence Sydenham wonders (as we observed before at §. 634.) that upon examining the matter discharged after giving a vomit, he found it neither considerable

ble in bulk, nor endowed with any sensible ill quality: And yet that the fruitless inclination to vomit proceeded from thence, was evident enough, because after giving the vomit the nausea was allayed. But we know that such a cause of loathing is present in the body from fasting; because as soon as any thing putrid is lodged in the stomach, it immediately destroys all the appetite. I am even apt to believe that I have sometimes observed sickness and loss of appetite arise only from a greater quantity of good bile flowing into the stomach, when I ordered the abdomen of a fasting person to be rubbed in bed with warm woollen cloths impregnated with the fumes of burning amber. For upon rubbing very hard he began to have a nausea, and giddiness, with an aversion to all food, 'till after a few hours he had a vomiting of bile, differing neither in colour nor in any other quality from healthy bile. But when afterwards he was more cautious not to press that region of the abdomen in rubbing, where the bottom of the gall-bladder projects out below the edge of the liver, he perceived no disorder from it.

But if this bilious matter lodged in the stomach begins to degenerate to a malignant putrefaction, there is then a putrid vapour and bitterness in the mouth; whence Hippocrates^r reckons a loathing of food, and a bitterness of the mouth among the signs, denoting there is a necessity for purging upward by vomit. But it seldom happens that any corrupt bilious humour lies a long time in the stomach, but the internal parts of the mouths and fauces, and more especially the back of the tongue become foul (as was said upon another occasion in the comment to §. 85. where we treated on the effects of a spontaneous alcaly in the first passages).

2.] The

2.] The first passages are by a law of nature lined with a mucus from the mouth to the anus, which not only gives a lubricity to the internal surface of these parts, but likewise defends them from being easily injured by the rough bodies swallowed, or acrid substances taken into the stomach. The mucus having served these uses is by degrees scoured off and attenuated more especially by the saponaceous bile, 'till at length it is discharged together with the *scæces* by stool. But when this mucus is tougher than usual, or the bile weaker and smaller in quantity, it is by degrees accumulated, oppresses the stomach, and excites an irritation, whence proceeds a troublesome nausea, which is often of long continuance. This disorder is very familiar with men of letters, especially those advanced in years; for as these lead too much a sedentary life, the abdominal viscera, are less agitated by respiration; the bile becomes inactive, and is often so much inspissated as to be scarcely able to pass out thro' the narrow neck of the gall-bladder wherein it is confined; and at the same time also old people are (*cæteris paribus*) more inclined to mucus than young people. In many people also the internal surface of the first passages is disposed almost in the same manner as we observe in those who have catarrhs, discharging also a great quantity of mucus every day by blowing from the nose, by spitting from the mouth, and by coughing from the lungs: And hence frequently there is a very great quantity of mucus collected in the first passages. The same thing may likewise happen from the eating food which is too glutinous or viscid, especially if the stomach is very weak at the same time, and the bile more inactive. But now whether this mucus adheres to the fauces or *cæso*phagus, or fluctuates in the stomach, it will have nearly the same effect

as if a feather was moved in those parts exciting a continual irritation, whence a perpetual nausea arises so long as the mucus continues in these parts. It is likewise probable, that the same effect will follow if too great a quantity of the mucus adheres to the intestines, especially the upper or smaller intestines; for we see that the intestines being irritated by wounds, inflammations, or strangulation in ruptures, excite a nausea and vomiting. The like nausea is likewise observed from worms creeping in these parts, only from a mechanical irritation of them. But such a nausea is discovered by those causes preceding, from whence we are assured that mucus may be accumulated in the first passages; and likewise from observing those effects in the body which usually happen from such a viscid tough matter: concerning all which we treated in the aphorisms here cited (in the text) under the title of diseases arising from a spontaneous glutinosity. It is also evident, that this disorder is perfectly opposite to that concerning which we treated under the preceding number of the present aphorism; for a nausea produced by a tough mucus is often happily cured by bitters and bilious medicines, as wormwood, centory, &c. and even the bile itself taken from healthy animals is very successful in the like case; whereas all those medicines would rather increase the nausea, if it proceeded from a too acrid or putrid bile.

3.] If an insipid mucus can thus irritate these parts by its fluctuation as to excite an incipient convulsion and nausea, and sometimes even vomiting itself, much more ought the same to be expected from that irritation of these parts, which arises from a slight inflammation: And the truth of this is also confirmed by practical observations, as will be made evident hereafter when we come to treat of
 inflammatory

inflammatory diseases in these parts. But perhaps likewise these parts, being irritated by inflammation, may also have a greater quantity of mucus separated into them; for thus we see that when an inflammatory tumor invades the fauces, there is an incredible quantity of mucus collected in these parts, and continually discharged by the mouth. Add to this that the adjacent viscera likewise, more especially those which lie upon the stomach, being slightly inflamed, may excite such a nausea, more especially if the stomach is compressed by a tumour of the parts of those viscera. Galen^s treating of an inflammation of the liver, observes that the disorder is accompanied with a loss of appetite, nausea, and vomiting; and adds that all those symptoms accompany this disorder in a greater degree when the concave part of the liver is inflamed, rather than when it is seated in its gibbous part. But it is evident enough that for the same reason a nausea may arise from an inflammation in the pancreas, spleen, &c. But the signs which denote that this cause of a nausea attends, are to be derived from the history of those diseases which proceed from an inflammation in these viscera; concerning which we shall treat hereafter under the head of acute, febrile diseases.

4.] This may indeed seem very strange, though it is in the mean time very true, that a nausea may arise only from a change in the thoughts or ideas. It was observed upon another occasion (see the comment to § 104.) that the mind has this wonderful property, that it can affix ideas to certain arbitrary signs, though there is no manner of similitude betwixt the signs and ideas themselves: As when, for example, a few letters conjoined together

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gether

^s De Locis Affectis Lib. V. cap. 7. Charter. Tom. VII. pag. 496.

gether excite ideas in us which we entertained a great while before, and of which there was not the least footstep often left in the memory. The same thing likewise takes place in the passions of the mind, which are frequently renewed, from the like causes, even against our inclinations. This is also true of a nausea; for I well remember that after taking a decoction of the leaves of fenna with tamarinds for several days to cure myself of a violent ophthalmia, by exciting an artificial diarrhœa, I had afterwards such a dislike to this kind of medicine, that I could not even prescribe it to others, for a long time, without exciting a nausea and trembling throughout every part of myself. When a few years ago I was going to a village near the city, being perfectly in health, and having a good appetite, by ill fortune the distended abdomen of a great mastiff dog, suffocated in the water, burst open, and suddenly exhaled such an intolerable vapour as immediately destroyed all my appetite, and raised a very bad kind of nausea: But some time after when I have passed by the same place, without thinking any thing of the matter, the remembrance of this intolerable foetid vapour has suddenly returned into my mind; but never without a nausea and trembling, though in a less degree. I believe every one must some time or another have experienced how easily a nausea may be raised only from the remembrance of a thing which before excited such a disturbance.

5.] A nausea frequently arises from this cause alone in hysterical women, and in men who have the same weak nervous system, easily susceptible of irritation, and sometimes even in those who have a more firm texture of the whole body. Thus even robust people cannot long support the tossing of a ship in the sea, if they have not been accustomed

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accustomed to it without being troubled with a vertigo or giddiness, and soon after with a nausea and vomiting. Many are subject to the like accident, if they are carried in a coach with their back towards the horses, as also from a swift turning round of the body in a circle. Sydenham has remarked, that in whatever part of the body this inordinate or tumultuous course of the spirits takes place, there immediately follows such symptoms as are conformable to the part itself. No wonder therefore if the violence of the disorder fixing in the stomach and intestines should excite a nausea, and many other symptoms peculiar to these parts. There is moreover, a wonderful consent betwixt the stomach and encephalon, insomuch that the one being disturbed easily produces a nausea and vomiting in the other, as was made evident in the history of wounds in the head. From the same principle likewise a nausea seems frequently to arise when people are disturbed with violent passions of the mind. Nor does it matter from whatever cause this disturbance in the motion of the spirits be originally produced; for a nausea frequently ensues from an irritation of the nerves in parts of the body very distant from the stomach. *Helmontius* *empturus villam obambulabat insigni cum appetitu; tum fortuito distorsit pedem, lapsus est, rigor statim obvenit, cum nausea, vomitu, & suffocato edendi priore appetitu: mox vero distortum pedem & semi-dislocatum reposuit: atque eodem instanti redditus est ipsi appetitus pristinus, cessataque est nausea.* “ Helmont being about to purchase a country seat, “ walked on with a great appetite; but happen- “ ing to slip, he accidentally distorted his foot, “ which was immediately followed with a shiver- “ ing, nausea, and vomiting, with a suppression

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“ of

“ of the appetite which he before had to food:
 “ But soon after he had replaced this distorted and
 “ subluxated foot, his former appetitereturned that
 “ very instant, and the nausea went off.” This
 cause of nausea is known to take place, if the
 signs denote that the nerves are irritated in any
 part of the body by a wound, distraction, &c. as
 also if the known habit of the patient is such,
 that the whole nervous system is too easily irritable,
 from whence disturbances of the spirits may easily
 follow, together with all the bad symptoms which
 proceed from thence. A plentiful discharge of a
 very limpid urine attending in this case, is a most
 certain sign of an hysterical or hypochondriacal fit,
 as we said before in the comment to §. 639.
 Whence there is no doubt remains that the nausea
 present in such a patient proceeds from an inordi-
 nate motion of the nervous fluid. This is more
 especially evident if a delirium, convulsion, gid-
 diness or trembling, denote that the functions of
 that viscus from whence all the nerves proceed,
 namely the brain, are disturbed. But it ought to
 be more especially observed in this place, that it ap-
 pears from the most certain observations, that sordes
 or foul humours, whether existing in the stomach
 or adjacent viscera before the fever, or formed and
 collected there during the time of the fever itself,
 may wonderfully disturb all the functions of the
 brain, and often excite a delirium, vertigo, &c.
 And therefore although these symptoms denote
 that the brain is affected, yet frequently the cause
 of all the disorders is not in the brain but in the sto-
 mach, and in that case the method of cure adapted
 to allay the inordinate motion of the nervous spirits
 will not suffice, but an evacuation will be necessary
 of the foul humours lodged in the stomach by a
 vomit or a purge. See what has been said in the
 comment

comment to §. 229. concerning the wonderful efficacy of certain poisons which greatly disturb all the functions of the brain, as long as they continue in the stomach. But we shall still have something more to say upon this head hereafter, when we come to treat of a delirium in fevers.

S E C T. DCXLIII.

IF this symptom continues long, it occasions a loss of appetite, an aversion to drink and medicines, and at length a vomiting, with the numerous disorders that may follow from thence; of which the chief are weakness, a putrid or alkaline acrimony, and drines.

After having explained what a nausea is, and what different causes may produce it, we proceed to the consideration of those effects which are to be feared from a nausea, if it continues for any considerable time; for a slight nausea of a short duration is easily tolerable, and can do no great mischief. But all the disorders proceeding from a long continued nausea arise from hence, namely, because the body cannot be recruited with food or drink, as long as the nausea continues; for at that time the patient always abhors every thing; and for the same reason no medicines at all can be taken. But in a healthy person great weakness will ensue, unless by food and drink taken in, and changed by the powers of the vessels and viscera, those parts are restored which are daily destroyed by the continual actions of life and health; and besides this all our humours, after abstinence for the space of twenty hours from food or drink, being left to

themselves by rest and heat, or even by a violent motion, incline to putrefaction, as we demonstrated before in treating of diseases arising from a spontaneous alcali at §. 80. It is therefore evident that a putrid alkaline acrimony will arise, if the nausea continues any long time. But since there is a continual waste of the most fluid parts of our humours by insensible perspiration and other excretions, while in the mean time that which is lost is not restored by drink, the body will be dried up. But it is very evident, that all these disorders will be increased if a fever accompanies the nausea, since by a fever itself the most fluid parts of the humours are expressed, and what remain are increased (see §. 587.) This febrile symptom ought for this reason never to be slighted, but to be immediately relieved. But in what manner it ought to be treated will be explained in the following aphorism.

S E C T. DCXLIV.

THE nausea arising from the first of these causes (§. 632. No. 1.) is allayed by the use of acids, saline, and watery drinks, with food and medicines of the same kind; as also by administering a lenient purge of the same nature, and strengthening the fibres by acid, austere corroborants; or, if it does not yield to these, by giving a vomit. But that which arises from the second cause (§. 632. No. 2.) is removed by diluting, attenuating, or exciting a purging or vomiting. But if it derives its origin from the third cause (§. 642. No. 3.) then it will not yield
 'till

'till those disorders are cured, according to the directions which will be hereafter given in these cases. The fourth species of loathing is removed by avoiding the remembrance and approach of such objects. But the fifth kind is cured by rest, with austere narcotic medicines and cold water.

Since it is evident from what was said at §. 642. that a nausea may arise from so many different causes, it is easily apparent, that no general method of cure can be prescribed agreeable to all the kinds of loathing; but that one ought carefully to discover by the signs there mentioned, from what cause the nausea derives its origin; and then the cause being thus known, a just method of cure may be prosecuted.

1. When therefore the loathing proceeds from a sharp, putrid, bilious humour propelled into the stomach, it cannot be removed, unless the bilious matter there lodged be evacuated, or at least so corrected by proper medicines that it can be no longer offensive. It is well known, that all putrefaction is prevented by acids and salts, and that these will often correct even a putrefaction already begun or formed. The best method therefore in such a case is to prepare food, drink, and medicines of acids, or of such things as very readily, or of their own accord turn sour by the heat of the body. Those very pleasant drinks which we recommended before (§. 640.) for febrile thirst will be here likewise serviceable: For by these the bilious humour will be diluted; and since it has frequently a tenacity whereby it adheres to the stomach, it may be so divided and attenuated by these saponaceous remedies prepared with honey, vinegar, juice of sum-

mer fruits and their syrups; jellies, or inspissated juices, &c. as to be afterwards more easily diluted and expelled, if necessary. At the same time also the incipient putrefaction of the bilious humour may be corrected by these medicines. The most agreeable foods may be prepared of oats, barley, sorrel, juice of citrons, with the addition of a moderate quantity of wine, to which add butter-milk, tart apples boiled, &c. But such food and drink may supply the place of medicines, and yet the remedies which are pleasant and well adapted to the same intention, ought not to be neglected, such as the juice of elder-berries, of currants, barberries, &c. with the addition of nitre fossile, and acid spirits, prepared chemically from nitre, sea-salt, vitriol and sulphur, used in such a quantity as will communicate an agreeable taste to those remedies, and yet not offend the stomach in the mean time by too much acrimony. The same acid spirits being united by a long continued and repeated digestion and cohobation with alcohol of wine, afford an acid oily medicine which is mild enough, and yet powerfully resists all putrefaction, and by a grateful fragrancy wonderfully recruits a weak stomach. But so agreeable are all these in this kind of loathing, that the patient who abhors every thing else can nevertheless bear these, and even frequently has a very strong and spontaneous desire for them.

But at same time such remedies will be here useful as correct the putrefaction by a mild acidity, and so irritate the first passages by a gentle stimulus, as to discharge the bilious matter by stool without any great disturbance. Here therefore cream and crystals of tartar, pulp of tamarinds, simple oxymel, &c. hold the first place; and may be either given alone, or mixed with the
preceding

preceding remedies. But since by a nausea, especially one of long continuance, the tone of the stomach is weakened, such remedies will be useful as are austere, or have a roughness joined with their acidity, by a prudent use of which the solid parts of our body are so wonderfully corroborated (§. 28. N^o. 4.) Hence the marmalade of quinces, the diamoron of Nicolaus, as it is called in the shops, as is prepared from the juice of four, unripe mulberries boiled with honey, the juice of pomegranates, medlars, &c. with such remedies as are prepared from these in the shops, are highly recommended.

But when there is so great a quantity of corrupt bile, or when it has acquired so great a malignity that it cannot be corrected by these means, but the nausea increases by every thing that is taken, however grateful and pleasant, nothing then remains but to discharge it upward by giving a vomit. But in the mean time, it can seldom or never be injurious to attempt the cure first by administering such things as we before recommended, since the putrefaction to be feared may be restrained by these, and the bilious matter so far attenuated and diluted as to be expelled with less uneasiness by a vomit. I well remember when bilious fevers were epidemic after a very hot summer, in which there was almost constantly a troublesome nausea and vomiting, I sometimes gave a vomit immediately without much relief, but when I used oxymel or the like for a day or two, diluted with a great quantity of water, the corrupt bile often discharged itself spontaneously by vomit, almost like thick glue, or else was easily expelled by giving a gentle vomit a second time. But only the more gentle vomits are here useful, (lest the force of the fever should be increased

increased by the more violent) namely, oxymel of squills, root of ipecacuanah, &c. which may be safely given in small doses even to infants. Sydenham^u, who used none almost but antimonial vomits, confesses that he has been obliged to abstain from the use of emeticks in young children or infants, when the curative indication called for them, because he apprehended dangerous events from them in such a tender age. It will be likewise of the greatest use, if a few ounces of warm water or some other thin liquor are drank after each vomiting; for thus the patient will vomit with more ease, and all the bilious matter will be more effectually washed off from the stomach. After the operation of the vomit was ended, he gave a gentle quieting draught with diacodium, to allay the disturbance raised by the medicines^w; and only by giving a vomit in this manner Sydenham assures us, he has been able successfully to cure the nausea in fevers; and this method may be always safely prosecuted, provided we are sure no inflammation is seated in the adjacent viscera; and that there is no danger of their being unable to sustain the violent shocks made in vomiting which would destroy them, if they were corrupted by a long continued cacochymy, or a latent abscess. For it is very evident, the inflamed parts by so violent an agitation might be affected with a gangerene; and if there is a latent vomica for example in the liver, which usually excites a malignant nausea, after giving a vomit a fatal over-purging often ensues, since the corrupted liver being violently pressed, may be burst open by the diaphragm and abdominal muscles convulsed. The celebrated Boërhaave is used to tell his audience upon this occasion, that he had seen such a case in a merchant of this city, Leyden, who after
having

^u Sect. I. cap. 4. pag. 68.^w Ibidem pag. 67.

having had the signs of a diseased liver for a considerable time, with a slow fever, and a yellow colour almost as in a jaundice, a gentle vomit was given him to remove the very troublesome nausea: this being done, a great quantity of ichorous corrupted yellow matter was evacuated both upward and downward, but without any relief, and a fatal superpurgation with faintings ensued, so that he expired a few days after. Upon opening the dead body almost the whole substance of the liver was found corrupted, and filled with a putrid ichor. But after the foul humour has been thus discharged by a vomit, those acid, austere remedies lately mentioned will be highly useful, that by these means the stomach weakened by a long continued nausea and vomiting, may be restored to its due strength.

2. But if the signs denote the nausea to be caused by a tough, viscid matter fluctuating in the stomach or adjacent passages, this ought likewise to be removed. But frequently there is so great a tenacity in this mucus, that it cannot be easily washed off either by vomits or purges, unless it be first diluted and attenuated. Water dissolves and dilutes all sorts of mucus in the body, and even the very tough mucus of the nose hardened into scales may be dissolved only by maceration in warm water. But in such people as have this redundant flux of mucus, there is always a weakness of the stomach, and the flaccidity of the body will hardly with safety permit a great quantity of diluent warm water; and therefore we endeavour to dissolve first this tough glutinous matter, and at the same time to amend the weak and cold disposition of the stomach in such people, by administering Venice soap, the inspissated bile of healthy animals, alkaline salts themselves, bitter, bilious,

bilious, and aromatic medicines, such as worm-wood, the lesser centaury, the roots of gentian or elicampane, &c. But when this is done, the mucous matter may be easily expelled by a vomit or purge, after it has been once dissolved and rendered moveable. But for this purpose is to be preferred, before the other medicines, the oxymel of squills, a medicine of the greatest fame with the antient Physicians, and which by the very penetrating bitterness of the squills fuses and divides all phlegm, and then evacuates it by exciting a vomit, provided it be taken in a larger dose than as an alterative. There are also other vomits and purges which may serve for this purpose, several forms of which are enumerated in the *Materia Medica* at the number corresponding to that of the present aphorism. For there is seldom any danger to be feared from evacuating medicines in this kind of nausea. But when such a mucous cacochymy has infected the whole mass of blood, it sometimes happens that the like viscid matter begins to be accumulated by degrees in the ventricles of the brain, whence the patient grows stupid, dull, forgetful, sleepy, lethargic, and at length falls into an apoplexy. But in this case the use of vomits, may be often of dangerous consequence; for during the time of a person's vomiting, we see that all the humours are carried with a greater impetus and velocity towards the head, whence the face swells, the eyes look red and watery, and a giddiness with a noise in the ears are often perceived. When therefore the encephalon begins to be overloaded with a tough, viscid cacochymy, to urge the humours upon this part with a great force by a vomit, may occasion a fatal apoplexy; and therefore it will be safer in this case to make an evacuation of the viscid matter by purges.

3. It ought always to be enquired with the strictest attention of mind, whether the nausea appears (from the nature of the epidemical disease then reigning, or from the signs to be observed in the patient) to arise from an inflammation in the stomach or adjacent viscera. For a pain in these parts, with an acute continual fever, and a hard pulse, give just reason to suspect an inflammation: But a vomit given in such a case, must without doubt do great mischief; for by the violent concussions, the same thing happens to these inflamed parts, as if one was to violently rub the hand when inflamed; for the most intense pain and a gangrene might soon follow from thence. In this case then only, the general method of curing inflammation, by bleeding, cooling purges, diluents, &c. will be convenient, making use of such cautions at the same time, as may be required by the different nature of the part, and as we shall explain hereafter in treating of inflammatory diseases in these viscera. Sydenham, who followed the example of the great Hippocrates, ingenuously confesses he has been mistaken in such a case: For, in a noble lady, of a sanguine temperature, and in the flower of her age, he observed a troublesome vomiting, together with an ardent fever, in which case, after bleeding, he ordered an emetic to be given, as he had so frequently known the vomiting in these fevers to be cured with such an evacuation; but the next day when he was informed the patient had a flux, he soon perceived that the vomit had been mischievous, though in other cases where the nausea proceeds from corrupt, bilious matter, it certainly prevents a consequent diarrhœa, or removes it when present. He therefore now altered his method of cure, but in vain, for his patient expired about the fourteenth day

46 Of Loathings in FEVERS. Sect. 644.
day of the disease. Being moved by this unhappy event to enquire into all the particulars which he had observed in the course of this disease, he concluded it was a local inflammatory disorder: For, the most burning heat remained even after repeated bleeding, the blood evacuated resembled that in a pleurisy, and there was likewise something of a cough with obscure pains in the vital organs; the time of the year was about midsummer, when inflammatory diseases are the most fierce, and pleurisies were at the same time epidemical. Hence therefore, he afterwards treated the same disease with which many others were taken as a pleurisy; namely, by bleeding, with diluents, &c. which method of cure very happily succeeded *. Happy is the person who immediately knows how to correct the error he has committed; for to err is a part of humanity, and therefore common to all of us, but immediately to discover and correct the error, must be allowed by every one to lie in the power only of such as are most accomplished.

The fourth species, &c.] For here no alteration is made in the solid or fluid parts of the body, but the nausea arises merely from a change in the thoughts or ideas. Therefore only by forgetting the thing which formerly excited the nausea, and avoiding whatever may renew the memory of it, will entirely complete the cure. For by this means the first impression is usually effaced, or at least so much weakened, that little or nothing of the nausea returns when the remembrance is renewed of the thing nauseated, even a long time after.

But the fifth kind, &c.] For here only the inordinate motion of the nervous spirits makes the cause of the nausea; which disturbance ought

* Sydenham Sect. II. cap. 2. pag. 148, &c.

therefore to be allayed, for which purpose narcotics afford of all medicines the most effectual relief, concerning the use of which, see what has been said in the commentaries to §. 104, 202, and 229. But since generally a nausea arising from this cause is accompanied or preceded with a vertigo, and as vertiginous patients can hardly bear the least motion of their body without increasing their disorder, it is evident, that rest is more especially useful to such. Sydenham *v* observes, that when he endeavoured to cure enormous vomitings in hysterical women, it was his custom to give narcotics chiefly in a solid form, or else diluted with so small a quantity of fluids-as might just suffice as it were to line the coats of the stomach, without being capable of a discharge by vomiting. In the mean time he advises the patient to be immediately disposed to rest after taking the narcotic, and more especially to keep their head still, because the least motion of it, more than of any other part, excites vomiting. But to strengthen the stomach, which in these patients is generally weak, and too easily irritable, it will be convenient to give the austere medicines which so happily corroborate the too weak and lax fibres (see §. 28. N^o. 4.) to which add the drinking of cold water. For by cold, we know the elementary particles of our solids approach mutually closer to each other, and increase their cohesion together. Moreover, every thing will be here convenient which serves for the cure of too great a weakness in the fibres, vessels, and viscera, which we recommended before at §. 28. and 47. but these are given not so much to relieve the present nausea, as to corroborate the whole body, that it may not for the future be so easily affected by slight causes; and therefore a conse-

quent nausea is thus prevented. For these inordinate motions of the nervous fluid, are never observed in robust people daily exercised with labour; but are most familiar to tender women, and men who lead a sedentary life.

But in this case, evacuations either by purging or vomiting, are almost constantly pernicious, since the cause of the disease does not consist in corrupt humours, but only in a disturbed motion of the spirits. But daily observations teach us, that hysterical women, and hypochondriacal men, are immediately seized with a fit of their disorder, if profuse evacuations have preceded. But in the mean time it cannot be denied, that the most surprising, and often the most sudden changes, may arise only from an inordinate motion of the spirits. For in a person unaccustomed to the sea, however healthy he may be on first entering on board, when the ship begins to be tossed, a nausea generally ensues, soon after which the contents of the stomach are vomited up, and then bile is brought up with a very troublesome straining, 'till at length the bile discharged is said to be eruginous, from its deep green colour. But this bile did not pre-exist as such in the body, but was thus altered by the unusual disturbance in the spirits from the agitation of the ship. In people who fall down with their head foremost from a high place, there is often a vomiting of eruginous bile instantly ensues, even though they were before most perfectly in health, as we said before in the history of wounds of the head. Sydenham ^z indeed makes the colour of the humours so uncertain and easily variable, that he thinks we cannot from thence discover any thing certain of the nature of the
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^z Ibidem, pag. 499.

the bodies in which they appear; and to prove this, he alledges the experiments of the Chemists, who only by mixing bodies together, know how to produce a wonderful variety of colours. Yet this seems to be true, that if the bile is so altered by an inordinate motion of the spirits, as to become eruginous, and stagnate about the præcordia, a nausea will continue as long as such bile is lodged about these parts. Thus, I have seen several who have been sadly afflicted with a nausea and vomiting from the tossings of a ship at sea, and who have continued ill after being set on shore, until the troublesome bilious matter lodged in the stomach was discharged by a gentle vomit. The same thing is also acknowledged by Sydenham^a, when he says: *Quamvis autem satis pateat, originarium hujus morbi fomitem in humoribus nullatenus stabulari, fatendum est tamen (quod res est) spirituum ἀραξίαν illam, cui morbus debetur, humores putridos in corpore coacervandos gignere.* “ That
 “ although it is sufficiently evident that the origin
 “ of this disease cannot be placed in the humours,
 “ yet it must be confessed (what the truth is)
 “ that the disturbance of the spirits to which the
 “ disease is owing, occasions the formation and
 “ accumulation of putrid humours in the body,
 “ &c.” And therefore he begins the cure even of hysterical disorders with evacuating medicines; namely, if there are signs denoting that the viscera are oppressed with a load of fæculent humours. But when severe pains, vomiting, diarrhœa, &c. receive no relief from thence, he directly allayed the inordinate motions of the spirits with anodynes, and when the disturbance was over, he afterwards applied himself to the radical cure of the disease.

^a Ibid. pag. 504.

It is therefore evident, that evacuating remedies do not cure the primary cause of the nausea, concerning which we are here treating; and even that, if they are strong, or often repeated, they rather do mischief: But they sometimes are of service by evacuating the stagnant humours collected together by these disturbances of the spirits; and this more especially if the tumults raised in the body by such evacuations, are afterwards allayed by the use of anodynes.

S E C T. DCXLV.

HENCE we may understand, why a purge or a vomit is so useful when there is a nausea, if given in the beginning of acute diseases, and in what kind of acute diseases? Why patients afflicted with acute fevers, have such an abhorrence to any thing fat or oily, eggs, fish, &c. while on the contrary they have an appetite to water, acids, summer fruits, and cold drinks? Why medicines are useless to the patient until the nausea is removed? Why this symptom is often incurable? And why such diseases often go off at last with a sudden, unusual, and wonderful appetite.

From what has been already said of a nausea, the reason of the following particulars is evident.

Why a vomit or a purge, &c.] Because in these diseases very frequently a perpetual nausea arises and continues from a corrupt, acrid, bile, stagnating in the stomach, or adjacent parts, and which

Sect. 645. Of Loathings in FEVERS. 51

which daily acquires a worse degree of malignity from the heat increased by the fever, and the free access which is given to the air into these parts: whence a vomiting arises, followed with a putrid diarrhoea, which is often fatal, while in the progress of the disease, the patient's strength being exhausted, they are no longer able to support the discharge. Hence therefore if the putrid bilious matter is evacuated in the beginning of the disease by a vomit or purge, all these ill accidents will be prevented. But above all, this method is frequently useful in acute autumnal fevers, which are used to spread epidemically after the bile has been exalted and kindled by the scorching heats of the summer; and almost all of which are acute remitting fevers, consisting of double paroxysms of intermittents, and frequently when the force of these fevers has been subdued, they turn themselves over to the class of intermittents: But in acute inflammatory fevers, as are most of those continual ones which appear in the beginning, or in the height of the summer, this method is often deceitful, because the nausea which accompanies these fevers very often, arises from an inflammation of the stomach, or adjacent parts; whence in such a case vomits especially make every thing worse, as is evident from what was said under the third number of the preceding aphorism.

Why patients afflicted with acute fevers, [See.] For all these substances of their own accord degenerate into a putrid rancidity, and since most of the functions are injured by the fever, what is taken into the stomach, is either difficultly, or not at all digested, and therefore they follow their own spontaneous corruption; and at the same time the quickness of the circulation being increased by the fever, inclines every thing to putrefaction,

(see §. 100.) and often, as we said before, the putrid bile in acute diseases is protruded into the stomach, or lodged in the adjacent parts. Hence provident nature, who is often herself so sufficient in the cure of diseases by a salutary instinct, invites and urges the patient to desire watery liquors, acids, garden-fruits, and every thing which can introduce an agreeable coolness through the body, heated by the fever. But these also allay the thirst, and wash out the corrupted humours lodged in the *primæ viæ*, correct the present, and prevent a consequent putrefaction, dissolve the concremented juices by a mild saponaceous force, and also loosen the bowels at the same time by a gentle stimulus, from whence it is sufficiently evident, how useful these things may be in acute fevers.

Why medicines are useless to the patient, unless the nausea is removed.] For as long as the nausea continues, the patient abhors every thing, or if any thing is taken, is thrown up by vomiting, while the nauseating stomach is so easily irritated by every thing that is swallowed. But in fevers generally attended with a nausea, either from acrid bile lodged in the first passages, or from an inflammation in the stomach and adjacent parts, it is evident enough, that the medicines taken into the body, will not stay to do any service, unless the nausea is removed. For unless the bilious matter lodged in these parts can be expelled by medicines either upward or downward, or at least be so corrected as no longer to irritate these parts into such convulsions as excite the nausea, nothing can be done, but the corrupt matter there lodged will infect the affluent humours with its malignity, and increase the nausea into a vomiting; by which, unless it is expelled, acquiring constantly a worse putrefaction by standing and the heat

heat of the body, it will excite a most putrid diarrhœa, or a dysentery, which is frequently fatal when the strength of the patient has been exhausted by the disease and a long continued nausea.

[Why this symptom is often incurable.] Because sometimes the causes of the nausea cannot be removed. For if there is so violent an inflammation of the stomach and adjacent parts, that it cannot be resolved, the nausea thence proceeding, will be equally insuperable. Thus also, if a putrid vomica or abscess lies concealed in the liver corrupted, which by a continual drain of its putrid matter through the hepatic duct into the duodenum, excites a perpetual nausea, it will never be curable, unless the putrid spring or abscess in the liver can be first cured, which yet is often impracticable. Vomits are here always dangerous, because there is just reason to fear, lest the liver wasted by an abscess should be burst by the force of vomiting; and although the putrid matter, lodged in the stomach or duodenum, should be discharged, a quantity of the same matter will soon be collected there again; and therefore a stubborn nausea will continue inflexible to all remedies, except that it may be often a little mitigated by acids, especially the spirit of sea salt, than which there is hardly found a more efficacious medicine to correct putrefaction. Such a troublesome and often incurable nausea is sometimes observed, when the whole internal surface of the fauces, œsophagus, stomach, and intestines, are affected almost in the same manner, and loaded with mucus, as is the internal membrane of the nose in a cold; and this is frequently a troublesome disorder to old people and men of letters. The like kind of nausea is often observed, especially in a morning, in those accustomed to a daily abuse of spirituous

54 Of Loathings in FEVERS. Sect. 645.
liquors; for in these miserable patients, the stomach is often so cold and weak, that unless they are stimulated by these spirits, there follows a perpetual nausea, and vomiting of a tough phlegm, whence they are obliged even against their inclination to have recourse to the same liquors. It is likewise evident from daily observation, that the nausea which arises during the first stage of pregnancy is inflexible even to the best remedies, 'till it spontaneously lessens, and often entirely ceases after the third or fourth month from the time of conception.

And why such diseases often go off.] We are furnished with numerous observations in the history of diseases, which teach, that sometimes the patient, after being afflicted with a long continued nausea, and an aversion to almost every kind of food, has in a sudden fallen into a strong appetite for such things as in the opinion both of their Physicians and friends seemed to be mischievous. But in the mean time those prudent Physicians who have been most versed in practice, have carefully remarked that we ought not always too rigidly to adhere to the rules of art, when the patient desires things seemingly absurd or improper, as we observed before upon another occasion in the history of fevers. For these efforts of nature in subduing diseases are very often wonderful, and frequently surpass all the skill we are possessed of in the art of healing. Sydenham has observed, that towards the end of a certain wandering and continual epidemic fever, those patients who were about to recover were importunately urged with a desire for something improper or absurd, either in food or drink; and he tells us he readily complied with such inclinations as seemed inconsistent, because the strength of the body being exhausted, called aloud

aloud for refreshment. When the causes of the disease are known, and what is so much desired by the patient will be serviceable against the known causes of the disease, they readily comply; thus they grant thin drinks, garden fruits, a cooling air, &c. when they are desired by those who are afflicted with acute fevers; but when towards the end of these diseases the patient has a great desire for pickled or red herrings, or other eatables of a difficult digestion, they are generally refused, because such things are believed to be repugnant to the rules of art. And yet as Sydenham observes^b, *In his omnibus naturæ, ut videtur, aberrationibus, quilibet in Praxi Medica vel mediocriter versatus, modo animum diligenter adverterit, facile concedet, ægros haud paucos, ubi primum spreto Medici dictamine genio suo obsecundaverint, se melius habuisse;* “ In these seemingly unreasonable longings of nature, one who is even but moderately versed in the practice of physic, if he diligently attends to the matter in hand, will readily grant, that there are more than a few patients, who have found themselves better by satisfying their appetite, which was at first opposed by the advice of the Physician^c.” But as those rules of practice are the most certain which are derived from the *juvantia* and *lædentia* (concerning which see § 11. No. 2. and § 602. No. 7.) and as many things are at present and ever will be concealed from us, it seems therefore to be the part of a prudent Physician, not always of a sudden to resist the unusual appetite of a patient, but rather to comply with it, unless certain mischief will infallibly ensue from the use of what they desire. But in the mean time, their unusual appetite

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^b Sect. V. cap. 2. pag. 288, 289, Dissertat. Epistolar. pag. 459.

^c Idem in

56 Of Belchings and Wind Sect. 646.
is generally towards such things as are acid and salt, and extremely averse to all putrefaction, and the loss of appetite and loathing of food in women with child is the most frequently removed by such. Thus Tulpus^d has an observation, that a woman with child abhorring all food, had afterwards a strong desire for raw sallad and turbots hardened by salting and dried in the smoke, and upon these only she lived healthy for the space of six whole months. Another woman with child was so highly delighted with salted herrings, that before her lying-in, she eat fourteen hundred of them without any offence to her stomach, or injury to her health^e.

S E C T. DCXLVI.

Of Belchings and Wind in FEVERS.

BELCHINGS have for their cause an elastic matter, capable of dilatation, and produced by heat, effervescence, or fermentation in the first passages; which elastic vapour being one instant confined, and the next set at liberty by a relaxation of the parts wherein it was imprisoned, is then exploded or discharged with some force and noise.

When air or an elastic vapour of the same kind is discharged upward by the mouth, it is termed a ructus of belching. In which we are therefore to consider the matter expelled, and then the causes which confine the matter before its explosion, and
which

^d Observ. Med. Lib. 2. cap. 20. pag. 130.
24. pag. 135.

^e Ibid. cap.

which afterwards discharge it with some force or noise, after being 'till then confined. For if we rightly understand these two principles, we shall have a just idea of belching and flatulency.

But the matter of belching and flatus is air, either that of the common ambient medium, with which we are encompassed on all sides, or else another kind of air resembling the former in its elasticity, and many other qualities, but which being concealed in a wonderful manner in bodies, is extricated from them by heat, effervescence or fermentation. For the celebrated *Boyle* ^f has taught us that water, wine, oil, and many other liquors, contain elastic air, which upon taking off the pressure of the incumbent atmosphere by the air-pump, ascends in the form of bubbles. The same thing has been since more perfectly considered by our celebrated author of these aphorisms ^g, who by just experiments has demonstrated to his audience that elastic air, notwithstanding its particles cohere together with a certain degree of tenacity, may yet be dissolved into exceeding small particles, so as to insinuate itself spontaneously into the empty spaces of liquors which contain no air, and be equally distributed throughout the whole mass of the liquor. Indeed the quantity of air thus imbibed by liquors is very small, and it occupies an exceeding small compass in the liquor; but yet in the mean time this small portion of air being absorbed, the liquor will not receive any more air in itself, whatever artifices may be tried to induce it. Nor does each individual particle of the air thus dissolved, and separately existing in those interstices of the liquid which are received
betwixt

^f Nova experimenta physic. mechanic. Tom. I. P. 57, &c.

^g Vide Chimiæ Element. Tom. I. pag. 507. & seq.

betwixt the contiguous elements, seem to retain the physical qualities of air; namely, elasticity, and a very easy dilatibility by heat. But when from any cause two of these aërial particles dissolved in a liquor are drove out, and joined together from the interstices of the elements or atoms of the liquid wherein they adhered, they then seem to repel each other forcibly, and constitute one of the least bubbles of true elastic air, dilatible by the least increase of heat. But this wonderful power whereby the separate elements of the air lodged in liquors, repel each other when they become again contiguous, seems to constitute the elasticity of the air: And this is so great, that the least quantity of that air which was lodged in a dissolved state in a drop of water, having its air particles or elements brought together into contact by expelling them from the interstices of the water by heat, that it produces such a bulk of truly elastic air, as will occupy a much larger space than the drop of water itself, wherein the elementary particles of the air before existed separate from each other.

All these particulars are directly proved by experiments in our author's chemistry before cited, and are necessary to be premised to enable us to enquire after the manner in which the elastic air, which is the material cause of belching and flatus, is produced in our bodies, and that we may know to what principles it is chiefly owing.

S E C T. DCXLVII.

HENCE therefore the common air, salts of an opposite nature, ripe garden fruits, putrefying humours, and fermenting vegetables, afford the matter of belching and flatus, the force and ill smell of which varies according to the different nature of the bodies which produce it.

This matter of belching or flatus either enters the body already in an elastic state and dilatable by heat, or else lying insensibly concealed in certain bodies, it is afterwards extricated from them. Concerning each of these we shall treat separately. But a matter already elastic is afforded by

The air.] That air is the matter of flatus in the human body, has been long ago observed by Hippocrates ^h, when he says, *Hominum enim & aliorum animantium corpora triplici alimento nutriuntur. Sunt autem illis alimentis hæc nomina: cibi, potus, spiritus. Verum spiritus, qui in corporibus sunt, flatus vocantur; qui vero extra corpora, aër.* “ The bodies of men and other animals, “ are nourished by a threefold aliment: but these “ aliments are denominated meat, food, drink, “ and spirit, or air. But the spirit within the “ body is called flatus, as that without the body “ is called air.” For that the common air with which we are encompassed on all sides, has a free course to enter into the first passages of our body, there is no one at all doubts. Moreover, as the air is mixed with the food and embarrassed in the saliva with

† De Flatibus cap. 2, Chapter. Tom. IV. pag. 214.

with the mucus of the tongue, mouth, and fauces, during the time of mastication, it is by that means conveyed into the stomach, and is from thence transmitted through the intestines, performing very considerable uses in the digestion of the aliments, since by its elasticity and pressure varying every moment by the heat of the body, it attenuates and renders the aliments fluid, excites the peristaltic motion of the intestines, or else continues their motion once begunⁱ. There is no doubt therefore remains, that the common air entering the body may constitute the material cause of belching and flatus.

But there is another question remains, whether the air thus concealed in liquors, or in other bodies, so as no longer to retain any of the physical properties of common air, may sometimes be so extricated from thence within our body, as to acquire that elasticity and easy dilatibility, when the elementary air particles are united together, which before existed in them asunder. It is evident from physical and chemical experiments, that taking off the pressure of the atmosphere, or only a considerable weakening of it: as also a great heat extricates the air dissolved in liquors, and unites together its separated elementary particles; and thus elastic air is again produced. But it is also evident from direct experiments, that the heat of an healthy body does not extricate the air, unless it becomes so great as to lessen the pressure of the atmosphere, which we never observe naturally. Even in a living person, there is very rarely so great heat present, as to be able to produce the like effects. We may therefore conclude, that the air contained and distributed throughout

ⁱ H. Boërhaave Institut. Medic. §. 58. 64. 69.

throughout our humours, cannot naturally extricate itself so as to be collected together within the vessels in the form of air bubbles^k, and that if this ever happens, sudden death follows. I inflated air by a tube into the crural vein of a dog, and soon after a great anguish, difficulty of respiration, and death ensued. The same has been also remarked from the air impelled into the jugular veins by Harderus^l. Ruyfch^m found the heart of a surprising magnitude, and inflated in the body of a woman; and upon wounding the heart with the point of a scalpel, it instantly collapsed and discharged the air with which it was filled, having little or no blood. But then he adds, that this woman died suddenly. There are many more observations of the like kind, teaching that air has been sometimes found in the blood-vessels, or in some other receptacles. In animals exercised with violent labour of body, there is sometimes so great a heat raised as to extricate the air from the humours, and to raise blisters; but then sudden death very frequently follows this too violent exercise of body. In the most ardent fevers before death there is sometimes so great a heat raised, that the like appearance also ensues. This more especially happens when there is a great propensity to putrefaction in such diseases, and the putrid humours discharge their contained air in the manner we shall presently explain; and therefore it is no wonder that truly elastic air should be sometimes found mixed with the blood after death, since then every thing spontaneously inclines to putrefaction. But in the mean time it is evident from all that has been said, that naturally no elastic air is to be found

^k Vide de his H. Boërh. Chem. Tom. I. pag. 517, 518, 525, 526.

^l Joh. Jacob. Harderi Apiarium pag. 114.

^m Epist. Anatom. & Problem. 16. pag. 11.

found in the blood, and that when it is there by disease, the patient is in danger of sudden death.

But chemistry has discovered many other ways whereby the latent air may be extricated from bodies, all which methods may take place in the first passages of the body, which make the proper seat of belchings and flatus. For when salts of an opposite nature are mixed together, or earths with acids, they raise a wonderful motion of effervescence, during which a great quantity of elastic air breaks forth, and this even though the two bodies were included a long time in a Boylean vacuum before their mixture, so as to free them of all the air that could be extricated from thence by removing the pressure of the atmosphere *. How great a quantity of air is generated by summer fruits, putrefying humours, and fermenting vegetables, has been demonstrated at large by many experiments by Mr Boyle †. It appears from daily experience, that fermenting liquors yield an incredible quantity of elastic air, which if it finds no vent whereby it may exhale, breaks through any vessel with an immense force. But we every day feed upon such things as are naturally inclined either to ferment or putrefy; and therefore when such an intestine motion is carried on in the first passages, it is sufficiently evident that the elastic air thence generated, or rather extricated, will afford the matter for belchings and flatus.

But the force or impetus of this elastic matter will be various, according to the different manner in which it is produced. An effervescence of alkaline salts with acids, make a pretty forcible explosion of this elastic matter; putrefaction and fermentation discharge it with a less force, but then they continue to generate or produce it for a much longer

* H. Boërh. Chem. Tom. I. pag. 527. & seq.
 Experim. Physic. Mechanicis.

† In

longer time. Ripe fruits plentifully eaten, generate a great quantity of this flatus, and often very suddenly by the heat of the body; and from hence follows such a sudden inflation of the stomach in many people after eating those fruits.

For the same reason likewise, the fætid smell will be various: Namely putrid, if it proceeds from a matter inclined to putrefaction; sourish, if it proceeds from a fermenting or vinous body; and again, of a kind different from either of these, if it arises from an effervescence of salts opposite to each other in their nature. Indeed it is seldom that such aliments are taken into the body as naturally effervesce with each other, but under the title of medicines such things frequently occur; as when for example, crabs eyes or the like absorbent powders are given to one afflicted with the heart-burn from an acid, &c. But the different smell of the belchings will easily point out the nature of the bodies, which being lodged in the primæ viæ produce this elastic vapour. Hence Celsus, in treating on diseases of the stomach, where he directs to suppress a vomiting arising spontaneously, very judiciously excepts that; *Si coacuit intus cibus, aut computruit, quorum utrumlibet ructus ostendit, ejiciendus est.* “Wherein the food taken into the
“ body is become acrid or putrid, either of which
“ will be pointed out by the belchings, and ought
“ to be thrown upⁿ.”

We have thus seen what is the matter of belching and flatus; but unless this matter in the first passages meets with another cause, it does not form either belching or flatus but freely exhales. But what this accessory cause is we shall explain in the next aphorism.

S E C T.

ⁿ Lib. IV. cap. 5. in fine pag. 209.

S E C T. DCXLVIII.

NOR yet will all these (§. 647.) afford any impetuous noise if they are allowed free liberty to exhale; and therefore it is evident that an alternate, convulsive, contraction and relaxation of the sphincter of the gula or œsophagous muscle, and of the upper or lower orifice of the stomach, and intestines must always concur at the same time; whence belchings, flatus, farts, and rumbling or croaking of the guts.

There is this wonderful property in the stomach and intestines of men and many other animals, in which experiments have been made, that the vermicular motion of them which is called peristaltic, continues a long time even after death; and that even when this motion ceases it may be renewed again by fomenting these parts with heat, or by irritating them °. It also appears that acrid substances applied to these parts have occasioned them to be contracted with a spasm or convulsive motion, not only in the place of contact where the acrid substance was applied, but frequently in many of the adjacent parts at the same time, so as to deny all passage to the contents into the intestinal tube, or into the cavity of the stomach. It was not without admiration that I saw in a dog who had been dead for some minutes, that if I irritated the stomach by the point of a knife, or by pinching with forceps, it became violently contracted,
not

° Wepferus Hist. Cicut. aquat. pag. 89.

not at the place irritated, but at some distance from thence, and that to such a degree that the bulk of the stomach lost five parts in six of its capacity. When I applied a small drop of oil of vitriol to the external surface of the intestine in a dog yet living, the gut became instantly so contracted in that part as if it had been tied together by a string. But this contraction of the intestines is sometimes used to be so obstinate, that *Wepfer* ^p has observed the bowels of those who have expired of a colic, as also in brute animals, into whose intestines he had forced purgatives or corrosive substances, that they were so constricted in several places, that the flatus contained betwixt the two contractions, could hardly be drove out from thence either one way or the other. But so long as the irritating acrimony continues to act, the flatus expelled is renewed again by more of the same kind, as *Wepfer* demonstrates by a fair experiment ^q. For after he had given half a scruple of mercury sublimate to a dog, when it began to operate upward and downward, upon opening the abdomen the stomach immediately burst forth inflated, and by compressing it the flatus escaped through the mouth, but was soon after filled again with the like flatulencies. All these particulars being duly considered, it is sufficiently evident what belching and flatus commonly are, and from whence they proceed. For an elastic matter wandering about in these parts makes the material cause; while the efficient cause is a spasmodic constriction of these parts, either from some acrid, irritating matter, or from an inordinate motion of the spirits. But altho' the air swallowed together with the food and drink, or

^p Ibidem pag. 91.^q Ibidem pag. 297.

freely admitted to wander through the first passages when they are empty, always affords a supply of this elastic matter, yet it does not occasion either belching or flatus, unless it is also attended with those spasms. All that has been hitherto said is fairly confirmed by a remarkable observation in *Helmont* ^r. For in a monstrous child afflicted with an umbilical rupture, which extended a hand's breadth and a half, under the thin and pellucid skin the intestines might be seen, and the unfortunate lad, whenever he had the gripes, afforded *Helmont* an opportunity of viewing the motion of the ileum: *Adeo ut intestinum istud, tanquam sibi obambulando ebulliisset, contorqueri & convelli videretur. Idque maximè, quoties nova tormina infestarent. Quæ cum sub doloribus sic se haberent, voluit etiam subter sanitatem contemplari, qualis esset intestinorum æconomia. Atque tum observavit alium successivum plane motum, quo se intestina exercebant. Nam quoties aliquid supernè ad anum transmittebatur (erat autem in consistentia liquidioris syrapi & obscure flavum) intestinum suis se transversis fibris contraxit, tanquam penitus isthac clauderetur, atque excrementum infra se depelleret: fiebat enim hoc successiva fibrarum transversarum contractura, non secus atque fidicen digitum post digitum aperit, & priorem laxat. Usque adeo propellebat quidem excrementum simul cum flatu, sed hic retrocedebat ilico ad pristinum locum.* “ He therefore saw that intestine boil up, twist, and contract as if it was walking. And this appeared more especially when new gripes came on. But since he had thus an opportunity of seeing what happened to the intestines during the pains, he was likewise

^r In Capitulo de Flatibus No. 38. pag 339, 340. & de Lithiasi cap. 9. No. 132. pag. 734.

“ wise willing to examine their œconomy under a
 “ healthy state. But then also he observed another
 “ kind of successive motion very plainly, with
 “ which the intestines exercised themselves. For
 “ when any thing was transmitted from above
 “ towards the anus, (the consistence of the matter
 “ being that of a thin syrup, and of an obscure
 “ yellow colour) the bowel being contracted by
 “ its transverse fibres, was by that means in a
 “ manner so perfectly closed as to drive down the
 “ fœces from below them: For this contraction
 “ of the transverse fibres was successive no other-
 “ wise than as a fidler closes one finger after an-
 “ other, and opens the rest. In this manner the
 “ fœces were propelled together with flatus, but
 “ this last immediately returned back to its first
 “ place.” It is therefore evident that the elastic
 matter of flatus is always present in the intestines,
 but that flatus and gripes only happen when the
 intestines are convulsed with a spasmodic con-
 traction.

Since therefore this elastic matter may be inter-
 cepted throughout the whole course of the œso-
 phagus, stomach, or intestines by a spasm or con-
 vulsion of the muscular fibres, it is evident that
 in all these parts flatulent tumours may be formed,
 disappearing in a little time, as soon as the fibres
 before contracted are relaxed, and a free passage
 made of the elastic matter; but often returning
 again when such spasms are renewed. Thus the
 fibres of the œsophagus being constringed, the
 intercepted air forms that globular tumour in
 hysterical women, when they falsely believe that
 the uterus ascends thither. The orifices of the
 stomach being constringed in the like manner,
 occasion a great tumour in the epigastrium from

the same cause; and upon a relaxation of its upper orifice, the elastic matter is discharged by belching; but if it goes out through the pylorus, it is dispersed through the intestines, and escaping by the anus with little or no sound, is only called flatus or wind, otherwise with a sound, a farting. But if the muscular fibres are successively relaxed and constricted again, the elastic matter wanders thro' the intestines with a slight murmuring noise, which is called borborygmi or croakings of the guts, and which are said to be confined if no discharge of flatus ensues. This murmuring is more especially perceived through the tract of the intestinum colon.

From what has been hitherto said it is sufficiently apparent what belching and flatus are in the human body, as well with respect to their matter as their efficient cause: It therefore now remains for us to see what maladies may be thence feared.

S E C T. DCXLIX.

IF these two causes concur together (§. 647, 648.) they act powerfully and continue a long time; and then the elastic matter being forced to expand and dilate itself, by the heat and motion of the parts, by its own proper force, and by being tied up in a cavity, the fibres of which are constricted with a convulsive force, it then distends and dilates the confining membranes and excites pain, and by compressing the adjacent parts, there follows intolerable anguish with colicky pains, soon disappearing

appearing when the flatus is discharged (see §. 220, to 227, and 631, 634.) But if to these is added the force of a fever, it occasions the most inexplicable torture.

If therefore plenty of air, or such substances as suddenly produce a great quantity of elastic matter, are confined in these passages, and at the same time this elastic flatus is intercepted by a spasmodic constriction of the fibres, either from some acrid irritation, or a disturbed motion of the spirits, the constriction being so great as to retain the flatus from escaping; in this case the rarefaction will be increased by the heat and motion of the body itself, and more elastic matter of the same nature will be added to the first from the flatulent bodies which produced it; whence the confined membranes will be gradually more and more distracted, and the most dreadful maladies will ensue. But if we consider what was said at §. 220. and the following concerning pain, it will be evident enough that the distraction of the parts being thus gradually increased must produce the most intolerable pains. At the same time also the blood-vessels, dispersed through the membranes thus distended, being compressed or straitned will occasion the most violent inflammation, and a suppression of all the vital circulation of the humours, whence a sudden gangrene, which so frequently proves mortal in these parts (see §. 432.) But also the adjacent parts being compressed or distracted by these flatulent tumours, may be likewise affected with the same maladies. A remarkable instance of this we gave in the comment to §. 422. No. 2. where a gangrene was threatened from a com-

pression of the iliac vein, by the intestinum colon distended with wind, which yet being discharged, the swelling of the leg soon disappeared, and life returned again into the part which was almost dead.

If now to these we add what was said in the comment to §. 170. No. 3. concerning the wonderful influence or power, which the nerves, dispersed through the abdominal viscera, have upon the vital functions, it will be evident enough how great disorders may arise from this cause only; and the reason will be also evident why strong and healthy people often expire in a few hours after they have suffered these confined or convulsive colics. At the same time it is also evident that the most intolerable anguish may arise from flatus, when the parts distended with wind compress the adjacent larger vessels, concerning which we treated under the title of anguish. Moreover, the intestines a long time distracted by wind may become paralytic, and then they never afterwards return to their natural contraction, but what is taken into the body will be accumulated as in a dilated sack, and being retained there a long time, will give rise to new disorders: Hence the iliac passion or intorsusception of the intestines, when the low part which is not distended, enters into the dilated part of the intestine immediately above. Hippocrates^s therefore very justly pronounces, that iliac passions, gripings of the guts, and other obstinate diseases arise from flatulencies.

But these great and numerous disorders immediately cease, if these convulsive spasms being allayed
afford

^s De Flatibus cap. 5. Charter. Tcm. VI. pag. 217.

afford a free discharge to the confined air, either upward by belching or downward by flatulent explosions, or else if it has an opportunity to wander successively thro' the whole tract of the intestines, producing those murmuring noises which we call borborygmi or croakings of the guts. If again a violent inflammation or a gangrene does not yet succeed, in the membranes distracted by the distending flatus, but they by too long a distension become paralytic, even then many disorders of the worst consequence may ensue, though the flatus be discharged; and even sometimes sudden death has followed, when the unwary have rashly judged the patient to be out of danger. For since in the confined or strangulated colic the intercepted air cannot be discharged by any efforts of art, a gangrene is often suddenly produced, by which the membranous fabric of the intestine being dissolved, the spasm goes off, and the flatus escapes, only it is then too late: for altho' the absence of pain, and the discharge of the flatus may seem to give such patients hopes of recovery, yet the coldness of the extremities, the weak and intermitting pulse, and the cold sweats with a cadaverous countenance, sufficiently demonstrate to a skilful Physician that death is near at hand. Therefore Hippocrates † says, *Dolores ex hypochondriis & tumores, si recentes sint, & sine inflammatione, solvit borborygmus in hypochondrio excitatus, & maxime exiens cum stercore, urina & flatu. Si vero non, & ipse transmissus. Juvat vero & descendens ad inferiores partes.* “ That pains and tumours of the
 “ hypochondria being recent and without inflamma-
 “ tion, are dispersed by a rumbling noise excited

F 4

“ in

† In Prognostic. Charter. Tom. VIII. pag. 631.

“ in the hypochondrium; and more especially
 “ when there is a discharge of the flatus and
 “ urine together with the fæces. But if it does
 “ not go off entirely, it removes itself, and is of
 “ service by descending to the lower parts.”
 Here he justly remarks that these disorders being recent and without inflammation are thus relieved. The truth of this is demonstrated by daily observation in hysterical and hypochondriacal people, who find that the intolerable anguish and severe pains are often immediately relieved, only by an explosive discharge of wind upward or downward. It was therefore not without reason that Tiberius Claudius Cæsar *dicitur meditatus edictum, quo veniam daret flatum crepitumque ventris in convivio emittendi, cum periclitatum quendam præ pudore ex-continentia reperisset* ^u. “ Is said to have meditated
 “ an edict whereby he gave pardon to any one of his
 “ guests at table who should break wind upward
 “ or downward, because he found that one had
 “ been in danger of perishing from confining this
 “ matter through bashfulness.”

But when a fever also attends at the same time that this confined air is pent up in these membranous parts contracted by a spasm, it is evident enough how great disorders must thence follow: For it is well known from physical experiments, that the air may be rarefied immensely by an increased heat; but by a fever the heat of the body is greatly increased. Besides this an inflammation if not yet present will soon be raised by the fever, since the humours are urged with an increased velocity through the vessels much straitened or compressed by the distension. But if an inflammation

^u Sueton. in Tib. Claud. Cæs. §. 32. pag. 477.

tion is already present, it will be so far increased in a short time by the enraged fever, that after the most excruciating torture it soon terminates in a fatal gangrene. This is the reason why skilful Physicians are not much afraid of colics or gripes in the abdomen, if they are without a fever; but when a fever also attends they foresee the worst consequences, and therefore they endeavour to cure the present or approaching inflammation by the most efficacious remedies. If now at the same time such things are lodged or confined in the bowels as generate a great deal of elastic matter by an increased heat, such as summer fruits, fermenting liquors shut up in the act of fermentation, or the like, it may be so far distended thereby, with the fever, and increased heat thence arising, as to burst the viscera; for even the strongest casks are burst open by the elastic vapours generated in fermentation. That such dreadful disorders sometimes happen, we are taught by the writers of observations. And hence the reason is also evident why Hippocrates affirms in his coan prognostics; *“ In febribus inflata alvo flatum non erumpere, malum. ”* “ That when the bowels are “ inflated in fevers without a discharge of the “ wind, it is a bad sign.”

▼ No. 45. Charter. Tom. VIII. pag. 853.

S E C T. DCL.

THE cure of this disorder is performed
 1. by removing the matter (§. 647.) by diluents; by dissipating the same with warm, watery liquors gently aromatized; by removing the equilibrium of the salts to the side which is necessary to predominate; by such things which correct putrefaction and allay fermentation. 2. By such medicines as allay convulsions, mitigate acrimony, and quiet the spirits, to be called off from these parts; of which the principal are opium, and the mild antihysterics. 3. By warm relaxing anodyne clysters, fomentations and epithems, with gentle aromatics, as also by the application of cupping-glasses to the abdomen without scarifying.

From what has been said before it is evident that the cause of belching and flatus is two fold, namely an elastic matter or air, swallowed or else extricated out of the food, and then a convulsive spasm or constriction of the œsophagus, stomach, &c. by which the elastic matter is intercepted and confined within the contracted parts. If therefore this elastic matter can be discharged, or the intercepting spasms be removed, so as to make way for the vapours to pass and repass freely, the cure will be obtained. But how and by what means this may be obtained is our business to explain in this place.

1. The

I. The ambient air always wanders through the first passages, and therefore one cannot be able to remove this matter of the flatus which proceeds from the air lodged in these parts. But when the air is intercepted by a spasmodic constriction of the parts it cannot escape until those spasms are removed, concerning which we shall treat in the following number of the present aphorism. But the flatulent matter arising from a fermentation, putrefaction, or effervescence of the ingested aliments or medicines, may be removed, or at least so corrected as to be no longer offensive. Here diluents hold the first place, and are of the greatest use, which as we have often observed before are only to be formed of water or watery liquors: For by these such matter lodged in the first passages is attenuated, dissolved, and rendered moveable, so as to be very well disposed to be expelled either upward or downward. But these watery drinks are to be used warm, because heat increases their diluent and attenuating power. Moreover, when we use our endeavours to remove the causes of flatus, we ought always to be mindful that a spasm attends at the same time, and therefore that nothing ought to be given that can increase those spasms. But it appears from daily observation, that by a plentiful drinking of any thing cold, flatus and gripes are often excited, or else increased if they were there before. For Hippocrates * observes, that cold occasions convulsions and a tetanus, and is an enemy to the nerves, whereas warmth is friendly to them: And a little after he adds † that warmth allays pains and mitigates convulsions and cramps. Since
therefore

* Aphor. 17 & 18. Sect. V. Charter. Tom. IX. pag. 204.

† Ibid. Aphor. 22. pag. 207.

therefore the first passages are so very nervous, and spasms always attend the flatus; the reason is evident why the watery drinks are required to be warm. To these drinks it is usual to add agreeable spices, which being diluted in a great quantity of water, gently irritate these parts by their mild stimulus into more equable contractions. For by a continual irritation and contraction of the fibres of the stomach and intestines, their contents are pressed and urged forwards; but this contraction soon after goes off, and is in a manner renewed again in the next part, as we are taught from observing the peristaltic motion in the dissections of living animals. I have moreover seen, by gently irritating the intestines, that a spasm has been raised in the part irritated, and sometimes in another part adjacent; but when I have afterwards in another place made a slight irritation of the like kind, I have observed the first to cease, and another like the former to succeed in a different part. It seems very probable that all those medicines of the shops which pass under the title of carminatives, operate nearly in the same manner; for these are in reality observed as well to produce flatus as to dissipate it. For if any one drinks the spirit of anniseed or the like aromatic spirits, they will soon after belch or break wind upwards, though being before perfectly in health there was no sense of any such flatus. Hence it appears that these things may be serviceable to remove the spasms already formed, even though by the taking of them, a more gentle kind of spasms are instantly excited, and as soon disappear. But at the same time it is to be observed that all these aromatics, especially those which are prepared by distillation with spirit of wine, if they do not immediately relieve as soon as given, they

they may be very mischievous: For there is danger of increasing the spasm then present by the too violent or often repeated stimulus of these medicines; and then inflammation is always to be feared in this case from such warm remedies, or if an inflammation is already present, they may greatly increase it. But it is very evident that the use of these will be much more dangerous, if the flatus is accompanied with a fever and gripes; and it is not unfrequent for fatal errors to be committed in such cases, as it is generally a custom with the patients to make use of such aromatic spirits, and often with great freedom before they send for a Physician. But when the milder aromatics, such as the greater and less warm seeds, as they are called in the shops, are drank infused in a great quantity of water, they are of the most happy use in dissipating flatulencies; and thus at the same time there will be no danger of mischief from too great acrimony.

By removing the equilibrium of the salts.] How sudden and copious a generation there is of elastic air, when opposite salts are mixed and ferment together, we are taught by many experiments: But it is rarely that belching and flatus arise from such a cause. But if to infants troubled with an acid in the first passages a considerable quantity of alkaline salts is given, the stomach may be so far distended with flatus on a sudden from that cause, that both its orifices will be constricted with a convulsive force, which may produce fatal convulsions in such tender bodies, which are so easily irritable. Hence it is much safer to dissolve those cheesy and acid coagulums which are often lodged in the stomach by giving Venice soap, and afterwards to make a discharge by a gentle vomit or a purge. Like-
wise

wife the use of antiacid absorbents, such as crab's-eyes, coral and the like given in small doses and often is much better than salts, because they make a much less effervescence with acids, and do not make so sudden nor so violent an explosion of elastic air by the effervescence which they raise. But if the cause of the flatus be known to arise from opposite salts, making an effervescence in the first passages, the only remedy is to weaken it, by drinking large quantities of diluent liquors, or by taking a greater quantity either of acid or alkali, that one of them prevailing over the other may cause a speedy cessation of their mutual conflict. In such a case also the use of oil of almonds or any other emollient is of the greatest service; for by this means the acrimony of the opposite salts is obtunded, so that they can act upon each other only with a less force.

By such things as correct putrefaction.] That putrefying humours generate the elastic matter of belching and flatus, was said before at §. 647. But the putrid smell of such belchings and flatus, together with the signs before mentioned, (§. 84, to 87.) sufficiently denote the presence of this cause. In this case such things as correct putrefaction, and especially acids, will dissipate the flatus: And among these acids there is hardly a remedy which recommends itself more to use than the spirit of nitre and sea salt, united by a long continued digestion with alcohol of wine; for which *spiritus nitri dulcis* is above all, much recommended by authors as a powerful discutient for wind or flatus. Yet is not its use so universal as many would have it, but only in such a case it is serviceable.

And allay fermentation.] A very frequent and often dangerous cause of flatus is the taking in of such

such aliments as are very prone to fermentation. Hence summer fruits eaten in large quantities frequently produce the worst disorders, as they immediately begin to ferment by the heat of the body; and this more especially when wine is drank after them, as is the custom of many, thinking by that means to correct the coldness which they suppose to reside in the fruits. It is well known that the juice of grapes immediately froths or sparkles and shews signs of a beginning fermentation, almost as soon as it is expressed; and the same thing is also observed more or less in the juices of the other soft fruits. Nor are these hurtful only inasmuch as they generate a great quantity of elastic matter, but also because the spirit or gas, which is called wild by Helmont, being produced by fermentation, is extremely apt to raise spasms, having a wonderful power and influence over the whole nervous system. The best remedy in this case is immediately to expel the fermenting matter either upward or downward, as it often happens spontaneously, when a most violent cholera arises from such causes. But if this cannot be safely performed, the fermentation begun must be suppressed as soon as possible. But there are here only two things to be used out of those which are able to allay fermentation, namely the spirit of sulphur by the bell, as it is called in the shops, prepared by condensing the vapours of burning sulphur; or else the earthy absorbents, which being copiously used effectually destroy every thing acid arising from fermentation^z. For it appears from the most certain experiments that the fumes of burning sulphur being shut up in close vessels which contain juices very apt to ferment, do effectually restrain all fermentation,

^z Vide H. Boërh. Chem. Tom. II. pag. 186, 187.

tion, and therefore it is not without reason that we may here expect the like effects from the spirit of sulphur. But when the fermenting liquor has acquired a considerable acid acrimony in the first passages, the earthy absorbents before-mentioned are most to be recommended.

2. It was said before (§. 648.) that the efficient cause of flatus was a convulsion or spasm of those parts which naturally contain the elastic matter of flatus and belchings, which matter being intercepted in these parts contracted by a spasm, has produced all those disorders enumerated in the preceding aphorism. It likewise appeared at the same time that all the belchings and flatus vanish when these spasms are removed. It likewise appeared from the experiments before enumerated, that acrid substances applied to these nervous parts, produced such spasms whereby the elastic matter might be intercepted, and therefore every thing which obtunds or weakens acrimony, will cure convulsions arising from this cause. Such things therefore as allay acrimony will answer this intention; and these are either general, which dilute or sheath as well as mitigate acrimony; to which use serve diluent watery drinks recommended in the preceding number of the present aphorism; as also soft oils taken in a large quantity, all which take off the edge of every thing acrid, and at the same time so defend these parts which they line, that they are either not at all or but very little affected by the acrimony lodged here; they likewise are very useful in relaxing and mollifying the contracted fibres. This is the reason why linseed oil or the like, drank to the quantity of a pound or two in some of the most dangerous cases, where a gangrene has already begun to appear, has frequently saved the patient

patient out of the jaws of death. But as this known acrimony varies, different kinds of correctives are to be used: Thus acid acrimony is mitigated by alcalies or earthy absorbents; but putrid alkaline acrimony is corrected by acids, and so of the rest. But concerning all these we treated before in the comment to §. 605.

But only a greater determination of the nervous spirits to some parts, from whatever cause derived, may excite spasms and convulsions. For there are causes sufficient to distend at one and the same time, all the voluntary muscles which come under the influence of the will. If therefore out of that great quantity of spirits which is always at hand, a derivation is made to some certain part, that part will be immediately affected with a true cramp. Thus for example, when a man falling into the water, catches hold of a stick which is put out to him, the spirits flow with so great force into the muscles of that part, that he will not only hold fast the stick, so as to sustain the weight of his whole body; but when such a person has been thus drawn out of the water, the determination has been observed so strong and so durable, that he has not been able by any force for several minutes to loosen his hand from the stick. If therefore these spasms happen either in hysterical or hypochondriacal people from a disturbed motion of the spirits, we are then to have recourse to such things as are able to allay these disturbances. But among these, opium deserves the first place, as a true quieter of the tumultuous spirits, and by the use of which Sydenham^r testifies he has been able to ease the most severe pains, vomitings, diarrhœas, &c. arising from a disturbed motion of the spirits. When the fibres of the intestines are contracted with a spasm in strangu-

^r In Dissertat. Epistol. pag. 506.

lated ruptures; and the intestines thus distended with the elastic matter cannot be returned, plentiful bleeding being premised to prevent inflammation, which is much to be feared in such a case, opium then given has often happily removed these spasms, and freed the patient from imminent danger of death. Hence therefore it is justly ranked in the first place among those remedies which are termed carminative, that is to say, which discuss wind. Hitherto also belong those anti-hysterical medicines, which, *Quæ factoris exhalatione repellendis spiritibus, seditionem molientibus, & in loco suo continendis opta nata sunt.* “ From their
 “ foetid exhalation are known to be suited for re-
 “ pelling the spirits and confining them within
 “ bounds, when they endeavour to raise a distur-
 “ bance ^s.” Thus we see that the strength of castor and foetid smell of asa foetida, with the fumes of burnt hoofs of animals, &c. almost instantly allay these wonderful disturbances, and take off the spasms. But in the present case only the more gentle antihysterics obtain, because we must not have recourse to the more acrid and heating, such as spirit of sal ammoniacum, the volatile oily salts, and the like, for fear of inflammation.

It is well worth observing in this place, the error of some, who endeavour to allay these spasms by suddenly exhausting the body with profuse bleedings. For although blood-letting is often useful in this case to remove the inflammation already formed in the distended parts, or in the adjacent compressed parts; yet to remove those spasms, a profuse and sudden evacuation is a doubtful remedy, since a convulsion may follow from that cause only, as we observed before upon another occasion.

^s In Dissertat. Epistol. pag. 507.

sion at §. 232. For here it is sufficient to alter the determinate course of the spirits by mild antihysterical remedies, or else to allay their impetuosity by narcotics.

3. But all those things which have been enumerated under the preceding numbers of the present aphorism, may be likewise applied, and with very good success, in the form of a clyster: for although clysters are only received into the large intestines, and hardly ever penetrate into the smaller, yet they are very useful, inasmuch as the cause of the flatus is often seated in the colon, and the hard fæces being accumulated in the large intestines, they may thus be commodiously washed out by clysters. Besides this, the large intestines being filled with a warm emollient liquor, it performs the office of a fomentation to the adjacent small intestines. Hence in the more desperate cases it may be convenient to inject a clyster of the like kind every hour, and as there is danger then in delaying the preparation of a clyster, in the common method, linseed oil with water and honey will afford a very proper matter. But when such emollient clysters have been used several times without success, recourse may be had to the more acrid, that the large intestines being irritated by their means, the spasms may be removed from the other parts: for that this may sometimes happen, is evident from what was said under the first number of the present aphorism. I remember myself to have succeeded sometimes in this case, by ordering an ounce of sal gem dissolved in a pint of water, and I have even sometimes used clysters, prepared from black hellebore, colocynthis, and the like, with happy success, provided there were no signs denoting an inflammation already formed, for by these acrid stimuli a great quantity of flatus

has often forcibly discharged itself together with the fæces. But when, these being also tried, the disorders are not alleviated, the disturbances excited by these must be immediately allayed by narcotics.

At the same time also warm fomentations of laxatives and anodynes applied to the whole abdomen will be very useful, taking care not to let them grow cold, for then they would be prejudicial; but this may be prevented by the application of tiles heated and wrapped up in cloths, or bags full of warm sand. The patient is sometimes immersed into a warm bath for the same purpose. But what benefit may be expected from these means in allaying spasms and convulsions, is evident from what was said before in the comment to §. 164. For when Galen perceived convulsions approaching in himself from a violent distraction of the muscles preceding, he prevented that disorder by a continual effusion of warm oil; and he testifies, that he immediately perceived a distension and convulsion of the muscles of the neck approaching, if he did but omit the pouring on of the warm oil for a short time. The like things are also recommended by Hippocrates ^t for the cure of the iliac passion, and after having tried them all in vain, he has been bold enough to insert a pair of bellows into the anus, and forcibly drive in the wind to dilate the contracted intestines. Sydenham ^u orders live whelps to be applied to the naked abdomen, in order to allay the horrid spasms of those afflicted with the iliac passion by so mild a warm fomentation, which is at the same time so very friendly to the nature of the human body. For the like purpose, I likewise used carminative em-

^t De Morbis Lib. III. cap. 13. Charter. Tom. VII. pag. 588.

^u Sect. I. cap. 4. pag. 91.

emplasters, as they are called in the shops, to repel the perspirable vapours, which moisten and relax, while by the grateful stimulus of the aromatics in their composition, they are likewise useful by exciting a gentle warmth.

But we hardly yet know a more present remedy to remove these spasms, whereby the flatulent matter is intercepted and confined, than the application of cupping-glasses: for by these even Galen^w has long ago observed, that pains arising from the flatulent spirit are immediately removed, as if by a charm. That these were very frequently in use among the Antients, is evident from Celsus^x. But they had two kinds of cupping-glasses, of which one sort only had a single opening, which was applied to the skin immediately after some burning flax was put into the glass. But the other kind had a mouth as large as the former in one part, and in another part was a small opening, by which they extracted the air by sucking, and afterwards closed up the orifice with wax. But in both cases the air in the cavity of the cupping-glass is discharged, whether by driving it out with the burning flax, or extracting it by sucking. Hence the pressure of the incumbent atmosphere upon the glass prevailing, presses it very close to that part of the body to which it is applied, and obliges it to stick fast: the reason of this phænomenon easily appears from physics. But the humours flow more copiously and impetuously into that part which is covered by the cupping-glass, since the pressure of the atmosphere is there taken off, or at least greatly diminished: hence tumour and redness always arise more or less in the part, in proportion as the cupping-glass adheres more

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forcibly,

^w Lib. XII. meth. medend. cap. ultimo Charter. Tom. X3
pag. 292.

^x Lib. II. cap. 11. pag. 82.

forcibly, and for a longer time. At present cupping-glasses are very commodiously applied to almost any part of the body, when the air is extracted out of the cavity by the application of the air-pump: and thus we are able at pleasure to make them adhere with a greater or less force, and at the same time to remove them without uneasiness, while by raising the valve the air is admitted, which was before prevented from entering into the cavity of the glass. But it is often difficult to remove cupping glasses, which have only one opening, and are applied to the skin with the flame of burning flax or spirit of wine, more especially when they firmly adhere, and are almost filled with the subjacent flesh rising into their cavity. Hence Oribasius^y cautions against the application of cupping-glasses to the breasts; for the substance of the breasts being drawn into the cavity of the glass, and, being distended, render the avulsion difficult. But all these inconveniencies are avoided by the use of such cupping-glasses as permit the air to be drawn out by the pump, and to be admitted again.

It seems to have been the opinion of the Antients, that cupping-glasses draw the spirit, that is the air, or material cause of flatus, from the deepest parts of the body; for these are the words of Celsus^z concerning the cupping-glass, *Ubi inhaesit, si concisa ante scalpello cutis est, sanguinem extrahit: si integra est, spiritum. Ergo ubi materia, quae intus est, laedit, illo modo: ubi inflatio, hoc imponi solet.* “When it sticks fast, if the skin is before incised by a scalpel, it extracts blood, but
 “ spirit or air, if the skin is whole; when there-
 “ fore the matter included injures in this manner,
 “ it is usual to apply the cupping-glass where the
 “ inflation

^y Charter. Tom. x. pag. 456. ^z Lib. II, cap. 11. pag. 83.

“inflation appears.” But it appears at present from the most certain observations, that the elastic air is not of such a nature as to be able to pass through the coats of the intestines, peritonæum, muscles, fat, &c. into the cavity of the glass; but cupping-glasses seem to perform their efficacy by deriving the humours more copiously and impetuously into those parts of the body to which they are immediately applied, and by that means to make a revulsion of them from the adjacent parts; at the same time also the nerves dispersed through the part under the cupping-glass, are often irritated and excited to pain, by which means the spasms, raised in other parts may be removed, as is evident from what was said before in the beginning of this chapter. For we know, by daily experience, that the tumultuous force of the disturbed spirits in any part may be allayed, by applying remedies to other nerves, and often in distant parts. When the strong smell of castor, or stinking fumes of a burning hoof, penetrate the nose of an hysterical woman, it often immediately removes those spasms of the abdominal viscera in a wonderful manner: and on the contrary, the fragrant of musk and civet has often thrown hysterical women into the worst convulsions. For the nerves, dispersed through various parts of the body, have a wonderful influence upon other nerves often very distant; and we even know for certain, that an injury inflicted upon a few nervous fibres, may wonderfully disturb the whole body in all its functions, as is evident from what we said before concerning wounds of the nerves and tendons in the history of wounds in general. It is not therefore repugnant to the known laws of the human œconomy, established by faithful observations, that spasms raised in some parts may be quieted by irritating, or making an

alteration in the nerves of other parts, although we cannot easily explain it *à priori*, from what we as yet know concerning the fabric of the nerves; and on the other hand, we know that often wonderful spasms and other dangerous disorders are produced from the very same causes, though applied to very foreign parts. There are many people subject to these spasms of the abdominal viscera from such slight causes, that if they stand any considerable time upon a stone pavement, they are immediately punished for it with severe gripes; and I have even known some liable to the same disorders, if they did but dip their hand at any time in cold water, or even barely handle wet linen or the like, especially in winter-time. On the other hand again, we are greatly surpris'd in the colica pictorum, that after the most severe fits, the patient's arms and legs become paralytic; and even in the more obstinate kind of the disease, they waste away, as in a true marasmus: but in the mean time the best method of cure for this dreadful malady, is by frictions with aromatic emplasters applied to the abdomen, the farinaceous gums given internally, &c. the remedies being rather applied to the abdomen than to the paralytic extremities of the body.

The method therefore of burning the soles of the feet by the application of hot irons, used in Asia to ease the most severe pains of the cholic, does not seem to be at all unreasonable. M. Homberg^a, who was born in the Island of Java, assures us that the inhabitants cure colicky pains and dysenteries by this method, which would be otherwise mortal. The same thing is also confirm'd by many writers of voyages and travels.

Thus

^a Academ. des Sciences l'An. 1708. Hist. pag. 57.

Thus we meet with a wonderful observation ^b of a man, who drinking much, after having travelled in the most scorching heats of the sun in a very hot country, was seized with the most cruel species of colic, called mordechin; and after suffering the most excruciating pains, he lay almost destitute of sense, and agitated with violent convulsions. The soles of the feet in this man were burnt with a hot iron, at about three fingers distance in the heel, 'till the thick cuticle being burnt thro', he could perceive the pain (for if the patient perceives no pain from the operation, the case is too far gone); the like cauterization was repeated upon the sole of the other foot, and the burnt parts afterwards sprinkled with pulverized salt, (or, in defect of that, burnt ashes will suffice) by which means all the symptoms were removed in half a quarter of an hour's time, only an intense thirst with great weakness remaining. They gave him for drink water, with which a little pepper and onions had been boiled. A most expert Physician who practised physick a long time at the court of the Great Mogul, affirms, that he can cure every colic by applying to the abdomen an iron ring heated red-hot, the diameter of which is about an inch and half, fixed so that the navel may come into the center of the ring, which he takes off as soon as ever the patient perceives the burning. The acupuncture of the Japonese, and the burning of moxa upon various parts of the body, seem to operate in the same manner, namely, inasmuch as by irritating the nerves they wonderfully allay the pains and spasms seated in other parts of the body. It is therefore of the greatest use to learn by experiments the wonderful consent of the nerves, and in what parts of

^b Lettres edifiantes & curieuses des missions etrangeres Tom. IX. pag. 250, &c. 254.

of the body those nerves are seated, by the irritation of which other spasms may be allayed. The Asiatic Physicians, little skilled in anatomy, have yet been able to learn by experience how to chuse such parts in the cure of different diseases, as by burning with moxa, or pricking with a needle, a happy cure may ensue. It was a very frequent practice with Hippocrates and the antient Physicians to burn several parts of the body in many diseases, as is evident from the many passages which have been collected by the celebrated Physician Ten Rhyne^c, who practised physick in the islands of Java and Japan, and made a diligent enquiry into all these particulars. He openly confesses that he was so greatly disordered for the space of three months with a troublesome palpitation of the heart and fainting, that he often believed he was expiring; but after many remedies tried in vain, he at length applied cauterizations made with the moxa or cotton of a kind of mugwort, three cauterizations or stoops on each side the navel, and two upon the region of the loins, and immediately he perceived relief to his pain and anguish; and after a copious discharge of ichor had flowed for the space of about twenty days, from the little ulcers which remained from the burning, he was entirely freed from this troublesome disorder^d.

Whether or no the aphorism of Hippocrates^e does not relate to this, where he says, *Duobus doloribus simul abortis non in eodem loco, vehementior alterum obscurat?* “That two pains arising together at the same time in different parts, the more vehement pain obscures the other?”

The

^c De Arthritide, pag. 119, & seq.

^d Ibid. pag. 143.

^e Aphor. 46. Sect. 2. Charter. Tom. IX. pag. 84.

The application of cupping-glasses will often happily supply the place of this seemingly strange and cruel method of burning, and greatly conduce to remove the spasms which make the efficient cause of flatus; but that the material cause, namely the elastic matter, cannot be removed by cupping-glasses, is sufficiently evident from what has been said before. Nor is it necessary to discharge the flatus in that manner, if it were possible, since when the spasms are removed, the elastic matter intercepted will easily find itself a passage to escape. Since therefore there is no evacuation aimed at in this case by cupping-glasses, there will be no need of scarifications. But concerning the various use of cupping with and without scarification among the Ægyptians for the cure of diseases, a more particular account may be seen in Prosper Alpinus^f.

S E C T. DCLI.

FROM these considerations (§. 646, to 651.) answers may be given to these otherwise obscure questions: namely, what foods, drinks, poisons, or medicines, are flatulent? Why they are particularly so, when the first passages are empty? And why when they are wounded, or when the abdomen is strictly constricted or bound up? Lastly, why flatulencies happen to hypochondriacal, hysterical, convulsed, and colicky patients?

From what has been hitherto said concerning the matter or efficient cause of belchings or flatus, a reason may be given for several things; which, without understanding these particulars, would seem obscure enough.

What

^f De Medicina Ægypt. Lib. II. cap. 13. pag. 129, & seq.

What foods.] Every thing which by the heat of our body generates elastic air, or rather from whence the latent air is extricated by the heat of the body, so as to acquire again its elastic force. Malpighi has demonstrated that a true air is contained in the tracheæ or air-vessels of plants. And Boyle has taught us, and after him the incomparable Dr Hales with great industry has shewn by many experiments, that a great quantity of elastic air is contained in, and may be extricated from many parts of animals, vegetables, and even fossils. All those vegetables therefore which contain in themselves a great quantity of elastic air, yield flatulent food, inasmuch as they supply plentifully the matter of flatus. If now there is also such an acrimony in these, as may irritate the fibres of the stomach and intestines into spasmodic contractions, the two causes of flatus will concur together, and such things above all are justly esteemed flatulent. Hence garlic, onions, and radishes generate so great a quantity of flatus, because they contain a great quantity of air, and irritate the first passages by an acrid stimulus. But these are more especially flatulent, when they are eaten raw; for in boiling, a great quantity of the elastic air which they contain, is expelled by the heat of the boiling water. Moreover, every thing which is greatly inclined to fermentation or putrefaction is likewise flatulent, because from fermenting and putrefying substances a great quantity of elastic air is extricated; and for this reason all the summer fruits, and especially in the most intense summer heats, inflate the bowels so much with wind. Hitherto also belong all glutinous substances, because in these a great quantity of common elastic air may be embodied in mastication, which, being afterwards rarefied

rarefied by the heat of the stomach and intestines, will be set at liberty again.

Drinks.] Of all drinks water is the least flatulent, because the unelastic air lodged in it cannot be extricated by the heat of the body so as to become elastic. But the most flatulent of all drinks are those taken in the act of fermentation; as for example, the ale which is close shut up in very strong bottles, and flies out with the greatest force upon opening them; for by an imprudent use of such, the most severe colic, iliac passion, and cholera morbus, frequently ensue. Next to these come such drinks as have not yet fermented, but are soon set to work by the heat of the body; as for example must, new wine, or ale, wherein no bitter herbs, such as hops, wormwood, &c. have been boiled as a preservative.

The ancient Physicians have observed that all the like aliments taken as food or drink produce flatulencies, having learnt it from a faithful observation, and not from understanding the causes. Thus Celsus[§], enumerating those things which inflate the belly, adds, *Omnia fere legumina, pinguia, prædulcia, jurulenta, mustum, atque etiam id vinum, cui nihil adhuc ætatis accessit: ex oleribus allium, cepam, brassicam, &c. quidquid denique subcrudum aliquis assumpsit, recenset.* “Almost all sorts of
“ pulse which are fat, sweet, and disposed to make
“ broths, with must, and even wine itself, which
“ has not yet acquired any considerable age:
“ among the potherbs, garlic, onions, cabbages,
“ &c. and lastly whatever is eaten raw by any
“ one.”

Poisons.] The most sharp and corroding poisons are flatulent, not from their generating air or elastic

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§ Lib. II. cap. 26. pag. 104.

ftic matter, but becaufe, by irritating the fibres of the ftomach and inteflines, they excite the moft violent fpafms, whereby the elastic matter always wandering in the firft paffages, becomes intercepted, and being greatly rarefied by heat, fo far diftends the fenfible membranes as to produce the moft excruciating pains. If now thefe poifons have alfo a power of inducing a fudden putrefaction in our humours, they are the very worft of all. From hence the reafon is evident, why arfenic, corrofive mercury, fublimated fharp cauftic poifons, caufe the abdomen to fwel to fuch a degree that it is often ready to burft. Perhaps alfo there are other wonderful poifons, which either by exciting a fudden putrefaction, or by fome other unknown latent force, are able to extricate the matter from our humours, whence enfues an immense flatulent tumour of our whole body. When the ferpent Prefter bit Nafidius, we read that his whole body was immediately fwelled, and that the wonderful effects of this poifon did not ceafe even after death ^h.

————— *Illi rubor igneus ora*
Succendit, tenditque cutem pereunte figura.
Miscens cuncta tumor toto jam corpore major,
Humanumque egressa modum super omnia membra
Efflatur sanies late tollente veneno.
Ipsè latet penitus congesto corpore mersus,
Nec lorica tenet distenti corporis auctum, &c.
 ————— *tumidos non capit artus*
Informis globus & confuso pondere truncus
Intactum volucrum rostris, epulasque daturum
Haud impune feris, non ausi tradere busto
Nondum stante modo crescens fugere cadaver.

Medicines.]

Medicines.] All those which have a considerable acrimony are flatulent, under whatever denomination they are taken ; more especially when they are applied to such people as have the whole nervous system easily irritable. Hence it is that the most severe gripes and flatus are often excited by the more acrid vomiting, and purgative medicines. And even the remedies themselves, which are used to dissipate flatus, may be in one sense termed flatulent, since by their stimulus, however mild, gentle, and soon disappearing, they excite the stomach and intestines into moderate spasms or contractions, and by that means relieve the more violent spasms raised in the other membranes of these parts. Moreover, many of those things among the food and drinks which are flatulent, are used under the title of medicines ; for thus the juices of summer fruits, garlic, onions, &c. are often taken.

And why more especially they are so when the first passages are empty?] Because then the air freely wanders through the intestines, and indeed in a greater quantity ; and at the same time the affluent bile and reliques of the ingested food being rendered more acrid, gently irritate and stimulate these parts ; whence the air is intercepted here and there by slight spasms, which, afterwards going off, it wanders with a murmuring noise, so as to produce borborigmi or croakings of the guts. For they who have fasted a considerable time have the bile often more acrid and bitter, or sometimes they belch up a saltish or a sourish liquor : and from this cause the empty intestines of hungry people are said to murmur.

Why when they are wounded?] From the profuse hæmorrhage, which (as we observed before §. 232.) brings on spasms and convulsions ; as also the same happens when nervous or tendinous parts have

have been injured by a wound; but more especially above all, when the abdominal viscera and particularly the mesentery or intestines have been wounded; see what has been said upon this subject at §. 170. N^o. 3.

Why when the abdomen is strictly constricted or bound up?] Because the intestines being then compressed, the free passage of the elastic matter contained in their capacity is intercepted. Hence is the flatus so often very troublesome to virgins, whose mothers endeavour with great care to give them a slender waist by tight lacing, powerfully constricting the whole abdomenⁱ. For this reason the unhappy girls are frequently tortured, 'till by unlacing them the abdominal viscera have an opportunity of returning to their due freedom.

Why flatulencies happen to hypochondriacal, &c.] There are two kinds of disorders usually comprehended under the denomination of hypochondriacal. Either an atrabiliary sœculency of the blood deposited in the abdominal viscera, and disturbing the action of those viscera, causing the humours to degenerate, which are separated by their fabric, though the efficacy of those humours is altogether necessary to make a due change in the ingested aliments. For this reason the ingested aliments will not be formed into good chyle, but by a spontaneous degeneration will be corrupted into a crude acid, a rancid, oily, or a putrid alkaline acrimony; whence a great quantity of the elastic matter will be produced, and at the same time the intestines will be irritated, and thrown into convulsive spasms by the acrimony resulting from the ingested aliments; and therefore belchings and flatus in such people are so frequently ranked among the signs of an atrabiliary matter occupying the abdominal viscera.

ⁱ Terentius in Eunucho Act. II. Scen. III. vers. 24.

cera, as will be more apparent hereafter at §. 1099. But in others there are frequent spasms of the abdominal viscera, without any signs of an atrabiliary cacochymy; by which spasms the air contained in the stomach and intestines is always intercepted so as to produce belchings and flatus. This more especially takes place in such men as exercise their minds much, but their bodies little; and hence the disorder is so familiar to men of letters, and seems to arise only from an inordinate motion of the spirits.

Hysterical women.] When the like irritability and disturbed motion of the spirits occur together in women, they are said to be hysterical; and that because all these disorders have been commonly ascribed to the uterus; but in the mean time if we compare the symptoms of the hypochondriacal passion in men, happening without any atrabiliary matter, with those of the hysterical fits, as they are called in women, we shall hardly find more difference than betwixt one egg and another, as Sydenham^k very well observes; and therefore from what has been said, the reason is evident why flatus and belchings are so troublesome to hysterical women.

Why in those who are convulsed?] For the nervous fluid rushing with an alternate force into the convulsed muscles, indicates a disturbed motion of them (see §. 231); and from a convulsion may be justly feared a disturbance of all the actions (see §. 233); but more especially the functions of the brain and the nerves which thence proceed, may be wonderfully disturbed by convulsions: no wonder therefore if the like disturbance happens in the nerves dispersed through the abdominal vis-

^k In Dissertat. Epistol. pag. 486.

cera, whence spasms, and consequently belchings and flatus, may be produced.

And in colicky patients.] Those who are frequently troubled with pains in the colon are said to be colicky. But although a most severe pain arises from inflammation in this gut, which may frequently prove fatal by turning to a sudden gangrene, as we shall declare hereafter at §. 963. Yet from common use it has been customary to call that pain a colick, which is not so fatal, but returns often, and commonly derives its origin from the fæces collected in this intestine, with the flatulent matter, being intercepted and obstructed in their free course through it. Hence Celsus^l says, *At si laxius intestinum dolore consuevit, quod κολον nominant, cum id nihil nisi genus inflationis sit, &c.* “ But if the larger intestine, which is called the
“ colon, has been used to a kind of pain, since that
“ is nothing more than a kind of inflation, &c.” And a little after he orders those who are thus affected to avoid cold, and every thing that does usually breed flatulencies: from whence it is evident, that this is a chronical disorder returning at intervals; which is yet more evident from another passage in the same author^m, *Is autem morbus, qui in intestino pleniore est, in ea maxime parte est, qua cæcum esse proposui. Vehemens fit inflatio, vehementes dolores, dextra magis parte: intestinum verti videtur; quod prope spiritum elidit. In plerisque post frigora cruditatesque oritur, deinde quiescit; & per ætatem sæpe repetens sic cruciat, ut vitæ spatium nihil demat.* “ But this disease, which is
“ seated in the larger intestine, lies mostly in that
“ part which forms the cæcum, as I have already
“ observed. There is a violent inflation, and in-
“ tense

^l Lib. I. Cap. 7. pag. 37.
pag. 213.

^m Lib. IV. cap. 14.

“ tense pains more on the right side; the intestine
 “ seems to be twisted, because it resists the adja-
 “ cent air. It arises in most people after cold
 “ things and crudities, and then ceases, but re-
 “ turning often, as age advances, it tortures the
 “ patient, but in such a manner as not to shorten
 “ his life.” From what has been said also of co-
 lics by Aretæusⁿ, we may conclude that flatulent
 matter, intercepted in the intestines contracted by
 a spasm, occasions this disease; for his words are
 these, *Sin autem cibum acceperint, quantumvis*
paucum, & non flatulentum, validè inflantur, &
difflandi quidem cupiditas eos incessit, verum flatus
exitum non inveniunt; ruētus vero sursum violen-
ter tentati etiam sine fructu sunt. Si qua vero parte
flatus vi erumpant, qui sursum virosi odoris sunt, &
acidus ruētus excitant, &c. “ But although they
 “ take food small in quantity and not flatulent,
 “ they are nevertheless violently inflated, and have
 “ a strong desire to break wind, but the flatus
 “ finds no exit; they have likewise fruitless en-
 “ deavours to discharge wind forcibly upwards by
 “ belching. But if they forcibly discharge the fla-
 “ tus either way, that which comes upwards is of
 “ of a strong smell, and excites acid belchings, &c.”^b

But from all this it is sufficiently evident, that co-
 licky patients are troubled with belchings and fla-
 tus; the truth of which is still more confirmed by
 the remedies recommended by Celsus^o for the cure
 of this disease. For he recommends dry and warm
 fomentations, and cupping without scarification;
 the efficacy of which in curing spasms, which
 make the efficient cause of flatus, we have before
 explained. Moreover the Remedy which Cassius
 glories to have found out himself, and which was

H 2 termed

ⁿ Lib. II. de causis & signis morbor. diuturnor. cap. 8. pag.
 59.

^o Lib. IV. cap. 14. pag. 223.

termed anticolic, from its great use in this disease, takes in anniseeds, castor, pepper, opium, &c. all which are extremely well adapted to discuss flatulencies, as is evident from what we advanced before. It deserves also to be remarked here, that Celsus in the same place orders, *Friktione ad extremas partes, id est, crura brachiaque materiam evocare.* "By frictions upon the extremities, that is to say upon the arms and legs, to call off the matter." As if he had known that nature often inclined to that way of drawing off the disease, as we made it appear in that kind of this disease, which is called the colica Pictonum; in which after the patient has suffered some violent fits of the pains, the extreme parts of the body become paralytic (as was said before at the third number of the present aphorism) and fall away when the cholicky pain ceases, after the violence of the disease has settled itself upon the limbs of the patient.

Of Vomiting in FEVERS.

S E C T. DCLII.

VOMITING is a violent expulsion of what is contained in the stomach first, then in the intestines, and afterwards in the viscera which empty themselves into the latter; it owns for its immediate cause a convulsion of the muscular fibres of the fauces, œsophagus, stomach, intestines, diaphragm, and abdominal muscles; and for its remote cause it acknowledges every thing that stimulates by irritating the fibres before described, or the viscera they compose, which are easily convulsed.

A vomiting is said to attend, when there is made a sudden and violent expulsion by the mouth of what is contained in the cavity of the stomach; for nothing can be expelled by vomiting without coming first into the stomach, into which however it may be derived from other parts of the body. But for this expulsion of the contents of the stomach by the mouth to be called a vomiting, it is necessary for it to be violent; for that gentle and successive expulsion of what is contained in the stomach in ruminating animals, does not in the least deserve to be called vomiting; no more does that rising in the stomach deserve to be thus called, whereby in many people some part of its contents ascend into the mouth without any violence or nausea, more especially if the stomach is over-filled with food or drink. I have known

such people who could at pleasure in this manner force up a part of what was contained in the stomach into their mouth; and it appears also from the writers of observations, that there have been many persons who have ruminated or chewed their food a second time. Many such instances have been collected by Peyerus ⁹.

By vomiting therefore there is an expulsion of what is contained in the cavity of the stomach, and consequently of every thing capable of coming into the stomach. Galen ^r indeed has pronounced that in vomiting is discharged nothing but what is contained in the stomach itself, and that what is contained in the intestines is never discharged by vomiting; but direct experience proves the contrary. For both kinds of bile pass thro' the common duct into the duodenum, and are in the mean time frequently discharged by vomiting: there is therefore evidently a passage open for the contents of the intestines to pass into the cavity of the stomach. But the duodenum being continuous with the pylorus, is seated near to the stomach, and therefore the contents of this intestine may the more easily penetrate into the stomach. But it also appears from observations, that the matters contained in the more distant intestines, may also come into the stomach; for when the peristaltic motion (whereby the contents of the stomach are protruded into the cavity of the intestines, and from thence, continually drove forward, but slowly, through all their turnings and windings, 'till they are excluded by the anus) is inverted in diseases, the intestinal fæces are in a frightful manner protruded by this retrograde motion in the stomach, and vomited up,
as

⁹ De ruminant. & ruminat. Lib. I. cap. 6. pag. 63.

^r Comment. in Aphor. 12. Sect. IV. Charter. Tom. IX. pag. 139.

as Hippocrates^s has long ago observed, and remarked it as a fatal sign. Even Galen^t himself acknowledges a vomiting of the fæces happens towards the end of the illiac passion; and therefore it is evident that we ought not to take what is alledged by Galen in so strict a sense; for he seems only to intend that the contents of the stomach might be easily expelled by vomiting, but that the intestinal contents were more difficult to discharge that way, and might be evacuated downward with much less trouble.

If therefore the contents of the intestines can sometimes make their way into the stomach, it is very evident, that all the viscera which pour the humours separated by their fabric into the cavity of the intestines, may afford the matter to be expelled by vomiting. But the large liver, and the spleen altering the blood by it's fabric to be sent to the liver, and the pancreas, evacuate themselves into the intestinal tube. Moreover all the humours discharged into the cavity of the stomach and intestines, from the meseraic and cœliac arteries, may be likewise expelled by vomiting.

It is therefore evident how manifold and copious may be the matter of vomiting. For the bile, phlegm, lymph, matter, ichor, atrabilis, &c. and even blood itself, have been ejected by vomit, as we are assured from the history of diseases.

But the immediate cause of vomiting is almost the same with that of a nausea, differing only in being a little more intense. But although an irritation and convulsion of the muscular fibres of the œsophagus, fauces, and stomach, excite vomiting, yet these of themselves do not seem able to

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make

^s De victus ratione sanorum Lib. III. cap. 7. Charter. Tom. VI. pag. 487. De Locis Affectis Lib. VI. cap. 2. Charter. Tom. VII. pag. 509.

make a total expulsion of what is contained in the stomach. For if we consider with how great a force this expulsion is made when a man vomits, it will be very evident, that much more powerful causes are required; for the fibres of the stomach, however violently convulsed, cannot expel all that is contained in its cavity; since to do this they ought to contract the capacity of the stomach to nothing. When I irritated the stomach with the point of a knife, after opening the abdomen in a living dog, it was convulsed indeed, but yet the animal did not vomit; hence therefore the convulsion of the fibres of the stomach may conspire towards the effect of vomiting, but does not of itself seem sufficient to discharge all the contents. When Wepfer^u opened the abdomen of a dog, to whom he had given mercury sublimate, the inflated stomach immediately protruded itself through the wound, and was indeed sometimes convulsed, but not very violently. But when he poured warm water several times through the gula into the stomach, the dog always threw it up again by vomit, together with froth and mucus; and he notes that the stomach was not very much contracted during the time of vomiting. *Verum diaphragma valide contractiebatur, ac si illud cum musculis abdominis vomitum multum promoveret.* “ But that the diaphragm was violently convulsed, as if that with “ the abdominal muscles greatly promoted vomiting.” A like motion of the diaphragm he observed in vomiting in another dog, who had taken flowers of antimony^w. For when the diaphragm, which is continuous with the stomach, is drawn violently downward, and at the same time the abdominal muscles are likewise contracted, all the

^u Cicut. aquat. histor. & noxæ cap. 21. pag. 297. ^w Ibid. cap. 20. pag. 251.

the contents of the abdomen are compressed, and the stomach being interposed as it were betwixt two presses, becomes so powerfully squeezed together, that all its contents are thrown up with a great force. For the way through the pylorus is less open, being wrinkled and compressed by the abdominal muscles convulsed; add to this that Wepfer * was able to perceive in a dog vomiting, that the convulsive motion began in the duodenum, and from thence continued to the pylorus and its *antrum*; whence it is evident that the contents of the stomach in vomiting have not a free passage through the pylorus.

But that vomiting principally depends on the pressure of the diaphragm and abdominal muscles, is confirmed from hence; that horses, who have the stomach seated so that the abdominal muscles can have little power on it, never vomit, as the horse doctors unanimously testify. For in these animals the stomach, however full, does not appear upon opening the abdomen, unless the large colon be first removed, a great part of which is contiguous to the diaphragm, and fills up the greatest part of the abdomen; for then indeed the stomach appears to view, deeply situated, and so remote as to be near a foot distant from the abdominal muscles. It is therefore evident, that the stomach being placed at such a distance from the abdominal muscles cannot be very forcibly compressed by them in a horse. But in dogs and cats, which are animals that frequently and easily vomit, the stomach is greatly exposed to the action of the abdominal muscles, as it likewise is in ruminating animals. Add to this that the diaphragm seems to be of a weaker fabric in horses; whence it has been found split through its whole length, in such of these animals, as have died suddenly

* Cicut. aquat. histor. & noxæ cap. 20. pag. 251.

suddenly after too violent labour. It is also certain that the upper orifice of the stomach in a horse is armed with a valve, which renders the return of what is contained in the stomach difficult; but this valve fills only two thirds of the diameter of the upper orifice of the stomach, and therefore cannot prevent some parts of the contents, at least the more fluid, from being expelled that way by vomit. But yet if a very large dose of emetic wine be given to a horse, no vomiting ensues in this animal, even though the abdomen is observed to be violently contracted and convulsed after taking the medicine, which sometimes occasions the death of the creature. Perhaps likewise the situation of the stomach with respect to the diaphragm is such in a horse, that this muscle also has very little influence upon it ^y.

Yet it must not be denied that Wepfer ^z gives us an observation, which seems to teach that vomiting may arise only from a convulsion of the stomach. For in a puppy, to which he had given resin of jalap, upon dissecting the abdomen, the stomach bursted forth greatly distended, and after laying bare all the viscera of the abdomen, he could perceive the stomach contract itself several times about its middle; and in the mean time, while Wepfer discovered a considerable lacteal canal behind the renal gland, the whelp vomited up a great quantity of frothy, mucous, and grumous matter, and this even though the diaphragm was slit up to the gula, and was whole only on the left-side; from whence that author concludes, that vomiting might be performed by the contraction of the stomach only, without the assistance of the diaphragm.

^y Vide de his Academ. des Sciences l'An. 1733. Mem. pag. 683, &c.

^z Cicutæ aquat. histor. & noxæ cap. 15.

hist. 1. pag. 221.

diaphragm. But if we consider that Wepfer was intent upon other things when the whelp vomited, it will be evident he could not so well distinguish whether it proceeded from the contraction of the stomach only. Moreover, when the fibres of the stomach are so very much distended and convulsed, it is no wonder that they should be able to expel part of the contents through the gula. Nor was there much discharged in this manner from the convulsion of the stomach, as is evident from the history itself which he gives us; for a little after he adds, *Ventriculo à sine gula ad duodenum secundum longitudinem supernè inciso, cavitatem muco viscidissimo spumæo & frustulis lacteis coagulatis plenam inventam fuisse.* “The stomach being slit open
 “longitudinally from the end of the gula to the
 “duodenum, its cavity appeared full of viscid
 “frothy mucus, with small portions of curdled
 “milk.” From whence I think it is evident, that a slight kind of vomiting, or rather what ought to be called a rising or cleansing of the stomach, may happen from a convulsive motion of its muscular fibres; but that strong vomiting, properly so called, requires a convulsion of the diaphragm and abdominal muscles.

All this is confirmed by the appearances which we observe in a person vomiting; for first a nausea is perceived, and a thin water or lymph often fills the mouth, the lower lip begins to tremble, and sometimes the whole lower jaw; all which denote an irritation of the fibres in the fauces, œsophagus, stomach, &c. Then follows often a slight belching up of the contents of the stomach, only from a strong convulsion of the stomach itself; but soon after the whole abdomen appears to be violently drawn inward, and the contents of the stomach are forcibly expelled upwards; so that after
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the vomiting, the whole abdomen and circumference of the diaphragm suffer a kind of obtuse pain, almost like that which is perceived in the rest of the limbs, after they have been tired by too much labour.

From what has been said therefore the proximate cause of vomiting evidently appears; but the remote causes may be numerous and very different, though all of them agree in this, that by irritating the fibres of the forementioned parts, they stimulate these viscera which are so easily convulsed, whether they directly act upon the viscera themselves, or by irritating the nervous fibres of other parts, they produce the like disorders by consent. A slight tickling of the fauces with a feather only may thus excite a vomiting, by such a mechanical irritation; as may likewise the phlegm flowing to those parts, a concussion or wound of the head, luxations, &c. concerning all which we treated under the title of nausea. For all the causes producing a nausea, if they are more violent, may likewise excite vomiting. In the two following aphorisms we shall therefore treat of the principal remote causes of vomiting, so far as they are found in the stomach itself, or in the adjacent parts.

S E C T.

S E C T. DCLIII.

VOMITING therefore happens sometimes from the fault of the stomach itself, convulsed, inflamed, suppurating, schirrhous or cartilaginous, joined with an acute fever; and is often very stubborn, being known from a knowledge of the disease itself, which being removed, the vomiting ceases likewise; concerning which we shall speak more hereafter.

From the fault of the stomach convulsed.] Sydenham^a has observed, that the disturbed motions of the vitâl spirits in hysterical and hypochondriacal people, have produced very different symptoms or appearances, according as they have attacked either one or the other part of the body: and that by this means almost every kind of disease was imitated, which might impose upon the Physician, if he be not attentive and skilful in his profession. But if this disorder fixes upon the stomach, it will be convulsed, and often a profuse vomiting will be excited, which when all other remedies have been tried in vain, has yet yielded to those medicines which quiet or regulate the disturbed motion of the nervous fluid. But concerning this we treated before at §. 640, N^o. 5.

Inflamed.] As the inflamed part is painful, and at the same time the very nervous and irritable fabric of the stomach is usually swelled, it will be therefore greatly injured by an inflammatory tumor here formed; whence a convulsion of the fibres of the stomach will soon follow, and consequently it's usual effect,
a vomiting;

^a In Dissertatione Epistol. pag. 480.

a vomiting; and this more especially, whenever the inflamed stomach is irritated, either by the ingested food or drink: For this reason a most painful vomiting, following immediately after taking food, is reckoned among the signs of inflammation in the stomach, as we shall declare more at large hereafter, at §. 951.

[Suppurating.] An inflammation being raised in any part of the body, the consequences of that inflammation may follow, as we made appear under the title of that disease, and consequently a suppuration, schirrhus, &c. may succeed: But when an inflammation tends to suppurate, all the symptoms are increased, and therefore it is evident that vomiting may easily proceed from thence. Moreover if a suppuration degenerates into an open ulcer, as the lips of every ulcer are almost constantly more or less inflamed, and such an ulcer continually irritated by the ingested food, a troublesome and long continued vomiting may be therefore produced from such a cause. Many instances of the stomach thus ulcerated, occur in the writers of observations; but it may be sufficient to produce only one from Hildanus, which that faithful author had an opportunity of seeing himself. A young man of a good and strong habit of body after high living at a feast, was the same night taken with a pain in his stomach, at first indeed not very acute, but by degrees increasing; and even sometimes a wandering pain attacked the head, abdomen, and limbs; but a vomiting in particular attended at intervals. Every thing being tried in vain, he at length expired, after leading a calamitous life for the space of eighteen months. The body being opened, a large foetid ulcer was found in the upper orifice of the stomach, in the anterior part of it, where a branch of the sixth pair of nerves

nerves enters the stomach, the ulcer having penetrated almost into the stomach itself ^b.

Schirrhous or cartilaginous.] That hard and schirrhous tumours have been observed as well in the stomach, as in the other viscera, was said before at §. 484. and when these are present, and especially if they begin to be malignant by compressing and irritating the adjacent parts, they may excite vomiting and many other bad symptoms. But the worst of all these tumours are those seated near the pylorus, obstructing the discharge of the food contained in the stomach into the intestines, for then there happens a continual vomiting. Two such cases were communicated to the celebrated Spon^c, from which it appears that the pylorus itself was schirrhous, and almost cartilaginous, and that a continual vomiting attended for several weeks before death.

But all these disorders are increased when the vomiting before-mentioned is accompanied with an acute fever, for thereby the inflammation, if it pre-existed, will be increased, or at least one will be raised, if there was not any before; since the humours agitated by the fever, irritate the adjacent parts, which surround these tumours of the stomach.

But an obstinate vomiting always attends from these causes, because by the endeavour itself to vomit, the inflammation of the stomach is augmented; and a schirrhous before dormant, and of a mild nature, lodged in these parts, often degenerates into a malignant cancerous disposition. But when the vomiting arises from phlegm, bile, or the like, irritating the stomach by their weight or stimulus, when these are evacuated either spontaneously

^b Hildan. Observ. Centur. 3. Observat. 20.
Apiar. observ. 62. pag. 250.

^c Harder.

neously or by art, the vomiting is easily allayed. But now as these causes of the vomiting are more easy or difficult to remove, so will the cure or removal of the effect or vomiting succeed or not.

But what methods are to be taken for the cure of an inflammation of the stomach, and the several ways in which it may terminate, will be explained hereafter under a distinct title. At the same time it is also evident from what has been said, why a vomiting is sometimes incurable, namely when the schirrhous tumours have acquired a cartilaginous hardness, and continually irritate the stomach.

S E C T. DCLIV.

A VOMITING may again proceed from a fault in the viscera and circumjacent parts, affected in like manner as the stomach before, and irritated by the stomach distended with food; and from hence a very obstinate vomiting frequently happens without any manifest cause accompanied by a fever.

It is well known that the natural situation of the stomach is such, that the greatest part of it is covered by the incumbent liver, while on the left side it is covered by the spleen itself, behind it is seated the pancreas, while the colon lies in contact with its fundus, &c. But it was said before in the Comment to §. 648, that the stomach is so easily irritable, that only by roughly touching its external surface with a pair of pliers, it is brought into convulsions, and this even in a dead animal by pricking it with the point of a knife. If therefore the like disorders happen in those parts contiguous

guous to the stomach, as we enumerated them in the preceding aphorism, it is sufficiently evident that the most obstinate vomiting may thence arise, even though there is no disorder of the stomach itself, nor any thing injurious lodged in its cavity. But the parts contiguous to the stomach press upon it so much more in proportion, and they will be so much more violently affected, as the stomach is more distended, and therefore vomiting arising from a disorder in the circumjacent parts near to the stomach, is commonly the worst when that organ is distended with food: therefore this ought always to be thought of in every obstinate, chronic, vomiting, and a careful enquiry should be made whether the signs denote this or that viscus to be affected, that thus suitable remedies may be adapted to remove the vomiting, if the cause of it is curable, or at least that it may be alleviated; and at the same time care must be taken not to make bad worse by a perverse method of cure, as frequently happens when such disorders are irritated by vomits or purges. There are indeed very numerous observations in medical history, which prove an obstinate vomiting to have proceeded from a disorder of the parts circumjacent or contiguous to the stomach. A youth of eighteen years old had the ensiform cartilage pressed inward by a blow, which by irritating the stomach produced frequent vomiting; but in vain was this vomiting attempted to be cured by various medicines, 'till at length the cartilage was restored to its proper place by a skilful hand^d. If now only such a mechanical irritation from the displacing of this cartilage could produce a continual vomiting, will not the like happen when a schirrhous liver, or pancreas presses upon the stomach in the same manner?

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^d Academ. des Sciences, l'An 1737. hist. pag. 67.

That a nausea and vomiting happen from an inflammation of the liver, was said before at §. 642. N^o. 3. When the gall-bladder is turgid with bile, while its excretory duct is obstructed from any cause, after the most severe anguish follows profuse vomiting of a long duration, until the bile is repelled and returned into the blood by the violent spasms of the diaphragm and abdominal muscles, and discolours the whole body yellow as in a jaundice. When a stone in the kidney has slipped from the pelvis into the narrow part of the ureter, a vomiting ensues only by the mechanical irritation from it; and it is indeed a salutary endeavour of nature, while by these violent concussions she endeavours to propel the stone from the ureter into the cavity of the bladder. Vomiting likewise follows from an inflammation of the intestines in the iliac passion, in strangulated ruptures, &c. as the observations both of ancient and modern Physicians unanimously testify. That the like effect will follow from suppurating tumors in the same parts is evident enough, and that all these disorders will increase if a fever attends.

From all which it is sufficiently evident, how careful we ought to be in searching after the causes of vomiting, in order to make a safe cure; and it likewise appears to be sometimes necessary not to suppress the vomiting, namely when, by the violent concussions in that operation, the offending matter lodged in the viscera is rendered moveable or expelled, as we observe in patients troubled with calculi, the jaundice, or a fluctuating atrabilis, &c. The best remedy in that case is to render vomiting less troublesome by a plentiful drinking of some thin liquor; for when the stomach is empty, the strainings to vomit very much fatigue the patient. It likewise appears from what has
been

been said that vomiting is sometimes incurable, when the viscera contiguous to the stomach being invaded with a schirrhous or cartilaginous tumour, press upon and irritate it: and in this disorder there is only one method of relief, namely the taking in food and drink by small quantities at a time, that the stomach might not be much distended.

S E C T. DCLV.

AND lastly, a vomiting may proceed from all the causes increased which excite a nausea (§. 642); from whence therefore disorder is to be discovered, and the curative indications are to be directed.

For a nausea (as is evident from what we said before at §. 642.) acknowledges almost the same causes as vomiting, only more slight; and therefore an increase of these will cause vomiting. Even vomiting frequently follows a nausea, and a nausea almost constantly precedes every vomiting. But every thing which has been said to be the causes of nausea, distinguished into five classes, may serve to this. But that the cure of a vomiting must be prosecuted in the same manner as that of a nausea proceeding from the same or slighter causes, is what no one doubts.

S E C T. DCLVI.

IF the vomiting continues it occasions an atrophy or wasting of the whole body, the iliac passion, convulsions, and the effects of a great and obstinate nausea, §. 643.

We come now to see what disorders are to be feared from vomiting, in order to form thence a prognosis. The matter which is thrown up by vomiting deserves to be here considered, because the prognosis often varies as that differs. Hippocrates^e observes that vomiting is the most useful, when the matter expelled consists of bile and phlegm both together, and not very thick; but a vomiting of the simple humours unmixed he pronounces to be worse. He condemns a livid porraceous or blackish matter, thrown up. And if the person vomits a humour of all those colours, he observes it is fatal. He likewise pronounces a humour discharged subputrid and of a foul colour bad; and that speedy death is denoted, if the matter vomited up is livid and ill smelling. Moreover, if the vomiting continues, all the nourishment taken into the body is expelled, and consequently it will be wasted with a true atrophy for want of nourishment. But if the vomiting returns at long intervals, it may be often supported for a long time, since as yet a sufficient quantity of chyle is derived from the food and sent into the blood. I have seen some cases in which the intestinal tube being contracted in some part, or compressed by an adjacent schirrhous tumour, the free course of the ingested aliment has been intercepted; from whence after three or four days
time

^e In Prognostic. Charter. Tom. VIII. pag. 638, 639, 640.

time a vomiting has ensued, preceded with severe anguish, by which means every thing was expelled that had been taken into the body all that time, and after this the patient has found himself very well, and has had an appetite to food, 'till after the like interval of time being almost elapsed, the vomiting has returned. Tulpius^f has an observation of a vomiting of all the food that was taken in during the space of about ten months in a virgin, but without any manifest loss of strength; but afterwards being troubled with a vomiting of the chyle, she perished before the eighteenth month of the disease. Perhaps she might have supported the vomiting longer, but the concomitant and continual fever, loss of speech, profuse menstrual discharge, and other most grievous maladies, accelerated the slow paced death. Many more histories are to be found in the writers of observations, by which it appears that such periodical vomitings have been often supported a long time together, when by this means the body was not wholly deprived of nourishment.

Iliac passion.] Sydenham^g very well remarks, that the violent vomitings which usually happen in the beginning of fevers, have sometimes been the occasion of the iliac passion. But he distinguishes two kinds of this disease, according as it proceeds either from an obstruction of the intestinal tube, or an irritation. The first he calls the bastard kind, and the latter the true illiac passion; and the last he says happens when the tumultuous blood by the fever deposits sharp malignant humours in the stomach and adjacent intestines, which by irritating their sensible membranes, invert the peristaltic

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motion,

^f Observat. Med. Lib. II. cap. 22. pag. 133.

^g Sect. I. cap. 4. pag. 89, &c.

motion, and throws up the offensive matter by the mouth. This inverted motion of the stomach takes place next in the duodenum, and afterwards throughout the whole tract of the intestines; so that the peristaltic motion, whereby the aliments are naturally propelled downward, is here inverted, and occasions a regurgitation of the intestinal contents into the cavity of the stomach to be expelled by vomiting. But he observes that the stomach leads the van in a vomiting that proceeds from an inversion of the peristaltic motion, and that therefore the principal aim of the cure ought to be levelled against the irritation of the stomach to remove it.

Convulsions.] Vomiting itself has for its cause a convulsion of the muscular fibres of the fauces, œsophagus, stomach, intestines, diaphragm, and abdominal muscles; as we said before at §. 652. It is therefore no wonder if by these repeated convulsions the whole nervous system should be disturbed, as was demonstrated before upon [another occasion in the comment to §. 233, so as to excite convulsions in other parts of the body: more especially as the nerves, dispersed through the stomach, intestines, and mesentery, have so great an influence upon all the other nerves of the body; as is evident from what we said before. Moreover, as the body is exhausted by frequent vomiting, there may be danger of convulsions from this inanition of the vessels (see §. 232). Hence Hippocrates is afraid of convulsions from the strong vomit of hellebore; and he also condemns convulsions and hiccups from a vomiting of healthy humours.

But now all the disorders following a long continued nausea, are deservedly ranked amongst the effects

effects of an obstinate vomiting, concerning which we spoke before at §. 643^h.

If now we also consider that all the contents of the abdomen are violently compressed, while the diaphragm and abdominal muscles are convulsed, the venal blood will thence be drove with a great force and velocity towards the right ventricle of the heart; and from the same action likewise, the arteries, leading to the lower parts of the body, and dispersed through the abdominal viscera, will be compressed: It will be thus evident, that the arterial blood is derived more copiously and impetuously towards the upper parts of the body, while at the same time the respiration being obstructed during the vomiting, the right ventricle of the heart cannot freely discharge its blood into the pulmonary vessels: Hence the return of the venal blood from the head is impeded, while in the meantime a great quantity is sent up by the large arteries. There is therefore the greatest danger, lest by a long continued vomiting some of the small vessels of the encephalon should burst, and a fatal apoplexy be produced by the extravasated humours compressing the brain, an accident which, we are assured, often happens in straining to vomit, by numerous instances in medical history. But moreover, if no rupture of the vessels should happen, yet the soft pulp of the encephalon may be compressed by a distension of the blood-vessels, and in consequence of that many disorders may ensue. But if we consider the alterations which happen in the act of vomiting, it will be sufficiently apparent that there are just grounds to fear all these maladies. For at that time the face looks swelled and red, the eyes are watery and suffused with blood,

^h Coac. Prænot. No. 565. Charter. Tom. VIII. pag. 885.

the jugular veins appear turgid or swelled, and the eyes observe sparks of light and variety of colours, the ears ring, the objects seem to turn round, and a vertigo or giddiness, and sometimes a dulness and sleepiness continues upon the patient for a while after violent vomiting. From hence it is evident, how dangerous vomiting is to bodies plethoric and turgid with ill humours; and how just it was in Sydenhamⁱ to inculcate, that if the patient's condition required bleeding and vomiting, the former ought always to precede the latter; lest by the violent strainings to vomit, the vessels of the lungs should burst, or the brain itself be injured by the powerful effusion, and perhaps effusion of the blood, of which he affirms he has observed some instances. And from hence it is also evident, why Celsus^k pronounces vomiting very improper for those who have a weak or disordered head.

Moreover, as all the abdominal viscera are violently compressed in the act of vomiting, and the lungs with the upper parts of the body are distended with a great quantity of blood; if any of the viscera are dissolved or weakened by chronic diseases, a rupture of them, and the very worst consequences are to be feared: and therefore from this cause has been frequently observed a fatal over-purging, or a discharge of blood upward or downward, when the liver being first corrupted has been broke by the violent strainings to vomit. Thus I saw a woman who was discoloured by a chronical jaundice, and by taking a vomit, she fell into an over-purging, whereby a great quantity of putrid foul matter was discharged by stool, and afterwards pure blood followed with faintings, ending soon after in death. Who would have ever believed, that the tube of the œsophagus could be broke by violent endea-

ⁱ Sect. I. cap. 4. pag. 35.

^k Lib. I. cap. 7. pag. 43.

endeavours to vomit, if this had not been seen by Boërhaave himself with his own eyes in the body of the illustrious high-admiral of our republic (as we said before in the comment to §. 170. N^o. 5.) Herniæ or ruptures are likewise frequently observed to arise from vomiting, and even a great change has been found in the natural situation of the viscera after long continued vomiting, as was said before upon another occasion in the comment to §. 169. Celsus¹ therefore justly pronounces, concerning vomiting, where he condemns the custom of those who endeavoured to allay a voracious appetite by daily vomiting: *Itaque istud luxuriæ causa fieri non oportere confiteor: Interdum valetudinis causa recte fieri, experimentis credo. Commoneo tamen, ne quis, qui valere & senescere volet, hoc quotidianum habeat.* “Therefore (says he) I must
 “confess that vomiting ought not to be excited
 “for the sake of luxury; but that it may be
 “sometimes rightly performed for the sake of
 “health, I am induced to believe from experi-
 “ence. But I advise those, who would live in
 “health, and to an old age, not to make use of
 “daily vomiting.”

S E C T. DCLVII.

IF the cause of the vomiting arises from some of those defects before-mentioned (§. 653, 654.), the cure is to be derived from the history of those diseases.

The cure of vomiting depends entirely upon the remote causes, by which the muscular fibres of the fauces and œsophagus, &c. (see §. 652.) or the other viscera, very apt to be convulsed, are irritated.

¹ Lib. I. cap. 3. pag. 29, 30.

tated. Therefore no general method of cure can here take place, but a careful enquiry is necessary to be made after the causes. But if the vomiting arises from a fault in the stomach itself, its substance being diseased either by an inflammation, suppuration, schirrhus, &c. (§. 653.) or from the like disorders occupying the adjacent viscera or other parts (§. 654.); the cure of the vomiting ought to be derived from the history of those diseases, concerning which we shall treat hereafter under the head of inflammatory diseases of the viscera.

S E C T. DCLVIII.

IF the vomiting proceeds from the causes before-mentioned (§. 653, 655.), then ought the same remedies (§. 644.) to be diligently called into use, more especially opiates and corroborating epithems, with attractives and discutients.

Concerning all these we treated under the title of nausea; where we first distinguished the several causes of loathing into five classes, and afterwards delivered the proper method of curing each. But it sometimes happens, that acrid and putrid bilious humours, or thick viscid matters, fluctuate in the stomach, or are collected in the adjacent parts; and though these have been expelled by emetics, or purgatives, yet vomiting immediately ensues from the ingested food, because the stomach is then rendered too sensible, and is too easily irritable after so many repeated convulsions in frequent vomiting. In that case opiates, which allay all those tumults, and obtund too sharp a sense of the stomach,

mach, are here of the greatest use, as are likewise all such things as are capable of changing the too great impetuosity of the spirits towards these parts, and of directing them other ways. For these purposes is recommended the celebrated antiemetic medicine described by Riverius^m, composed of a scruple of sal absinthii mixed with a spoonful of lemon-juice and swallowed; for when these come into the stomach an effervescence arises, by which a wonderful stimulus is excited in the nerves of the stomach, which happily removes the spasms and convulsions of it. But it is very evident, that this remedy does not act so much by expelling or correcting the matter contained in the stomach and intestines, but only by changing and directing the impetus of the nervous fluid upon these parts. But concerning the use of opiates we treated before at §. 644, N^o. 5.

On the same account those remedies will be useful which corroborate the stomach, over weakened by these violent concussions, as was there said; whence also after vomiting, if the stomach is infirm, Celsusⁿ advises cold water to be drank, bread to be eaten that was baked the day before, to drink strong rough wine, and to eat roasted meats and the most drying food of all kinds. Many such forms whereby a languishing and weak stomach may be relieved after long continued vomiting, are furnished in the *Materia Medica*, of our author corresponding to §. 644, where they were employed for the cure of a nausea arising from the same causes. But also epithems, fomentations, or cerates, composed of the like ingredients, and applied externally to the region of the stomach, are of the greatest use, forms of which may be likewise seen in

^m Prax. Medic. Lib. IX. cap. 7. pag. 415.
cap. 3. pag. 30.

ⁿ Lib. I.

in the place last cited. Theriaca Andromachi spread upon leather, and applied to the epigastrium, is commonly very useful, on account of the best spices and opium, of which last it contains a large quantity. Cupping-glasses applied to the region of the stomach, without scarification, are likewise useful for the reasons before mentioned at §. 630. N^o. 3.

S E C T. DCLIX.

HENCE the reason is evident, why it is so difficult to suppress vomiting in many acute fevers, and hence likewise appears the falsity and danger of the rule which asserts that vomiting is cured by vomiting: why frequently sudorifics remove vomiting, as in the plague; and why the vomiting frequently ceases when a crisis happens in the small-pox? Why it is frequently relieved by bleeding, as in acute inflammatory diseases? Why those who have a continual vomiting in the beginning of an acute fever not proceeding from inflammatory causes, have a critical diarrhœa towards the end, which might have been prevented by giving an emetic in the beginning of the disease? Why a vomiting of every thing immediately after it was taken into the body, is one of the very worst signs in acute diseases? Hence likewise it appears, that hiccups may arise from the same causes, and be cured by the same means.

From

From what has been hitherto said concerning vomiting, the following corollaries may be derived.

The reason is evident why it is so difficult to suppress, &c.] For frequently in acute fevers there is an inflammation of the stomach, intestines, or other viscera incumbent on the stomach; and from this inflammation a vomiting ensues, which therefore cannot be allayed, unless the cause of the vomiting itself is removed, which frequently cannot at all be done, or with great difficulty. It is likewise evident from what was said in the history of wounds in the head, that the brain, being injured by concussion or compressure, is followed with a vomiting of eruginous bile; and therefore likewise when the functions of the encephalon begin to be greatly disturbed in inflammatory diseases of the head, such a vomiting attends and cannot be removed, unless the inflammation there seated can be first cured. Hence that saying of Hippocrates mentioned before in the comment to §. 267: *In capitis doloribus æruginosi vomitus, cum surditate & pervigilio, cito vehementer insanire faciunt.* “In pains of the head, vomitings of eruginous bile, with deafness and over-watching, these soon cause the patient to be violently delirious.” But also the atrabilis, which has lain a long time fixed and immoveable, oppressing the abdominal viscera, being dissolved and put into motion from any cause, kindles the most acute fevers, and among other symptoms of the worst kind produces a nausea and vomiting (see §. 1104.) not to be allayed unless the turgid atrabilis can be removed, or so corrected as to be less injurious; which how difficult it is to perform, will appear when we come to treat hereafter of this disease.

Falsity and danger of the rule, &c.] This has indeed been esteemed by many as an universal axiom or rule in practice; that whenever there is a vomiting and nausea in diseases it is always useful to promote a vomiting by art, believing that they then always endeavour to discharge the matter of the disease by the same ways which are inclined to by nature. And what confirmed them in this opinion, is the happy success they have met with in this practice, when the vomiting arises from the troublesome quantity or the acrimony of the bile or fluctuating phlegm in the first passages. But, from what has been said, it is evident, that a most obstinate vomiting sometimes arises from an inflammation, ulcer, schirrus, or cancer in the stomach itself, or in the circumjacent parts. But it is easily apparent, that emetics, given in such cases, must greatly exasperate all the disorders. Thus also in a vomiting which proceeds from a disturbed motion of the nervous fluid, this rule is false, since emetics being given increase the disturbance. But Hippocrates^o has very prudently limited this rule, by saying that vomiting is to be allayed by vomiting, when the matter which excites a vomit is washed out together with the emetic.

Why sudorifics often remove vomiting, as in the plague?] This has been observed by Sydenham, that a most severe vomiting often attends those seized with the plague, whereby the medicines given were immediately expelled; and therefore in such a case he abstained from giving medicines, 'till he had raised an incipient sweat only by the weight of bed-cloaths; for, says he, *Nam cum materiae morbificae radii versus ambitum corporis sese exporrigant, ilico alvi fluxus & vomitiones, ab eisdem*

^o De locis in homine cap. 15. Charter. Tom. VII. pag.

eisdem introrsum reflexis, ac in ventriculum & intestina decumbentibus provenientes, ultro sedantur P.

“ When the morbid matter extends itself in radii
 “ towards the circumference of the body, immediately the vomiting and purging cease, which
 “ proceeded from the same reflected inward,
 “ and extending into the stomach and intestines.”

But so certain was Sydenham of his being able to allay such a vomiting by exciting sweats, that when an apothecary's brother lay very ill of a pestilential fever, and had taken the stronger sudorifics without effect, immediately throwing them up again by vomit, he nevertheless promised that he would easily take off his vomiting, though every thing taken before would not stay upon the stomach. But in the end he fulfilled his promise, for when the patient began to be in a moderate sweat only by the weight of bed-cloaths, he swallowed and retained a large bolus of theriaca, and by a copious sweat continuing, the patient was cured of the disease. But when a sweat once begun was interrupted by any cause before the matter of the disease was perfectly expelled, all the symptoms immediately returned worse than before.

Why vomiting often ceases when a crisis happens, as in the small-pox?] The contagion of the small-pox being received into the body often excites its tragical effects first about the stomach; this is evident from the anxiety and pain of the upper orifice of the stomach, which is perceived about this part with a nausea and vomiting, which so frequently attend in the first stage of this disease. All these disorders usually continue through the whole stage of infection, 'till the received poison begins to be deposited towards the surface of the body by the fever, so as to produce inflammatory

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tory pustules, tending to abscess or to a gangrene. Then indeed all the symptoms usually diminish, and the hitherto troublesome vomiting ceases, there being a critical deposition of the poisoning stimulus, and of the humours changed by it towards the outer surface of the body. But when a vomiting continues after an eruption of the small-pox, it denotes that the pustules then invade the internal surface of the stomach and œsophagus itself, or else that the stomach is irritated by the bile, rendered acrimonious by the violent fever preceding; concerning which we shall treat more at large hereafter in the history of the small-pox.

Why vomiting often ceases by bleeding as in acute inflammatory cases?] Because in these diseases the vomiting frequently arises from an inflammation of the stomach or adjacent viscera, or only of the brain itself. But that blood-letting is a principal remedy to remove the inflammation, is evident from what was said before concerning the cure of that disorder. In the comment to §. 644. N^o. 3. mention was made of the remarkable case of a noble lady lying ill of an acute fever, to whom Sydenham gave an emetic to remove an urgent vomiting, which he had experienced to be useful in so many other vomitings: but he ingenuously confessed, that he there observed the error he had committed; and afterwards in others afflicted with the like fevers, he treated this vomiting by bleeding, as in a pleurisy, and with very happy success.

Why in the beginning of an acute fever, &c] Because then the stomach is almost constantly irritated by the bile abounding, or rendered more acrid; which bile being rendered more malignant by stagnating and by the fever, being conveyed
into

into the intestines excites a diarrhoea towards the end of the disease, which is often dangerous, as the patient's strength being greatly weakened by the preceding disease, renders him incapable of supporting any copious evacuation. This observation holds true, more especially in that kind of continual fever, which frequently occurs in autumn, and in that epidemical constitution which particularly favours the invasion of intermitting fevers. But since intermitting fevers are oftener epidemical than other diseases, so the continual fever which prevails at that time, is observed to be more frequent than the rest, as Sydenham ^q well remarks. Nor was it without reason that this great man, comparing together all that he had learnt concerning epidemical constitutions, by a faithful observation continued for many years, concludes ^r, that this was the chief fever in nature, because it occurred more frequently than the rest, and because the axioms which the antient Physicians have left us concerning the crises of diseases, agree more with these than with any other fevers, as we observed in the comment to §. 587, where we treated of crises. But also autumnal intermittents which usually invade together with these continual fevers, are of the like nature; and double tertians and even quartans, when the fits have been protracted and doubled, often turn into such a continual fever ^s, as on the other hand that fever sometimes turns itself over to the class of intermittents ^t. Hence Sydenham ^u justly concludes that the forementioned continual fever is, as it were, a sort of compendium of those autumnal intermit-

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tents,

^q Sect. I. cap. 3. pag. 57.
pag. 317.
pag. 73.

^r Ibid. Sect. V. cap. 6.
^s Ibid. Sect. I. cap. 4. pag. 68.

^t Ibid.

^u Sect. I. cap. 3. pag. 56.

tents, as on the other hand every fit of the intermittent seems to be a sort of compendium of the continual fever, and the difference he places chiefly in this, that the effervescence once begun in the continual fever, always holds out in one continued course to the end: but that intermittents run the same course in broken periods at different times. Hence it is evident how extensive this practical rule may be, since it takes place as well in those acute continual fevers which the most frequently occur, as in the intermittents, which are so frequently epidemical. For I have observed, that when these fevers occur most frequently in these low countries, a vomit given in the beginning of the intermittent or acute fever has been of great service: although, as Sydenham well remarks^w, an emetic given in the beginning of these diseases, has brought up a matter not very considerable in quantity, nor endowed with any apparent bad quality. But when a vomit is given in the progress of the disease, after being neglected in the beginning of it, there is often a great collection of foul, bilious matter expelled; and in the mean time the patient is thereby greatly relieved, the fever going on frequently through its course quietly without any troublesome symptoms, and that fatal diarrhoea is thus always prevented, which so frequently succeeds in the end of these diseases. The only difficulty then will consist in distinguishing well whether the cause of the fever is inflammatory or not; towards which the season of the year, the known epidemical constitution of the disease, and a faithful observation of the *juvantia* and *lædentia* will afford considerable light. For such diseases prevail mostly about autumn; but the spring, and the next succeeding part of the summer is more

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^w Sect. I. cap. 4. pag. 65.

apt to produce inflammatory diseases. But what care is necessary to distinguish in these cases is evident, since Sydenham himself, who was so well skilled in these things, ingenuously confesses he was deceived, as we said a little before.

Why a vomiting of every thing as soon as taken, &c.] For it almost constantly denotes that the stomach itself, or the contiguous diaphragm, or else the adjacent viscera, are invaded with a violent inflammation; whence these parts are so much irritated by the least repletion of the stomach as to excite a vomiting, by which these inflamed parts being roughly pressed, there is great danger lest the present inflammation should suddenly turn into fatal gangrene. At the same time also such a vomiting is of very bad consequence, inasmuch as it prevents the use of diluent and cooling liquors, a great quantity of which is necessary in the cure of such diseases.

Hence likewise it appears that hiccups, &c.] A hiccup seems to be a convulsion, wherein the œsophagus, stomach, and diaphragm are drawn upward, and then again the diaphragm is suddenly convulsed downwards*, for which see more in our author's Theoretical Lectures or Institutes, §. 808. For the appearances which are observed in a person who has the hiccup, seem to declare this, and after a long continued hiccup there is usually a troublesome uneasiness perceived about the fauces and upper orifice of the stomach. But this convulsive motion happens so swiftly, that one cannot exactly determine what parts are in action; whence Sydenham † ingenuously confesses, that he could not satisfy himself upon enquiry concerning the cause of hiccups. But it seems evidently enough to consist

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* Herm. Boërh. Institut. Medic. §. 808.
cap. 4. pag. 86.

† Sect. I.

in a convulsive motion of the œsophagus. - This is confirmed by Hippocrates^z, who derives a convulsion and hiccup from the same causes, where he says, *Convulsio aut à repletione aut ab inanitione fit: ita vero & singultus.* "A convulsion proceeds either from repletion or inanition; and so does likewise a hiccup." And elsewhere^a he often joins a hiccup and convulsion together; as when he says, *Effuso copioso sanguine convulsio aut singultus accedens malum.* "A great quantity of blood being extravasated, if it is followed by a convulsion or hiccup is a bad sign." And in the aphorism next following, *Hypercatbarisi convulsio aut singultus accedens, malum.* "That a convulsion or hiccup succeeding after an over-purging is bad." But since a vomiting and nausea acknowledge for their immediate cause a convulsion of the muscular fibres in the fauces, œsophagus, stomach, &c. therefore vomiting seems also to result from nearly the same causes, and may be cured by the same means which were prescribed for the cure of a nausea and vomiting: for it arises almost from the same causes as a vomiting: and it is frequently a companion of an inflammation in the stomach, as we shall declare hereafter at § 951.

Hippocrates^b observes, that an inflammation of the liver is attended with a hiccup; and in another place, he says, that both vomiting and hiccups proceed from the iliac passion^c. Very frequently do we observe hiccups arise from an inordinate motion of the spirits in hysterical patients, which is to be cured by allaying the tumult, or directing the spirits another way; which effect often happily succeeds by irritating the nerves in some other part of the body, or by quieting the hiccup by giving an opiate.

^z Aphor. 39. Sect. VI. Charter. Tom. IX. pag. 273.

^a Aphor. 3. Sect. VI. *ibid.* pag. 195.

^b Aphor. 58.

Sect. V. *ibid.* pag. 230.

^c Aphor. X. Sect. VII. *ibid.*

pag. 296.

opiate. Hippocrates observes, that sneezings following in a person afflicted with the hiccup, removes the hiccuping by changing the course of the nervous spirits, (which before rushed with too great an impetus into the fibres of the œsophagus,) by irritating the nerves dispersed through the nose. Diafcardium given in a large dose, which we know contains opium, happily cures the hiccup; as we are assured by Sydenham^e, that he has experienced it when the seeds of dill and other famous specifics have been of no service.

If therefore the hiccup arises from the causes which we enumerated among those of nausea and vomiting, the cure is to be derived from what has been said before. If the hiccup arises from a too sudden evacuation, as it frequently does in old people after a diarrhœa, and especially after vomitings, as Sydenham^f observes, those evacuations are to be suppressed, and the lost humours supplied by laudable nourishing juices. But if the hiccup proceeds from too great a fulness, then evacuations will be serviceable.

Moreover, hiccuping frequently follows when the interior surface of the œsophagus is irritated by the mass of food and drink swallowed and suddenly forced down. Thus voracious children, when they greedily eat what they have stole privately, are usually affected with a hiccup. The same disorder likewise proceeds frequently from the swallowing of any thing very acrid. But the most frequent and troublesome of all hiccups arises, when the œsophagus is invaded with apthæ, or little ulcerations; and frequently the Physician knows that these ulcerating eruptions begin to break out in the œsophagus, from the hiccuping which attends, and this even before they begin to appear in the fauces or internal parts of the mouth.

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^e Sect. I. cap. 4. pag. 87.^f Ibidem.

But when the apthæ fall off, we frequently see the tongue and fauces in a manner excoriated, whence they become extremely painful if they are touched with the slightest acrimony; and the same thing likewise then happens to the internal surface of the œsophagus, so that a most painful hiccuping follows almost from every thing that is swallowed, and frequently even from the saliva itself; for the cure of which hardly any thing is found better than the swallowing a little fresh expressed oil of almonds every hour, which by its healing virtue happily eases and defends the excoriated gula.

Of Weakness in FEVERS.

S E C T. DCLX.

GREAT weakness follows from an obstructed influx and pressure of the nervous fluid into the muscles.

Concerning weakness of the solid fibres of the body, as also of the smaller and larger vessels and viscera, which they compose, we treated at large in the beginning of these aphorisms; where it appeared that a weakness in these fibres is properly such a small cohesion of the parts which constitute the solids, as may be broke by a slight force, so as to render them incapable of the actions required from them towards life and health (see §. 41). But here, by a febrile weakness we understand an impotency in exercising the motion of the muscles which depend upon the influence of the will, as when a patient lying ill of a fever can hardly raise or turn his body, or move the limbs, even though he endeavours it by the influence of the will, and although there is no impediment from pain in the parts to be moved. For those who are afflicted with the gout or rheumatism are indeed prevented from moving their limbs by the severity of the pains, but they are not therefore said to be weak. But since in every febrile patient there is a weakness attends the exercise of the muscular motions, which can never be performed by them with so much ease, pleasure, and constancy, as happens in health; therefore in this place we treat only of an extraordinary or great

weakness as a febrile symptom, requiring in a peculiar manner the care and attention of the Physician. Great weakness is therefore such an impotency in the exercises of the muscular motions, as renders them neither constant nor easy, but yet so as to be in some measure ruled by the influence of the will. For where there is a total impotency of exercising these motions, which cannot be conquered by any endeavours of the will, it is called a palsy, which is to be well distinguished from a weakness, however great that may be. Moreover, a palsy does not destroy the action of all the voluntary muscles at once, but a great weakness usually affects all the muscles equally; although it is more or less perceived in one part in than another, according as the muscles ought to exert a greater or less force when they act. Thus even the weakest person will be able to move his lips, eyes, fingers, &c. when he cannot extend his arm, raise his body, or turn himself round in the bed; because to perform this more and stronger muscles are required to act at the same time.

But it is evident from the demonstrations given concerning muscular motion in our institutes or theoretical lectures, that the cause of motion is sometimes present in, and absent from the muscle, and therefore that it is derived to it from some other part, and is not always present in the muscle itself. It likewise there appears by direct experiments, that a free communication is required betwixt the encephalon and muscles to be moved by the intermediate nerves, in order that the cause of motion may be applied to the muscles; for this communication being intercepted by a ligature of the nerve leading from the encephalon to the muscle, there can then be no motion excited in such a muscle. But from what we at present know by

anatomy, concerning the fabric of the encephalon, we may conclude that a most thin fluid is transmitted from the encephalon through the nerves by very distinct passages to every muscle, even though this fluid by its great tenuity escapes all the senses, and flows through vessels so minute, that they cannot be demonstrated to the eye by any artifice^g. It is therefore evident, that the weakness concerning which we here treat, follows from an obstructed influx and pressure of the nervous fluid into the muscles. But this pressure of the nervous fluid into the voluntary muscles, proceeds from the influence of the will; for as soon as we will or endeavour to move any limb, it is instantly in motion without any sensible interval of time betwixt the endeavour of the will, and the effect which it produces. But in what manner this power in the mind, of exciting the motion of the muscles by the will, acts upon the first origin of the nerves, and there increases the quantity and celerity of the nervous fluid about to flow through the nerves, remains indeed unknown to us, since there is not the least reason to be given from what we as yet know concerning the nature of the body and mind, whereby one may understand the means through which these two act mutually upon each other, or suffer mutually the one from the other^h. Moreover, this endeavour of the will may be present even in the weakest person, and yet not be followed with its due effect; and therefore the cause of this weakness must be a deficiency of the very thin nervous fluid, or an obstruction of its free course from its origin through the nerves into the muscles.

It is indeed true that experiments teach us likewise that an artery being tied, before its distribution

^g Vide de his H. Boërhaave Institut. §. 284.

^h Ibid. §. 27. 1.

tion into a muscle, destroys the motion of that muscle; but the influx of the arterial blood seems only to be required to put the muscle in a capacity of being affected by the moving cause to be derived from the encephalon through the nerves into the muscle. Therefore the influx of arterial blood into the muscles does not seem to be the proximate cause of their motion, but only disposes the muscle to be put in motion by the accession or influx of the nervous fluid through the nerves. For our will has no influence whereby it can directly accelerate the influx of the arterial blood into any muscles; and when a muscle is in violent action, its flesh looks pale from an expulsion of all the blood. Moreover, if there is a deficiency of arterial blood in the body, which is followed by too languid a motion of it, to which any one would willingly ascribe the febrile weakness, yet it is certain that the influx of the nervous spirits into the muscles is also deficient in proportion. For the secretion of the nervous fluid and equable motion of it through the medulla of the brain and nerves, require the application of the arterial blood, with a due force and quantity to the cortical fabric, whence the same effect will follow.

It now remains for us to see, what are the causes that have been observed to obstruct the influx and pressure of the nervous fluid into the muscles, so as to produce great weakness in fevers.

S E C T. DCLXI.

WHICH obstruction may proceed from an emptiness of the vessels exhausted of their fluids, an imperviousness of the fluids, an obstruction of the nervous tubes, or a compression of them, more especially at their origin in the brain and cerebellum; or lastly, from a weakness of the heart.

From an emptiness of the vessels exhausted of their fluids.] The motion of our fluids through the vessels proceeds from two causes, namely the heart impelling the blood into the converging arteries, and distending them; and afterwards the reaction of the arteries, whereby they resist dilatation and contract themselves again at the time when the heart is dilating. But that quantity of the blood, which is projected out of the ventricles of the heart into the arteries, would not be sufficient to dilate them even in the most remote parts of the body, unless the arteries were already full at the time when the blood is impelled into them by the contraction of the heart. When therefore there is so great a loss of the fluids that the sides of the arteries, when they are most contracted, do not come into contact in every point with their contained fluid; in that case the blood expelled from the heart would fill the arteries without dilating them, and the moment after when the heart is dilating, the arteries could not contract, because they were not dilated; and therefore the blood contained in their cavities would stagnate and not be sent forward, 'till by repeated actions of the heart it had expelled a sufficient quantity of blood to fill them,

them, so as to be dilated by the next systole of the heart. The natural motion therefore of the humours through the vessels being thus weakened, there will be a deficiency of the quantity of the blood to be propelled through the vessels of the encephalon, the pressure will be diminished whereby the fluids are urged into and through the secretory vessels in the cortical part of the brain; and consequently there will be a deficiency in the secretion of the spirits, and their equable motion through the nerves, whence weakness must necessarily follow. The truth of this appears from daily observation; for when the strongest man or the most fierce animal has suffered so great a loss of blood from a wound, that the arteries begin to want their due fulness, they immediately languish and fall into great weakness.

From an imperviousness of the fluids or an obstruction of the nervous tubes.] A fluid is said to be impervious, when it cannot pass freely through the ultimate small extremities of the vessels in which it is contained; whether or no this happens from the viscosity of the liquid by which its cohering particles do not suffer themselves to be easily separated, that they may pass through the ultimate extremities of the vessels; or whether the orifices of the smaller vessels being dilated, make way for the larger globules to enter into them by an error of place, which being incapable of passing through those ultimate extremities, the effects in both cases will be the same, as from an imperviousness of the liquid. The vessels therefore which contain an impervious liquid will be obstructed, because the bulk of the particles to be transmitted, exceed the capacity of the transmitting canal (see §. 107); whence all these functions will be abolished or disturbed, which depend upon a free circulation
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of the humours through those vessels. But the secretion of the nervous spirits, and the motion of them through the nerves, depends on a free circulation of the humours through the vessels of the encephalon; whence it is evident, that weakness in fevers may arise from an imperviousness of the fluids, and an obstruction of the vessels thence following. Hence in acute inflammatory diseases, when the blood being deprived of its diluent vehicle passes more difficultly through the extremities of the arteries, there often ensues so great a weakness; and this more especially, if the violence of the disease settles upon the head, and the impervious blood begins to stagnate in the vessels of the encephalon. For the same reason there is a weakness of the body often attends in a cold mucous cacochymy, when the sluggish and viscid humours cannot pass through the narrow straits of the cortical vessels of the encephalon; whence a numbness, dulness, and incapacity to exercise the motions of the muscles.

Or a compression of them, more especially at their origin in the brain and cerebellum.] In plethoric people great weakness often arises from this cause, though there is no defect either in the solid or fluid parts of the body; only there is a redundancy or too great a quantity of good blood. For the cranium is always exactly full, as appears when the upper part of the skull is taken off together with the dura mater in a dead body; for then the mass of the encephalon immediately raises itself, and the top of the skull cannot be adapted again without compressing the brain. If therefore there is too great a quantity of red blood, as there is naturally no red blood ever found in the cortical part of the encephalon, but it is confined only to the vessels of the dura and pia mater, those vessels
being

being distended since the skull cannot give way, the soft pulpy fabric of the cortex will be compressed. But as there are arteries found containing red blood dispersed betwixt the medullary substance of the brain itself, and great numbers of them encompass the medulla oblongata; it is evident that from this cause the tender threads or tubuli of the nerves may be so compressed at their very origin in the brain and cerebellum, that from thence the due influx and pressure of the nervous fluid into the muscles may be impeded, and consequently a weakness may follow. But because the substance of the brain is softer than that of the cerebellum, therefore from such a cause the functions of the former, upon which depend the action of the voluntary muscles, will be first injured. Thus we often find those who are very plethoric are also very weak; but after a copious blood-letting they immediately recover their former strength of body. The same consequence will likewise take place, when the impetus of the blood rarefied by heat and increased by the fever thus distends the vessels, though there is not too great a quantity in general. But if from the same causes some of the vessels being burst, extravasate their humours, and compress the substance of the encephalon, it is very evident that the disorder is still more dangerous. From this cause the most fierce bull by a blow on the skull immediately falls down, and loses all his strength. Hippocratesⁱ seems to have acknowledged the same cause of weakness, when he says, *Qui præter rationem, nulla existente vasorum inanitione, prostratis sunt viribus, malum.* “That in those who have a loss of
 “ their strength without any manifest cause, and
 “ not from any inanition of the vessels, it is a bad
 “ sign.”

ⁱ In Coac. Prænot. N^o. 56. Charter. Tom. VIII. pag. 855.

“ sign.” And in another place ^k, *Quibus capitis & cervicis dolores, atque totius corporis cum tremore imbecillitas quædam, sanguinis eruptiones solvunt.* “ That eruptions of blood remove pains of the head and neck, in those who have a trembling and weakness throughout the whole body.” It is now sufficiently apparent that weakness may arise from any cause compressing the brain, whether it consists in a dilatation of the vessels, or in a collection of humours in the ventricles or some other part of the brain. A remarkable instance of this we read in Le Motte ^l of a woman who received a slight contusion of the head towards the left eye, with a fracture of the adjacent temporal bone, almost without any pain or other bad symptom, so that the injury appeared but slight with an ecchymosis in the contused part. In about eighteen days time after the accident, the ecchymosis being now wholly dissipated, nor any disorder as yet perceived, the patient began to grow weak, and in two days more had her memory impaired, and spoke inconsistently; afterwards the weakness continually increased, tho’ she eat much, and all the functions of the brain were more and more weakened, ’till she expired after the space of two months. Upon opening the body there was found a white and turbid serum lodged pretty deeply in the cortical substance of the brain next to the medulla, and that part of the brain where this serum was lodged, dissolved or broke to pieces by the least touch.

Or lastly from a weakness of the heart.] Every one knows that the heart is truly a muscle, acting with a muscular force upon the blood contained in its cavities, and expelling the same powerfully into the arteries. But to enable it to perform this, it requires

^k Prædict. Lib. I. ibid. pag. 800.
Chirurgie Tom. II. pag. 580, &c.

^l Traité complet de

requires a due strength in its muscular flesh; for when the heart in its contraction urges the blood forward, it ought to be able to overcome the resistance of the arteries already full; and then the sides of the heart are pressed with the same force by the contained blood, as is equal to the force implied by the heart in propelling the blood through the arteries. There is therefore required a considerable strength in the muscular fibres of the heart, that they may not be stretched beyond their due length. If therefore from any cause the due cohesion of the fibres of the heart is weakened, while the resistances to be overcome remain the same, there will happen a greater distraction or elongation of those fibres, whence their cohesion once weakened will be soon increased, and the cavities of the heart will be enlarged. But when the resistances are increased, though the fibres of the heart retain their first strength, they must suffer a greater force, in consequence of which they will be more stretched, and so farther weakened (see §. 25. N^o. 3.) We treated more at large upon this subject, and confirmed what we advanced by the most faithful observations of the best authors; when upon another occasion we discoursed concerning an aneurism of the heart (see §. 176), which always supposes a weakness and stretching of the fibres in the heart. It appears, from many instances in medical history, that the heart has been sometimes eroded by ulcers, and by that means weakened in its substance; and the right ventricle of the heart appeared burst from such an ulceration and erosion upon opening the body of the illustrious Duke of Brunswick^m. But there is an observation much more surprizing given us in the same place by the celebrated Morand, who searching after the cause
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^m Academ. des Sciences l'An 1732. Mem. pag. 594.

of sudden death in the body of a certain nobleman could find nothing amiss either in the head or in the abdomen, and the lungs appeared sound: but upon opening the pericardium there appeared a mass of congealed blood, and in the left ventricle a perforation, which was equal to eight lines in length; and the fleshy substance of the heart appeared so infirm, that the probe made its way through in every part by its own weight, which, though small, was sufficient to make it pass quite through the heart. If therefore the strength or firmness of the muscular flesh in the heart may be so much diminished by latent causes, there is no room to doubt but it may be weakened from slighter disorders of the same kind, whereby it will not be able to propel the blood into the arteries. But upon this force of the heart depends the application of the arterial blood to the fabric of the encephalon, together with the secretion of the spirits through the nerves thereon depending; and therefore it is no wonder if a weakness of the heart impedes the influx and pressure of the nervous fluid into the muscles, which is followed with great weakness.

But may we not refer to the forementioned causes of weakness many other wonderful appearances observed in diseases? There is sometimes a matter lodged about the præcordia, which, as it were by a poisoning force, in a moment suppresses all the strength, and occasions great weakness as long as it continues there, even though there has been no preceding loss of the fluids, nor any observable change to be found either in the solid or fluid parts of the body, to which the suddenly produced weakness might be ascribed. Galenⁿ has observed not only convulsions, but even a syncope to follow

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from

ⁿ De locis affectis, Lib. V. cap. 6. Charter. Tom. VII; pag. 493.

from bile lodged about the præcordia, and upon discharging that matter by vomiting, all the maladies immediately ceased. In continual fevers which spread epidemically, Sydenham ° was surprized to find, among other bad symptoms, a great and sudden weakness of the patient's strength; but after giving a vomit, all the severe symptoms which tortured the patient, and terrified the by-standers, were directly mitigated P. But sometimes the greatest weakness has been observed, when poisons being taken have been lodged in the stomach only, as is confirmed by many instances in Wepfer's history of the cicuta aquatica. But they do not all seem to act in the same manner by rendering the liquids impervious, or by obstructing the vessels, because all these maladies cease immediately as soon as they are discharged out of the stomach. Whether or no by altering the nerves of the stomach they act directly upon the heart itself? or whether the cerebellum is first affected, which serves to the vital functions of the body? It is sufficient for us here to be acquainted with these wonderful effects, though we do not understand the manner wherein such a weakness suddenly arises from the like poisons; and it will be also serviceable at the same time to know this, lest the weakness from such a cause should be ascribed to others.

° Sect. I. cap. 3. pag. 57.

P Ibid. cap. 4. pag. 65.

S E C T. DCLXII.

THE former cause of weakness is demonstrated from the previous and present symptoms of profuse evacuations; such as the long continuance of the disease, an artificial or morbid hæmorrhage, sweats, diabetes, spitting, or a diarrhœa; a deficiency in the taking in, retaining, digesting, and distribution of the food; a paleness, leanness, small pulse, collapsed vessels, and flaccid muscles.

Since therefore a weakness may arise from so many different and even opposite causes, it is altogether necessary, in order to accomplish a cure regularly, to learn first from what cause the weakness derives its origin. The signs are therefore to be enumerated whereby the cause of the present weakness in the body may be distinguished from others. But in the present aphorism we are to treat of those signs which denote the weakness to be ascribed to an emptiness of the vessels, and wasting of the fluids.

In the first place, hitherto belong large evacuations of any kind, which, while present, appear to the senses; but, when they have preceded, they are to be learnt from the history of the disease. Moreover, by large evacuations of any kind the body is altered, and appears with a different face externally to what it had before; so that from these changes being observed, one may also judge such evacuations have preceded. But concerning each of these we are next to treat.

Long continuance of the disease.] It is well known that, by the vital motion of the humours

through the vessels, even moderate and healthy, the solid parts of the body are ground away, and the quantity of the fluids lessened; whence is required a restitution of what is lost by taking in food and drink to be so changed by the powers of the vessels and viscera of the body, as to be converted into our own nature. But when the vital motion is accelerated by a fever, a much greater quantity will be daily wasted from the body, inso-much, that fat people, afflicted with a continual fever, have often lost half their weight in a fortnight's time. At the same time also many of those functions are injured by the fever, which ought to change the food into our own nature; whence the assimilation or restitution of what is lost will be either deficient or disturbed. It is therefore evident, that a weakness, following after a disease of long continuance, proceeds principally from this cause, and is to be cured by such things as are able to repair the lost solid and fluid parts.

Morbid or artificial hæmorrhages.] To make a due secretion of the nervous fluid in the brain and cerebellum, and to continue its pressure into the muscles, requires a due quantity or impetus of the arterial blood to be sent into the arteries of the encephalon. When therefore the quantity of the blood is greatly diminished by hæmorrhages, either spontaneous, or procured by art, it is evident that weakness must follow. When we treated of those remedies (§. 610) whereby too great an impetus of the vital humours might be allayed in a fever, it appeared that blood-letting was most fit for this purpose, by which the strength might be weakened to any degree; for even in the most healthy and strongest person this evacuation may be continued ad deliquium, or 'till the patient faints with great weakness. How great a weakness often arises
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from such an hæmorrhage, when by miscarriage, or in women with child, the vessels of the uterus are broke, and pour forth their blood in a stream, we are taught by daily observation. The great strength of raving mad persons I have thus known so much weakened by bleeding, that they have not been able to move their limbs; whence the madness was indeed relieved, but an incurable foolishness succeeded in its place. The weakness arising from the hæmorrhage is still more increased, because the due assimilation of the ingested food is hindered by the too great loss of blood. (See § 25. N^o. 1. §. 43. N^o. 3.)

Sweats.] What disorders may arise in diseases from profuse sweats, has been in part declared in §. 594. N^o. 2. and will be partly shown hereafter, when we come to treat professedly of a febrile sweat. It may be sufficient here to observe, that as the thinner parts of the blood are exhaled by sweating, what remains will be inspissated; whence the equable circulation through the smallest vessels of the encephalon will be disturbed, and consequently the secretion of the nervous fluid and its pressure into the muscles will be impeded. Also by such a profuse evacuation by sweats, the fluids are too much exhausted, and the vessels emptied; whence *Ægineta*^q observes, that excessive sweatings so much weaken and fatigue the patient that they frequently bring on a fainting. But profuse sweats, as *Sydenham*^r well observes, often arise from the powers of the body weakened after diseases of long continuance, and, as long as they last, prevent the patient from recovering strength after the disease.

Diabetes.] An unfrequent disorder which *Galen*^s affirms he had only twice seen; and tells us it

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^q Lib. II. cap. 46. pag. 22. versa.

^s Sect. V. cap. 2. pag. 291.

was looked upon as a sort of miracle from its so seldom occurring amongst mankind. *Aretæus*^t will have it so called ἀπὸ τῆ διαβαίνειν, because there is a very swift passage of the fluids through the body. Galen^u observes that it hath been called *hydrops ad matulam*, an urinary diarrhœa, and *dipsicus*. The Latins have not given it a peculiar name, but have only called it too great a flux or profusion of the urine^w. But Galen seems to call it by the name of a diabetes, when the ingested drink suddenly passed through the body unaltered by urine; for thus he expresses himself: *Equidem eum bis vidi, supra modum sitientibus infirmis, atque idcirco affatim bibentibus, celeriterque per urinam reddentibus epotum tale, quale biberant.* “ I
 “ have indeed seen this disease twice, the patient
 “ being more than ordinary thirsty, and therefore
 “ drinking plentifully they quickly discharged
 “ what was drank by urine just as it was taken
 “ in.” *Ægineta*^y likewise gives the following definition of a diabetes. *Diabetes est subitus potulentorum exitus, talibus per urinam redditus, qualia epota fuerant.* “ A diabetes is a sudden discharge
 “ of liquors drank, which are voided by urine,
 “ such as they were taken in by the mouth.” But in this sense a diabetes frequently occurs; for in acute inflammatory diseases it is often of the worst presage, when the drink taken in is very soon expelled by urine little altered. But *Celsus*^z calls it
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^t Morbor. diurn. Lib. II. cap. 2. pag. 51.

^u De Locis affectis, Lib. 6. cap. 3. Charter. Tom. VII. pag. 511.

^w Cels. Medic. Lib. IV. cap. 20. pag. 234.

^x De Locis affectis, Lib. VI. cap. 3. Charter. Tom. VII. pag. 511.

^y Lib. 3. cap. 45. pag. 47.

^z Medic. Lib. IV. cap. 20. pag. 234.

too great a profusion of the urine, *cum super potio-
num modum mingitur, & jam sine dolore profluens
maciem & periculum facit*; “wherein the patient
“makes more water than what he drinks, which,
“coming away without pain, causes leanness and
“danger of death.” From whence it is evident,
that not only the ingested drink is thus expelled from
the body in a diabetes, but also other humours
escape by these passages, and waste the body.
Hence Aretæus^a says, that the cause of the diabe-
tes is a cold and moist dissolution or wasting of
the flesh and limbs by urine, and that though the
thirst is intollerable, and a great quantity of liquor
is drank, yet the quantity of the urine exceeds that
of the drink. But although a diabetes is an unfre-
quent disease, yet that degree of it, which Are-
tæus^b calls perfect, is above all the most seldom to
be met with: namely, when the urine is discharged
in a continual profusion without any intermission,
whence a speedy wasting and death ensues.

We may therefore distinguish a twofold diabe-
tes, one wherein a great quantity of thin urine is
discharged, equalling or even exceeding the drink
taken in: the other is indeed an increased quan-
tity of urine, but at the same time the thicker hu-
mours escape with it; whether they arise from
a colliquation of the parts of the body, or from
the chyle or milk prepared from the ingested ali-
ments flowing with the blood, and distilling toge-
ther with the urine through the renal ducts; the
latter is commonly with more propriety termed a
diabetes by Physicians, namely a frequent and co-
pious discharge of a milky or chylous urine^c.

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^a Morbor. diuturnor. Lib. II. cap. 2. pag. 51.

^b Ibidem.

^c Herm. Boërh. Inffit. Med. §. 824.

This distinction has been already given us by Celsus^d, who divides too great a profusion of the urine into thin and thick. The former kind of diabetes, in which there is discharged a great quantity of thin urine is more frequent, and seems to be less dangerous; because frequently such a copious discharge of the urine supplies the deficiency of the sanctorian perspiration; and medicinal history acquaints us, that people have sometimes supported it for a long time without much damage. Cardan^e testifies of himself, that for forty years of life he was afflicted with such a copious discharge by urine, insomuch that he discharged from sixty to an hundred ounces every day; nor yet did he fall away, nor was he troubled with any great thirst. The latter kind of diabetes, wherein a great quantity of urine is discharged together with chyle or milk, is less frequent, as the body is thereby deprived of its nourishment, and must consequently waste away. But although the chyle or milk flowing together with the blood does not seem naturally to pass through the renal ducts, yet it is not very unusual to find some such appearance in the urine even of healthy people. I have sometimes seen in myself some hours after a meal, and especially after hard walking, and having first eaten a large breakfast, that my urine, which appeared turbid and milky almost the moment that it was evacuated, immediately after deposited a white sediment, very much like chyle. And I have since sometimes observed the same kind of urine in others. Galen^f seems to have sometimes observed a like matter in the urine, which he calls a
crude

^d Lib. IV. cap. 20. pag. 234.

^e De Vita propria, cap. 6. Tom. I. pag. 5.

^f De Alimentor. facultat. Lib. I. cap. 2. Charter. Tom. VI. pag. 311.

crude juice ; concerning which he has the following passage : *Crudus autem succus propriè dictus talis est, quale id apparet, quod in urinis quandoque subsidet, puri adsimile ; verum pus graveolens est & glutinosum. Crudus vero succus illi crassitie & colore tantum est similis, quum neque graveolens sit, neque lentus. Non tamen febricitantibus solis ex crudorum humorum copia in urinis subsidet, cujusmodi dixi, sed & sanis, qui post multos exantlatos labores cibos duros & confectum difficiles comedunt.*

“ But the crude juice properly so called is such as
 “ that appears and sometimes subsides in the urine,
 “ resembling pus or matter ; but matter is glu-
 “ tinous and ill-smelling, whereas this crude juice
 “ resembles it only in colour and consistence,
 “ being neither viscid nor of a bad smell. But
 “ such a juice, as that before mentioned, subsides
 “ in the urine not only in those who abound with
 “ crude humours in fevers, but even in healthy
 “ people, who eat food hard and difficult to di-
 “ gest, after they have been exhausted with much
 “ labour.” Now, according to the greater or
 less quantity of the chyle circulating with the blood
 which this way escapes, the body will fall away
 sooner or later ; but those who retain a sufficient
 quantity of chyle, and have a strong appetite, of-
 ten support the disorder for a long time, as may
 be seen in the observations which Schenckius [§] and
 others have collected. But now every thing ca-
 pable of relaxing the renal ducts, or of causing the
 humours to flow towards the kidneys with a greater
 quantity and impetus may be the cause of this dis-
 ease. Hence we read in the writers of observa-
 tions, that it has been produced by too much of
 watery drinks, and from the more acrid diuretics.

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§ Lib. III. pag. 454.

The cure therefore will principally consist in rendering the too lax renal vessels more firm, by avoiding drink as much as possible, and taking only those of the stronger kind. By keeping the whole surface of the skin lax and very perspirable, and if the patient is strong enough, by using exercise of body 'till the sweat begins to appear: for we know that by sweats the quantity of the urine is diminished; whence people who labour hard in the summer-heats drink a great quantity of small beer, and often discharge very little by urine; because in these almost the whole quantity of ingested liquor is carried off from the body by sweating. Cold is to be strictly avoided, because by that a great quantity of the humours is derived to the kidneys, as it diminishes the cutaneous exhalation. By these means I have been able to cure a gardiner of this disease, making use at the same time of a drying regimen of diet, and applying woollen cloths moistened with oxycrate to the region of the kidneys. But he indulged himself much in sleep, and did not go to his usual labour 'till long after the sun was risen, being equally cautious likewise to avoid the evening-cold; but by exercising himself so much the harder in his daily labour, he made up for that loss of time. But it required three months time before this disease could be wholly removed, even though it was but mild at first, returning again sometimes within that space. But all these particulars agree very well with what is recommended by Celsus^h for the cure of this disease, when he says, *Opus est exercitatione & fricatione, maximeque in sole vel ad ignem. Balneum raram esse debet, neque longa in eo mora: cibus comprimens: vinum austerum meracum; per æstatem, frigidum; per hiemem,*

^h Lib. IV. cap. 20. pag. 234.

hiemem, egelidum, sed tantum, quantum minimum sit, &c. Vitanda omnia sunt, quæ urinam movere consueverunt. “ There is need of exercise and
 “ frictions, more especially in the sun or be-
 “ fore the fire. Warm bathing should be seldom
 “ used, and when the patient is not to stay long in
 “ it: the food is to be astringent, and the wine
 “ should be rough and strong; drank cold in the
 “ summer, and in the winter with the cold taken
 “ off, but not so much as to warm it; every
 “ thing is likewise to be avoided which usually
 “ promotes urine.”

Spitting.] How much the body may be exhausted only by a discharge of the saliva, we are taught from a salivation raised by mercury: for by this means even a fat person is in a few weeks-time perfectly emaciated. In the small-pox, more especially of the confluent kind, there is often a great quantity of humours discharged this way from the body. And very frequently in those who are troubled with thick and large apthæ, when they fall off a copious spitting ensues, because the vessels dilated under the apthous crust being set at liberty when the scab falls off, a great quantity of lymph pours forth from their open mouths, whence great weakness follows: And frequently such patients are lost, unless the profuse spitting can be restrained, as the strength has been usually much exhausted by the disease.

Diarrhœa.] How many different kinds of liquors may be this way carried off from the body, and how the whole habit may be drained by it, we shall declare hereafter at §. 719. It is sufficient here to observe that thereby a very great quantity of the humours may be evacuated, and consequently a weakness brought on.

A deficiency of the food taken in, retained, &c.] For to keep up the strength, as we have often said before, requires a restitution from the ingested food and drink of those parts, which have been wasted from the body by the daily actions of life and health. If therefore from bad advice nourishment is neglected to be given to the patient (see §. 602); or if the patient should not be able to swallow it, as in a quinsy, weakness may ensue; as it also may if the ingested food is not retained, but discharged out of the body, either by vomiting or diarrhœa, before chyle can be prepared from thence. But since the ingested aliments do not nourish until they have been first changed by the powers of the body (see the comment to §. 1.) it will not be sufficient barely to take in and retain the foods, but a due digestion of them is also required, which, being deficient, will be likewise attended with weakness. But since the chyle is prepared by the efficacy of the stomach and intestines, joined with the mixture of the ingested liquors, it ought to be capable of entering the small mouths of the lacteal and mesenteric veins to mix with the blood, and be farther elaborated by the action of the vessels and viscera; and this is called the absorption and distribution of the chyle or food. If therefore the entrance of the chyle formed from the ingested aliments into those vessels is obstructed, either from a glutinous matter collected in the first passages, and adhering to the sides of the intestines (see §. 71), or from apthæ seated throughout the whole tract of the primæ viæ, there will be a deficiency of the nutrition, and consequently a weakness will follow.

Paleness, leanness, &c.] All these are the signs by which we know that the vessels are empty by being exhausted of their fluids; for such changes
 happen

happen apparently in the external habit of the body in those who are weak from this cause. For paleness denotes a deficiency of the red blood, and leanness a wasting of the fat; a small pulse and collapsed vessels demonstrate a scarcity of the humours distending the larger conspicuous arteries and veins. The muscles, which are so large in strong people, being exhausted of their fluids, become small and flaccid in those who are weak, because the fluid distending their vascular substance is so greatly diminished; and this more especially, because the fat interposed betwixt the muscular fibres is also wasted, though it is upon this chiefly that the bulk of the muscle depends. For although in consumptive people before death, the habit of the body appears so far wasted, that only the dry skin seems to be left hanging upon the bones, yet they are able to exert the motions of their muscles; and therefore the muscular fibres properly so called remain entire, although all the fat being consumed which was interposed betwixt those fibres, makes the bulk of the muscles appear incredibly small. Galenⁱ very well remarks this, when he says, *Singularum partium substantiæ molem ex tali maximè compleri natura, quæ & perire & regigni potest, uti in cavis ulceribus manifestè videre licet.* “That the bulk or substance of every part
 “ is made up chiefly by nature of such matter as
 “ may be both wasted and regenerated, as one
 “ may plainly perceive in hollow ulcers.” When therefore such changes appear in the external habit of the body, we may be certain that the present weakness of the patient ought to be ascribed to inanition of the vessels.

ⁱ Method. Medend. Lib. X. cap. ultim. Charter. Tom. X. pag. 245.

S E C T. DCLXIII.

AN imperviousness of the fluids from a glutinous or inflammatory tenacity is known from the signs before given (§. 69 to 75.)

There is more especially a twofold viscosity observed in our fluids, by which they are rendered impervious: The one which arises from a deficiency or inactivity of the vital motion, which is usually accompanied with coldness, paleness, and leucophlegmatic swelling of the body; the other proceeds from an increased circulation and violent action of the vessels upon their contained fluids, by which the humours being rendered too dense and compact, pass more difficultly through the ultimate extremities of the vessels: And this last is called an inflammatory viscosity or tenacity, which is more especially denoted by a heat and redness of the body. Concerning the former we treated under the title of diseases from a spontaneous glutinosity in the aphorisms cited in the text; and it is very rare that weakness in fevers arises from that cause, because bodies full of such sluggish and glutinous humours are less inclined to fevers, more especially such as are acute; and in these the impetus of the vital motion being increased in the fever, often happily dissolves that cold lentor. But the latter is much more frequently the cause of weakness, in fevers: and often such a lentor is produced by the fever itself, though it did not pre-exist; or if it was present before the fever it will be increased thereby, as is evident from what has been said in the commentaries to §. 100, 587, 609. But this inflam-

Sect. 664, 665. in FEVERS. 159
inflammatory imperviousness is more especially discovered by the signs enumerated before §. 382, 384, and 385.

S E C T. DCLXIV.

BUT the weakness arising from an obstruction of the vessels may be known from what has been said on this subject, from §. 107 to 144.

Concerning this we have treated in the history of obstruction under the aphorisms cited by these numbers.

S E C T. DCLXV.

THE cause of weakness arising from a compressure of the brain and cerebellum, is known from what is observable in their functions injured at the same time, which functions we know for certain depend upon the entire or healthy state of these viscera; such are a delirium, sleepiness, trembling, vertigo, or ringing in the ears attending at the same time.

As the brain is less firm than the cerebellum, causes compressing the fabric of the encephalon generally act more powerfully and sooner upon the brain than upon the cerebellum, as we observed before in the comment to §. 661. For it seldom or never happens that the vital powers are weakened by a compressure of the cerebellum, but that the animal functions appear first injured from
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the brain being more especially affected in the same manner. For the cerebellum is furnished with no cavity wherein humours might be collected so as to compress that only; and then the fourth ventricle of the encephalon, as it is called, which lies under the cerebellum, cannot be so filled as to compress the cerebellum, without affecting the medulla oblongata in the same manner, which containing the medullary fibres both of the brain as well as the cerebellum, therefore the functions of the former will be injured by it as well as the latter. But that compressure, which arises from too great a distention of the blood-vessels, must act equally or even more upon the brain; and therefore the signs of this disorder are best known from the injured functions of the brain, since it does not seem possible for the distension of the vessels to compress that part of the encephalon which serves to the voluntary motions of the muscles, without touching the rest, upon which the other functions of the brain depend. Hence also in the case before-mentioned in the comment to §. 661, where a weakness ensued after a contusion of the head, from a serous liquor being collected in the cortical substance of the brain, there was a weakness of the memory and a slight delirium attended also at the same time.

But it must be observed that the functions of the brain may be also disturbed from too great inanition of the vessels. For when any one faints away after copious bleeding, a trembling, with ringing in the ears, and a vertigo with darkness usually precede; the same is also true of any other sudden evacuation, by an over-purging, &c. If therefore there are none of the signs of too great an evacuation (§. 662.) we know that these disorders proceed from a compressure of the encephalon;

lon; whether that arises from too great a fulness only, or from an imperviousness of the humours, or else from an obstruction of the vessels: for when impervious humours hesitate in the narrow extremities of the vessels, or are transmitted thro' them, but with great difficulty, the very tender vessels may be so far dilated by the impulse of the vital fluids urging behind, as to compress the very soft pulp of the encephalon. Hence Hippocrates^k pronounces, *Prædebilitatorum* (προεξιδυνάτησάντων) *desipientiæ pessimæ*, "Fainting away from great weakness to be most dangerous." But sleep, if profound, denotes an increased compressure of the brain, and that it now inclines to an apoplexy. But concerning the trembling, as we mentioned before in the comment to §. 661. Hippocrates remarks, *Quibus capitis & cervicis dolores, atque totius corporis cum tremore imbecillitas quædam, sanguinis eruptiones solvunt*. "That those who have a pain of the head and neck, with a sort of trembling and weakness throughout the whole body, are relieved by eruptions of blood." Namely, when by this means the too great quantity of blood distending the larger vessels is removed. But a vertigo, as was said in the comment to §. 267, is of all disorders of the brain almost the slightest, and almost every disorder of the head begins with it; and when they are cured they generally leave a vertigo as the last symptom. In the slightest vertigo there seems to be a rotation of all objects, which denotes an incipient compressure of the encephalon: but as the disease increases there seems to be a darkness before the eyes, and afterwards, when all the powers of the body are weakened, the patient falls down; and

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^k Prædict. Lib. I. Charter. Tom. VIII. pag. 705. ¶ Coac. Prænot. N^o. 102. ibid. pag. 857.

a severe vertigo usually terminates in an epilepsy; or frequently in an apoplexy. Even Hippocrates tells us, that a vertigo arises in diseases from a distension of the vessels with blood, when he says¹, *Tenebrosas vertigines ab initio sanguinis è naribus fluxus solvit.* “A flux of blood from the
 “ nose terminates dark vertigoes in the begin-
 “ ning.” But a vertigo is generally accompanied with a ringing in the ears, which Hippocrates tells us is a sign that the brain is affected, and especially compressed: for sometimes there is observed such a troublesome ringing of the ears in diseases without a vertigo, when the arteries, dispersed through the organs of hearing, begin to compress the adjacent nerves; or when a considerable trunk of an artery lodged in the dura mater, being dilated with a greater quantity of blood, affects the auditory nerve in that part where it enters the os petrosum: for, says he^m, *In febribus ardentibus, si aurium sonitus accedant cum visus hebetudine, & gravitate secundum nares, melancholico modo mente moventur, sanguine ipsis non erumpente. Tinnitus in acutis, & sonitus in auribus, lethale.* “If in
 “ ardent fevers a noise in the ears attends with a
 “ dulness of the sight, and insensibility of the smell-
 “ ling, unless such have an eruption of blood,
 “ false impressions are made on the mind, as in
 “ melancholy people.”ⁿ And again, that a ring-
 “ ing and noise in the ears is a fatal sign in acute
 “ diseases.” That is to say, if the incipient compression of the brain is not immediately relieved by an hæmorrhage raised either spontaneously or by art, *Sonitus aurium cum visus hebetudine, & secundum nares gravitate, mentem emovet, & sanguinem profundit.* “A noise in the ears with a dull-
 “ ness

¹ Coac. Prænot. N^o. 341. Charter. Tom. VIII. pag. 871.

^m Ibid. N^o. 132. pag. 859. ⁿ Ibid. 194. pag. 862.

“ness of the sight, and an insensibility of the
 “smelling, disorders the mind and excites a flux
 “of blood.” Many more passages of the like
 kind are to be met with in Hippocrates.

S E C T. DCLXVI.

BUT that which arises from a weakness
 of the heart we know from the signs
 of a deficient circulation, §. 106.

In the heart lies the origin of the circulatory
 motion; for all the circulating humours return
 by the veins to the heart, and are at length expelled
 again from thence by the arteries. But it is certain that
 as the heart is a muscle, its motion requires an in-
 flux of the nervous spirits. But the heart, by the
 interposition of the machine of the cerebellum is
 the cause of renewing the motions in itself, when
 it propels the blood by its muscular force, through
 the arteries of the encephalon. Hence we only
 know that a weakness of the heart attends from
 those signs which demonstrate its action to be les-
 sened. But the whole power of the heart is em-
 ployed in exchanging the blood contained in its
 cavities; and therefore the motion of the humours
 being diminished through the vessels, will be a sign
 that the heart is weakened. But the muscular
 force of the heart, whereby its contained blood is
 moved through the arteries, may be weakened by
 causes seated without the heart itself; as when, for
 example, the cerebellum or nerves thence continu-
 ed to the heart, are compressed: but concerning
 these, we treated before. But we here consider
 only that weakness of the heart which derives its

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origin

origin from causes residing in the heart itself, although the other conditions necessary for the heart's motion, and placed without it, are well disposed. But concerning this weakness of the heart we treated before at § 661. Since therefore the force of the heart may be diminished also by other causes (§. 662 to 666) already enumerated, it is evidently difficult to distinguish betwixt the weakness of the heart, whose cause resides in itself, since the effect is always the same, namely, a deficiency of the circulation. But we conclude that a weakness of the heart, properly so called, attends, if there are none of the causes present hitherto mentioned; and yet the circulation appears deficient.

S E C T. DCLXVII.

LIQUID food, coming near to the nature of the blood, digested by art, and soft jellies prepared from animals and vegetables, and mixed according to art with vinous liquors and spices, given often and in small quantities at a time, with gentle frictions externally, will procure the most convenient repletion or restitution of what is wasted; more especially if they are formed with materials suitable against the nature of the disease.

We come now to treat of the cure of weakness, which ought to be different according to the variety of the causes; and therefore every class of the causes will require a particular method of cure. First then, we shall here treat of the cure of weakness arising from the emptiness of the vessels exhausted of their fluids.

Hippocrates

Hippocrates ^P lays it down as a general axiom in practice, that diseases arising from fulness may be cured by evacuation; and, on the contrary, those arising from evacuation may be removed by repletion: therefore the curative indication in this case demands a restitution of the exhausted juices to fill the too empty vessels. But here the greatest difficulty lies in the restitution of the same matter, which has been wasted from the body: for we may easily fill weak bodies with food and drink, but for the lost substance to be restored from them, they ought to be changed by the powers of the body, so as to put on the nature of healthy humours. But this change in the aliments is performed by the conjunct actions of the vessels and viscera conspiring together; as also from a mixture with a due quantity of healthy humours already pre-existing in the body, with a great quantity of which only a little of the crude chyle is gradually mixed (see §. 25. N^o. 1.) But in this kind of weakness there is a deficiency in the quantity of healthy humours, and there is a less efficacy exerted by the vessels and viscera upon the humours, and therefore that power languishes whereby the human body assimilates the ingested food into its own nature. It is therefore necessary for such aliments to be taken in, as may be subdued and changed by the weaker powers of the body; for they err much who endeavour to fill a weak and exhausted body by the stronger foods. For, as Celsus ^Q affirms, *Quo valentior quæque materia est, eo minus facile concoquitur, sed si concocta est, plus alit. Itaque utendum est materiæ genere pro viribus; modusque omnibus pro genere sumendus. Ergo imbecillis hominibus, rebus*

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^P Aphor. 22, Sect. II, Charter. Tom. IX. pag. 63.

^Q Cels. Medic. Lib. II. cap. 18. pag. 100.

infirmis opus est : mediocriter firmos, media materia optime sustinet : & robustis apta validissima est.

“ The stronger the matter of which any food
 “ consists, the more difficultly is it concocted ;
 “ but if the concoction is once effected it nourishes
 “ more. Therefore such food is to be chose,
 “ with respect to its matter, as is agreeable to the
 “ powers, and to the manner in which it is to be
 “ taken by all. Therefore the weakest aliments
 “ are necessary for weak people: but for such as
 “ are moderately strong, food of a middling mat-
 “ ter supports the best, while the strongest foods
 “ are best adapted to the robust.” The food
 should be therefore liquid, because the whole ac-
 tion of the chylificative viscera consists in changing
 it into a fluid chyle, and therefore their action will
 be assisted by taking in liquid foods: they ought
 again to be such as are like the blood, that is, which
 contain a great deal of the same matter, which
 comes near to the nature of the lost substance ;
 and which may be subdued by the actions of the
 vessels and viscera yet remaining, however languid
 (see §. 28. N^o. 1.) More especially here are re-
 commended flesh broths of beef, veal, mutton,
 or poultry, but not made very strong and thick ; be-
 ing very careful to take off all the fat which might
 sit uneasy upon a weak stomach, and turn very
 rancid ; making an addition of a little salt or juice
 of citrons, partly for the agreeableness of the taste,
 and partly to prevent putrefaction, to which they
 spontaneously incline. But how much good may
 be expected from flesh-broths, is evident from that
 wonderful observation of Lower in the comment
 to §. 234 N^o. 4. From whence it appears that in a
 patient exhausted by a profuse hæmorrhage, flesh-
 broths drank plentifully flowed through the vessels
 instead of blood, by which means the youth re-
 covered,

recovered, though he had lost almost the whole mass of blood. The like liquid nourishment may be also prepared from milk, decoctions of bread, the whites of eggs, &c. Nor will it be injurious to add a moderate quantity of wine and mild spices to these, to raise the weak powers, and render the efficacy of the vessels and viscera more active upon the ingested food by these agreeable stimuli. But in profuse hæmorrhages, as long as there is just reason to fear a return, it is better to abstain from all stimulants, and supply the patient with flesh-broths only; as, for example, in women who miscarry, where the blood often flows from the uterus in a continued stream, 'till the patient is reduced to the greatest weakness, and are barely not deprived of life: but if wine or spices are given to these, the little quantity of blood which yet remains in the body would be expelled through the open vessels; but if they are only supported by flesh-broths they almost constantly recover again. But in other evacuations which proceed from the long continuance of the disease, as sweats, a diarrhœa, &c. the use of wine and aromatics is safer, but given in such a quantity as not to be injurious by their stimulus; because we here treat of weakness as a febrile symptom. But all these aliments, however good in themselves, may offend in too great a quantity, if too much of them is taken into a weak body: for after such profuse evacuations there are but few of the animal humours left in the body, which would therefore be too suddenly filled with crude juices, following their own inclination or spontaneous change rather than be altered into our own nature. Moreover, as the powers which ought to move the humours through the vessels are here so infirm, the body will be rather oppressed by the great quantity of liquors

taken in, which being collected into the larger or smaller cavities of the body might occasion a drop-sy. Hence it is evident that these ought rather to be given frequently and in small quantities, 'till the patient recovering strength is able to bear more. Galen^r justly advises in recovering weak patients, to observe that the ingested nourishment be in proportion to the nourishing powers; *Si enim nutrimentum se ipsum concoqueret, & distribueret, & alendis partibus assimilaret, & partibus quibus alimento plurimo opus est; adhæresceret, proculdubio maximè nutriente cibo opus esset: verum quum non aliud est, quod nutrimentum desiderat, aliud quod ipsum conficit, sed, quod nutriendum est, ipsum sibi & nutrimentum attrahit, & mutat & concoquit, & adjungit, & assimilat, &c.* "For if the patient can concoct and distribute the nourishment in himself, and assimilate the same to the parts to be nourished, so as to adhere to those solids where the most nourishment is wanted, the most nourishing food is then best: but when there are no parts which require further nourishment, then those organs which prepare the nourishment, concoct, change and attract it to themselves, whence it becomes assimilated and conjoined, &c." Hence it appears the strength and quantity of the food ought to be in proportion to the strength of the body.

But as the action of the vessels, by which they operate upon their contained fluids, and move them forwards, is deficient in weak people after too profuse evacuations of body, their efficacy is therefore happily supplied by external frictions (as we said before upon another occasion in the comment to §. 28. N^o. 2.) But after profuse hæmorrhages frictions are not to be used, unless we are certain

certain that the bleeding vessels are so far closed, contracted, and secured, that there is no danger of their opening again so as to renew the hæmorrhage, when the motion of the blood is increased by friction. But the frictions ought always to be gentle to avoid too much increasing the motion of the blood, whereby the nourishment taken in might be dissipated; but only such a friction is required as will make an equable distribution of the nourishment through all the parts of the body. Hence Celsus^s, in speaking of friction says very justly, *At, ubi totius corporis imbecillitas hanc curationem per totum id exigit, brevior debet esse & lenior, ut tantummodo summam cutem emolliat, quo facilius capax ex recenti cibo novæ materiæ fiat.* “ But when the
 “ weakness of the whole body requires this reme-
 “ dy to be applied throughout, it ought to be mo-
 “ derate, and of short duration, so as only to
 “ soften or raise a gentle moisture of the skin, by
 “ which means new matter may be more easily
 “ made from the food lately taken in.” For
 much friction wastes the body, and moderate fric-
 tion fills it, as Celsus^t observes from Hippocrates.
 How much this intention will be answered, if a
 weak person lies in bed with a strong and juvenile
 body, has been said before on another occasion in
 the comment to §. 28. N^o. 1. as also at §. 611.

By all these means may be commodiously made
 a repletion of the body exhausted by too great eva-
 cuation. Only one thing remains yet to be re-
 marked, that the nourishment taken in ought to
 be of a contrary nature to that of the disease.
 Thus, for example, if a person ill of an ardent fe-
 ver is taken with a profuse hæmorrhage of the
 nose, so as to lose almost all his strength; in that
 case decoctions of bread, with the juice of citrons,
 oranges,

^s Medic. Lib. II. cap. 14. pag. 90.

^t Ibid. pag. 88.

oranges, Rhenish wine, &c. will supply proper matter for filling the body, since that disease naturally inclines to turn the humours putrid. On the contrary, if a woman naturally weak has lost a quantity of blood by miscarriage, flesh-broths are preferable to other nourishment.

S E C T. DCLXVIII.

IF the weakness proceeds from an imperviousness of the fluids (§. 663), those remedies are to be used mentioned at §. 75, and 132, to 137; for there is nothing can conduce more than these to the cure of this disorder.

We find principally two kinds of viscosity in our fluids, by which they are rendered impervious (as we observed before at §. 663); one of which is cold and mucous, but the other hot and inflammatory. The cure requires us to restore the due perviousness of the fluids by attenuating this viscid. In what manner and by what remedies the cold viscosity may be resolved, we demonstrated in the comment to §. 75. But what is required to remove the inflammatory viscosity, may be understood from what was mentioned concerning the cure of obstruction (§. 132, & seq.). Hitherto also ought to be referred those remedies, which we recommended to procure a fluidity to the inflammatory matter obstructing the vessels, for the removal of an inflammation (§. 398). At the same time it must be well observed here, that the force of the fever itself happily dissolves the imperviousness of our humours, if the violence of it is so moderated as to preserve the very tender vessels from being destroyed by the too great force of the fever, and to
prevent

prevent the too great diffipation of the more thin humours (concerning which you may consult what has been said in the comment to §. 609, & seq. to 616). But from all this it is evident, that the greatest caution is necessary to procure a happy resolution of an impervious fluid, since the impervious matter is often various, and of a different nature, so as frequently to require even opposite remedies.

S E C T. DCLXIX.

ALSO the cure of the weakness proceeding from an obstruction of the vessels (§. 664.) is to be had from §. 124, to 144.

After the cause of the obstruction appears from a careful examination, the cure may be had from what has been said in the aphorisms before cited concerning the cure of obstruction.

S E C T. DCLXX.

BUT the weakness which arises from a compression of the encephalon (§. 665.) is for the most part removed by such things, as being applied to that part may remove the obstructing matter (§. 124, to 144.), and divert or call off the impetus of the blood towards other parts. This is performed by moistening the nostrils, head, face, mouth, and neck, with emollient fomentations, and by applying blisters to the feet.

When the substance of the brain and cerebellum are compressed, from an obstruction of the vessels with impervious humours impacted into them, by the impulse of the vital fluids urging behind, so as to distend the vessels, and compress the adjacent parts, it is then sufficiently evident, that every thing will be required the same as we recommended to remove an imperviousness of the fluids, and to open the obstructed vessels. But as there is here so much danger from a disturbance of those functions whereon our life and humanity depend, therefore all the assistances of art are deservedly to be used. But much good may be hoped for by turning off the violence of the disease from the head towards some other part; for by that means the impervious liquids impacted into the small vessels, are prevented as much as lies in the power of art from being further urged into their more narrow extremities; for thereby all the disorders might be increased, and the cure of the obstruction there formed might be rendered more difficult.

But

But in what manner the impetus of the humours may be drawn off from any part of the body towards some other, has been explained at §. 396. N^o. 4. where we treated on the cure of an inflammation; where we also spoke concerning the efficacy of blisters and other remedies in making a revulsion. But blisters are more especially applied to the feet in this case, because thus the impetus of the humours is derived towards a part of the body most distant from the head. But since, as was said before in the place last cited, the vessels resist the blood to be propelled through them by the heart, partly by their fullness, and partly by the strength or resistance of their coats which oppose their dilatation, it is evident that the impetus of the blood may be turned off from any part, by removing the fulness of the vessels, or diminishing the resistance of their sides in other parts. But above all, the revulsion will be made the most effectually, if that part of the body, towards which the revulsion is attempted, receives its arterial blood from the same larger trunks with those parts from whence the curative indication directs the impetus of the blood to be drawn off. Hence it is so useful in this case to moisten the nostrils, head, face, and mouth, with emollient relaxing fomentations, that by lessening the resistance to the sides of the vessels in these parts, which receive their blood from the external carotides, the quantity and impetus of the blood to be drove towards the encephalon by the internal carotides may be lessened. For this reason Hippocrates ^u would have the head to be washed with much warm liquor in a phrenzy, and in the same disease Sydenham ^w orders the hair to be shaved off, and the head to be covered with a cap, that

^u De affection. cap. 3. Charter. Tom. VII. pag. 622.

^w In schedula monitoria de novæ febris ingressu, pag. 660.

that the head being naked may not lie exposed to the external cold; for by this means a very free perspiration is made through the whole skin of the head, and a revulsion procured from the internal parts of the head. For we see in other diseases, that as soon as the free circulation of the humours is impeded, through the parts which receive their blood from the external carotides, the internal parts of the head are then too much oppressed or urged by the blood. This is evident in a coryza or cold, where the membrane dispersed throughout the whole internal surface of the nose is slightly inflamed, and often so much swelled that no air can be inspired through the nostrils: For in the first stage of this disease there is a heaviness in the head, all the senses are dull, the sleep is disturbed, and the muscles seem indisposed to their usual actions; all which disorders are best relieved if the nostrils are fomented with the vapours of hot water, to restore these membranes to their due moisture, and recover the free circulation of the humours in the vessels dispersed through them. For this being done the head will be relieved, and for the most part these symptoms will vanish, or be greatly diminished.

It is to be observed, that in inflammatory diseases of the head, certain injuries of the functions of the brain continue a long time, even though the violence of the disease has been gone off for some time, and all the fever seems to be absent; whence often a weakness, stupidity, sleepiness, &c. remain. For when the arteries in the cortical substance of the brain and cerebellum, have admitted the grosser humours, as those vessels are destitute of strong coats, they cannot easily contract themselves again, even though the impetus of the humours urging behind the obstructing particles shall be diminished; and

and this seems to be a very probable reason why the symptoms arising from a compressure of the nerves in their origin at the brain and cerebellum, from a dilatation of their adjacent vessels, continue so long 'till the impacted particles of the humours being gradually dissolved in the narrower parts of the dilated vessels, the integrity of the functions returns. Sydenham * was surprized that he could not remove these symptoms, though he tried all means by bleeding, blistering, cupping, clysters, &c. for which reason afterwards, when the patient had been bled, he only gave two or three clysters of milk and sugar in the first days of the disease, to abate the force of the fever, which being then epidemical, usually affected the head more immediately; and he attempted nothing farther, only ordered the patient to abstain from flesh and spirituous liquors. But, when he carefully attended to every thing, in order to learn the method of nature in subduing those symptoms, he found to his joy that the disease, upon which he was meditating, went off safely, though slowly, of itself. Hence afterwards, when the violence of the disease began to remit, he let it take its own course, so as to wear out or destroy itself by degrees †. If therefore a weakness should remain in such a disease from a compression of the nerves about their origin in the brain and cerebellum, it seems to be the part of a prudent Physician not to exhaust the body any farther by evacuations, but to commit the whole business to time and nature. I well remember myself to have often met with the desired success by this method.

* Sect. V. cap. 2. pag. 287. † Ibid. 282.

S E C T. DCLXXI.

BUT that which arises from a weakness in the heart is seldom remedied unless slowly; but the general remedies before-mentioned (§. 667 to 671.) may be here serviceable.

If the weakness of the heart arises from a cause not residing in itself, as when, for example, the heart as well as the whole body languish from a deficiency of the vital humours after profuse evacuations; or if the cause, being lodged near the cerebellum, compresses the cardiac nerves in their origin, then such things as are useful to relieve those causes will be here equally serviceable, concerning which we spoke before (§. 667 to 671). But when the cause of the weakness resides in the heart itself, how shall we be able to distinguish it? It will certainly be very difficult. But although we should discover it thus, what curative indication can be found in a case where the heart, which labours for all the rest of the body, is itself only deficient. When therefore from any cause the muscular fibres of the heart have once lost their due strength, they will not sufficiently resist the distending blood, whence they will be stretched, and consequently the weakness once formed will be continually increasing. It is therefore very rarely that a weak heart can be cured, since it never ceases to labour; and all the little hope which remains is, that, by a very gentle motion of the circulation, such only as may be sufficient to continue life, an opportunity may be given to the weak fibres to recover their strength gradually by being distended with a less force,

force. For all the cordial medicines, as they are termed, which name they merit, either for increasing the languid motion of the blood; or from the replenishing the exhausted vessels; these always pre-suppose an entire or healthy state of the heart; and by these we can irritate the heart, and excite it into more frequent contractions; but to strengthen it when the disorder lies in its proper fabric is always extremely difficult, if not wholly impracticable.

S E C T. DCLXXII.

FROM what has been said (§. 660 to 672) it appears to us how few understand what cordials are in acute fevers, and what sort of weakness that is, which is often insuperable in fevers.

There is not any remedy, how much soever it may be famed, that can be absolutely and of itself termed a cordial in fevers, or a recruiter of the strength, since the use or abuse of it depends entirely upon the knowledge of the various causes of the weakness. In the beginning of acute diseases a weakness sometimes suddenly arises from an over quantity or a rarefaction of the blood distending the vessels, or from an imperviousness of it through the vessels: but in that case such things as lessen the quantity or too great impetus of the blood, are truly cordials, and abate the force urging against the impervious fluid in the obstructed vessels. Hence opening a vein so frequently recovers the strength in the beginning, when it would be very injurious in the end of the disease; and on the other hand such things as by a grateful stimu-

lus increase the languishing motion of the humours, and the separation of the morbid matter thereon depending, would nevertheless certainly increase the weakness which attends in the beginning of these diseases. Those things which, by filling the body exhausted with profuse evacuations, might be useful, would be injurious, if no such loss of the fluids had preceded. Even after such acute diseases as naturally are used to settle their violence chiefly upon the head; the remaining weakness, though the force of the disease is already over, will not in the least give way to stimulating cordials, but can only be safely cured by time, as we observed a little before at §. 670. Whence it is evident how much attention is necessary to rightly determine in the cure of acute diseases, whether cordials are useful, and what kinds of them are necessary: and therefore it is evident that in acute diseases cordials are seldom sufficiently understood. Of this opinion was Hippocrates^z, who in treating of these says; *Neque enim horum adeo peritos video Medicos, qui, ut oportet, dignoscant in morbis debilitates, & quæ ob vasorum inanitionem, & quæ ob aliud quoddam irritamentum, & quæ ob dolorem, & ab acumine morbi oriuntur, quosque affectus, ac diversas eorum species natura nostra, & habitus singulis pariat: Quamvis hæc cognita aut ignorata salutem aut mortem adferant, &c.* “ Nor do I know
 “ any Physicians so skilful in the knowledge of
 “ these, as they ought to be, to distinguish in the
 “ weaknesses of diseases, which arises from an emp-
 “ tiness of the vessels, and which from any other
 “ irritation, or those which arise from pain and the
 “ violence of the disease, and what disorders with
 “ their several kinds are peculiar to the individual
 “ nature and constitution of each of us: and this
 “ notwith-

^z De diætâ acutor. Charter. Tom. XI. pag. 69, 70.

“ notwithstanding the knowledge or ignorance of
 “ these particulars, may be the cause of the health
 “ or destruction of the patient, &c.” The greatest
 perplexity often arises to the Physician, more especially to those who attend at the courts of the great, when even against their knowledge or advice stimulating cordials are obtruded upon the patient under some formidable title of alexipharmics, and which being taken do great mischief; but if the event of these doubtful diseases turns out for the worse, and these cordials are not used, the Physicians are blamed, as if they had neglected a medicine of importance. For when in the beginning of the most acute diseases the patient’s strength is suppressed, the unskilful accuse the malignity of the disease, and advise cordials to raise the powers, often not without great damage to the patient. Hence Sydenham ^a not without reason pronounces, *Quod de Malignitate (sive notionem, sive verbum dixeris) opinionis inventio humano generi longe ipsa pulveris pyrii inventione lethalior fuit. Cum eæ febres præsertim malignæ dicantur, in quibus intensioris præ cæteris inflammationis gradus conspicitur.* “ That the opinion of malignity, either with regard to the notion or the word, has been an invention much more destructive to mankind than the invention of gunpowder. Because those fevers are more especially said to be malignant, in which there is observable a greater degree of inflammation than in others.” And for this reason he condemns the perverse use of cordials so frequently throughout all his works.

What that weakness in fevers is which frequently proves insuperable.] Namely, if the cause of the weakness cannot be removed. But this frequently happens when the body is exhausted by evacuations

^a In Schedul. monit. de novæ febris ingressu, pag. 681.

which cannot be restrained; as for example, colliquative sweats in a confirmed phthisis, or the diarrhœa which usually closes the tragedy of that disease; in that case even the most famed cordials are in vain administered; or if the thick blood by an inflammatory tenacity is violently urged by the force of the fever into the very tender small vessels of the encephalon, so that it cannot be resolved, nothing will relieve that weakness. If an artery burst by the violence of the fever, pours out its blood into the ventricles of the brain, where by its bulk it compresses the adjacent parts, in that case the use of all medicine is in vain. But that this may happen in fevers is evident, since the arteries in the membrane of the nose, which are much stronger than in the brain, are frequently burst, and sometimes the like happens even in the lungs or kidneys; whence in acute diseases frequently ensues a fatal hæmoptoe or bloody urine. But also from a distension of blood-vessels in the encephalon, the nervous filaments being compressed a long time together in their origin, afterwards remain impervious during life; for their contiguous sides growing together, and no more fluid passing through them, they dry up or wither. The incurable deafness, blindness, loss of memory, foolishness, &c. which continue during life after acute diseases of the head (as appears from medical observations and histories) sufficiently prove that these effects ought to be feared.

Of Heat in FEVERS.

S E C T. DCLXXIII.

THE external heat in fevers is known by the thermometer, and by the sense of the patient, as the internal heat is known from the sense of the patient and redness of the urine,

Heat is found to be so constant a symptom in fevers, that Galen places the individual nature or essence of a fever in heat, as likewise have other very celebrated Physicians after him, as we observed in the history of fevers. In a healthy person there is a certain determinate degree of heat; but the febrile heat properly speaking much exceeds the natural one; and it is concerning this excess of the heat beyond what is healthy that we are to examine here under the title of heat in fevers. But in this aphorism we consider how the febrile heat present may be known. But heat is perceived both in the external surface of the body, and likewise in the inmost recesses thereof as long we live, as every one knows; but this is (*cæteris paribus*) always greater in the interior parts; because the external heat is taken off by the ambient air, which is always much colder than the human body. The external heat of febrile patients may indeed be perceived by the touch, but one cannot thereby exactly distinguish its various intensity or degrees, because the sense of heat may be different in us upon many accounts: thus, for example, when our hands are cold, the hand of a patient will seem to be hot, which yet would hardly seem warm, if our hands were much heated either by rubbing

or any other cause. Therefore the most certain method of measuring the febrile heat is by the thermometer, of which there are many good ones made at present portable, and called after their inventor *Fahrenheit*; and the most exquisite are those which contain mercury instead of any other fluid. With such a thermometer let the heat of a healthy person be first measured, and the degree marked upon the scale affixed; and then this being known, if the same thermometer is held in the hand of a febrile patient, or the bulb of it put into his mouth, or applied to the naked breast, or under the arm-pit for a few minutes, the different height of the ascending mercury will make it appear how much the febrile exceeds the natural and healthy heat. But it appears that thus we are only acquainted with the external heat in the surface of the body or internal parts of the mouth, which have a free communication with the external air, and are therefore always less hot than the internal parts of the body. Add to this, that sometimes the external parts of the body are not much hot in fevers, while the internal parts are burnt up; as Hippocrates^b observes in an ardent fever, and justly derives from thence a very bad presage. That such a heat attends we know from the sense of the patient, who usually complains of an intolerable burning, more especially about the vital viscera in these most fatal fevers.

The other sign, by which the internal heat is known in febrile patients, is the redness of the urine. It is demonstrated in our chemistry and theoretical lectures^c or institutes, that the colour of the urine proceeds entirely from its oil, the fat being

^b De Morbis Lib. I. cap. 13. Charter. Tom. VII. pag. 548.

^c Vide Institut. Medic. H. Boërhaave, §. 378. & Chem. Tom. II. pag. 310.

being attenuated and ground together; and therefore the colour of the urine is more intense, as there is a greater proportion of oil with respect to the other constituent parts; and therefore this liquor may incline through various degrees, from the straw-colour of healthy urine to a deep redness. But this mixture of the oil with the urine supposes a violent attrition betwixt the constituent parts of the humours, and betwixt the humours and their vessels^d: and since from the same cause proceeds the increased heat in fevers, (as we shall presently make appear §. 675.) the reason is therefore evident why a redness of the urine is deservedly accounted a sign of internal heat. The truth of this is confirmed by daily observation, namely, that the redness of the urine increases in proportion to the heat of the body. For the urine of people who are weak and of a cold habit is pale, but that of robust people of a warm habit is much higher coloured. Even in the same person the natural colour of the urine is often increased to a very intense redness, only by violent and long continued exercise of body; but then also the heat of the body is proportionably increased at the same time. But it is to be observed that the colour of the urine may be likewise increased from other causes, as, for example, profuse sweats, or abstinence from drink a long time, whereby the diluent vehicle of the urine is lessened, and consequently the proportion of the oil is increased with respect to the other principles. For, after long abstinence from food or drink, there is very little urine discharged but such as is very red, or high coloured, and extremely acrid^e. It ought therefore to be considered, whether or no the redness of the urine should not

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be

^d Institut. Medic. ibid. §. 999.

^e Ibid. §. 372.

be ascribed either wholly or in part to these causes. It must also be observed, that sometimes the urine appears thin and without colour in fevers, though at the same time there is a very intense heat; and this may happen if the patient being very thirsty drinks great quantities of thin liquors, soon passing off by urine, which, being thus diluted with so much water, will be of a paler colour: but even sometimes in acute diseases, such a thin and colourless urine is observed without any such plentiful drinking of thin liquors preceding; but then this is always a very bad sign; whence Hippocrates ever condemns such an urine in these diseases; and in a phrenzy he makes it a fatal sign, as we shall declare hereafter. For such a colourless urine denotes that the salts and oils of the blood, being rendered more acrid by the febrile motion, are not washed out by the urinary passages, but retained in the body, where they may do great mischief: or else it denotes that the blood, being thickened by an inflammatory tenacity, cannot be attenuated by diluent liquors, but that the drink taken in is soon after discharged again from the blood; and therefore the greatest danger is threatened from an imperviousness of the humours, and a retention of their acrid parts.

S E C T. DCLXXIV.

BUT this febrile heat always supposes or requires a greater quantity of fire in the part which it heats more than the rest.

All people by a common assent justly ascribe heat to fire, because these are inseparably connected together; for wherever we observe the quantity of fire increased as to sense, we likewise perceive an increase of the heat; whether that proceeds from a change in our sensitive organs from the fire applied to them, or whether we know this to be so from such effects as appear by evident experiments to be produced from the increased quantity of fire in any part. But the sense of heat perceived in us can determine nothing certain with respect to the quantity of fire contained in any part, since it only represents the mere change of the perceiving organ to the mind, which change in the organ may be real and different, though the very same quantity of fire be contained in a part. For, frequently, when thunder, lightning, and rain or hail happen in the summer-time after an almost suffocating heat in the air, we perceive a very troublesome sense of cold, even tho' there is then so great a heat in the air, that if a person who had been a long time exposed to a severe winter's frost was to enter a chamber, the air of which was to be thus hot, he could not endure it, but would immediately lose all his strength. Hence it is evident that the sense of heat perceived in us does not always correspond to the quantity of
fire

fire collected in any part. When the celebrated author of these aphorisms treated of fire in his public chemical lectures, he considered it as a thing concerning which we as yet knew nothing, that he might be the better able to detect its nature by experiments only. Yet he found it necessary to be provided with certain marks or signs capable of denoting that the fire to be examined was present, and capable of being accurately distinguished by the senses in any place. But by the most careful examination he then discovered the rarefaction of the bodies only, by which their bulk is found increased without any difference in their weight, afforded that mark or sign whereby it might be known whether the quantity of fire was increased in any place or body. But although neither this nor any other sign can determine how much fire is contained in any place, yet this mark is sufficient to point out the increase and decrease of the fire. The truth of this our author has demonstrated by many fair experiments both in solid and fluid bodies^f.

From what has been said therefore we may take it for granted, that a greater quantity of fire is contained in a place which is hotter than another; and the thermometer, by the expansion of its contained fluid, pointing out the various degrees of rarefaction from fire, one may be therefore able by it to determine the quantity of increase and decrease of the fire in those parts of our bodies to which it can be applied. For when a phlegmon, which derives its name from fire, (as we demonstrated at §. 670.) invades the hand, there is a troublesome burning perceived in that part; but also the thermometer, being applied to this part, manifestly

^f Vide H. Boërh. Chem. Tom. I. pag. 130, & seq.

manifestly shews that a greater quantity of fire is there contained, than in the other parts of the body. Thus in the worst kind of ardent fevers in which the patient perceives a coldness in the extremities, but a burning heat upon the præcordia, here the thermometer being applied first to the extremities, and then to the naked breast, will exhibit to the eye the difference in the quantity of the fire contained in those parts. From hence we may also conclude, that in those parts of the body to which the thermometer cannot be immediately applied, a greater quantity of fire is present when they are hotter. It now remains for us to see what the cause is, by which a greater quantity of fire may be collected in the body of a febrile patient, either throughout the whole, or some particular part.

S E C T. DCLXXV.

WHICH greater quantity of fire (§.674) arises from a more violent attrition of the fluid parts against each other, and against the sides of their containing vessels.

All bodies acquire that degree of heat which is common to the medium in which they exist, unless there is a cause exciting heat, that is to say collecting a greater quantity of fire in them: and hence after death, the human body by degrees acquires the temperature of the air. There was therefore in life a cause generating heat in the body, which cause after death is absent. But as long as we live the humours are moved through the vessels, which motion altogether ceases with death; and only the absence of this motion destroys that excess of heat, whereby the human body exceeds the heat of the
ambient

ambient medium, even though nothing at all is lost of the solid or fluid parts of the body. For if even the most healthy person is drowned or immersed under the water, the dead body soon grows cold. Since therefore heat attends the motion of the humours through the vessels, and is destroyed when that motion ceases, it seems that one may thence conclude the motion of the humours through the vessels in a living person to be that cause which produces the heat: And in this we are more confirmed, because the motion of the humours being increased thro' the vessels, the heat is also increased, as on the contrary it is diminished, when that motion is lessened. For if the velocity of this motion is increased by violent running, the heat may be so much augmented as to destroy the body in a little time by a most ardent fever; but as soon as such a person is at rest, the increased motion abating, the degree of heat acquired grows gradually less, till the person returns to his natural and healthy degree of heat, unless the humours are so altered by the increased quickness of the circulation, and the heat thence arising, as will produce a fever, either by a stimulus or coagulum (see §. 587.); for then indeed the increased quickness of the blood's motion will continue, together with its effect, a greater heat.

But the origin of heat seemed to be so abstruse in the Opinion of the ancient Physicians, that they believed something divine or miraculous lay coucealed therein: Whence Hippocrates^s says; *Quod calidum vocamus, id mihi & immortale esse videtur, & cuncta intelligere & videre & audire, & scire omnia, & presentia & futura.* “ That we call
“ heat seems to me to be immortal, capable of un-
“ derstanding,

^s In Libro de Carnibus cap. 1. Charter. Tom. V. pag. 302.

“ understanding, seeing, and knowing all things at
 “ the same time, both present and to come.”
 Hence the Ancients likewise say, that the innate
 heat of the human body seems to be a part of
 the divine spirit; (As we said before upon
 another occasion §. 440. N^o. 3.) the most
 wise king Numa would have heat, or fire,
 worshipped as the head or principal of all
 things. But although Galen in one place ex-
 pressly denies in words that heat arises from attrition
 in animals: (for thus he expresses himself ^h.
*Non enim ex attritu spiritus in arteriis calor
 generatur in animantium corporibus, sicuti foras in
 lapidibus & lignis, sed contra ab innato calore motus
 ipsorum fiunt.* “ Heat is not generated in ani-
 “ mal bodies from an attrition of the spirits in
 “ the arteries, as is common in stones and
 “ wood; but, on the contrary, their motion pro-
 “ ceeds from the innate heat.”) Yet elsewhere
 he confesses ⁱ that Physicians dispute this matter
 among themselves; and adds, *Quod autem calor,
 in nobis sit, evidenter omnibus patet; utrum vero is
 ex motu in corde & arteriis ortum habeat, vel sicut
 ipsum moveri cordi connatum est eodem modo & calor,
 dissentiant inter se Medici.* “ What heat is in us
 “ appears evidently to all; but whether or no
 “ it arises from the motion in the heart and
 “ arteries, or whether it is inherent or connat-
 “ tural as motion is to the heart itself, is like
 “ that controverted among Physicians.” Nor is
 it surprizing that Galen should think it difficult
 for the heat to arise from an attrition of the fluids
 contained in the arteries; since he believed that
 only spirits, or the most fluid parts of the blood,
 flowed through the arteries. But in the mean
 time it is evident from what has been said, that
 the

^h Lib. VIII. de Hippoc. & Plat. placitis cap. 7. Charter.
 Tom. V. pag. 242.

ⁱ In libello adversus Lycum
 cap. 2. Charter. Tom. IX. pag. 359.

the opinion of heat arising from the motion of the fluids thro' the vessels, is very ancient.

That fire is collected, and consequently heat produced even in a great degree from the attrition of solid bodies against each other, is directly proved by experiments ^k. But it likewise appears at the same time, that if oil, water, or any other liquor is interposed betwixt the surfaces of the bodies to be rubbed together, there will hardly any heat arise even from a violent attrition; or if a heat is produced, it is nothing comparable to that which arises from a violent attrition without any liquor interposed. From hence some Physicians, even of great fame, have doubted whether heat ought to be ascribed to this cause in the blood, which they are rather inclined to think grows hot from something else, and this even though they cannot deny that this heat is increased by motion. The celebrated Schelhammer ^l thinks that those who deny the innate heat in us, ought not to be refuted, but laughed at, since it is obvious to the sense of every one; and in opposing those who derive the heat of the blood from its motion he says; *Provoca ad experientiam totius naturæ rerum. Moveant mihi & conquassent quemcumque humorem, & fluctus in simpulo concitent integros dies noctesque, æstuet mare, fluvii rapidissimi per immersas rupes provolvantur integra sæcula, ne tepescent quidem unquam, multò minus calebunt. Numne igitur vident, aliud quam motum esse, a quo caleat sanguis? etsi motu calor ille augeatur.* “ Let
 “ us appeal to experience throughout the whole
 “ nature of things. Let me shake and agi-
 “ tate any kind of humour in a cruet even
 “ whole days and nights, or even though
 “ the sea and most rapid rivers fluctuate, and
 “ run

^k H. Boërh. Chem. Tom. I. pag. 176.

^l De genuina febres curandi methodo Sect. II. §. 33. pag. 91.

“ run swiftly over immense rocks for whole
“ ages together, yet will they never become warm,
“ much less will they grow hot. Is it not there-
“ fore plain that there is another principle than
“ motion by which the blood grows hot?
“ even though this heat is increased by motion.”
But it must be observed that heat is not raised by every kind of motion in bodies, but only by such wherein the bodies mutually resist or act upon each other, more especially if the bodies are elastic. Hence therefore heat may be excited in fluids by attrition, if they are elastic; but if they are not elastic, it will be difficult to effect this: Hence it is that water so difficultly grows hot by attrition. Yet milk, being swiftly agitated and shook, grows warm, as country people know by daily experience, when they make butter of it. But even if fluids not elastic, are urged with a great force through very small vessels, they will grow warm by attrition, and much more if the tubes through which the liquors are drove are elastic^m. But it appears from the observations of Leeuwenhoeck, since confirmed by others, that our blood contains a great quantity of elastic spherical particles; for the red blood globules, arriving at the ultimate extremities of the sanguiferous arteries, pass thro’ by one at a time, and with some difficulty, so that they often change their spherical, into an oval figure, as they are squeezed through the mouth of the artery into the vein; but when they have passed this straight, and arrived into a larger diverging vessel, they recover their pristine figure; the truth of which may be seen to the eye with a microscope, by viewing the pellucid membranes of living animals furnished with red blood. Our blood therefore is composed of elastic particles, and moved through elastic arteries, concerning the
truth

^m H. Boërh. Chem. Tom. I. pag. 197.

truth of which no one can doubt. If again, we consider that the fluid consisting of these elastic parts, is drove through elastic vessels of a converging or conical figure, and with a very swift motion; it will be evident that the particles of the fluid will be every moment changing their direction, striking against each other, and against the sides of the vessels, so as to suffer a great attrition. Moreover, in the ultimate narrow extremities of the sanguiferous arteries, the thinner parts of the blood escaping through the lateral secretory vessels, there remain hardly any but the red globules; and these last pass even with some difficulty thro' the artery into the vein, by one at a time, in such a manner that they come into contact with the sides of the artery; and therefore in these parts will happen a violent attrition of two elastic bodies, from which attrition we know heat arises.

All that has been said is fairly confirmed by the appearances observable in diseases, when the fluids or solids, or both, degenerate from their healthy conditions. For when a great part of the red blood has been exhausted by profuse hæmorrhages, the heat of the body proportionably decreases, as the native heat of the body is also diminished in those, who instead of firm blood, have their vessels filled with inactive water or a yellow greenish sharp serum, as in girls afflicted with the green sickness; and likewise where there is observed a too weak cohesion in the solid parts of the body, whence there is a less action of them upon their contained fluids, and consequently a less attrition. For the red parts of the blood consisting of the largest spherules contained in our humours, and moved through the largest vessels of the body, are the best disposed to produce heat by attrition, and to retain the heat longest after it is once raised.

For

For the more dense the matter of which any body is composed, or the greater its bulk, and the more exactly spherical its figure, so much the more is it disposed to retain fire or heat a longer time in itselfⁿ. But all these properties are observed chiefly in the red particles of the blood, if we compare them with the other constituent parts or elements of our humours. For this reason the vessels full of red blood, are placed in those parts of the body, where the thinnest fluids pervade the smallest vessels, to supply the deficiency of heat in the latter. Thus we know there is a great number of blood-vessels, dispersed thro' the medullary part of the encephalon, encompassing the medulla oblongata, and distributed through the plexus choroides in the ventricles of the brain, &c. But so long as in the incipient animal, there is not strength enough in the solid parts, to excite a due heat and attrition in their contained fluids, that defect is supplied by the warmth of the mother's body in which they are contained, or else by the heat of incubation.

Since therefore our natural heat depends on the mutual attrition of the parts of the fluids against each other, and against the sides of the vessels, therefore heat in fevers is justly ascribed to an increase of the same causes. But from whence this increase arises we are next to enquire.

ⁿ H. Boërh. Chem. Tom. I. pag. 278.

S E C T. DCLXXVI.

BUT this more violent attrition proceeds from a greater motion of the parts of the fluids sent from the heart, and from a great resistance of the vessels against the heart.

The heart propels its contained blood into the arteries, and therefore the motion given to the blood from the heart is the force whereby that fluid strikes against the sides of the arteries, and against the other parts of the blood already contained in those vessels. For the arteries are always full, as well in their contraction as dilatation, and therefore the blood, already contained in the arteries at the time when the heart empties its cavities into them, makes resistance, nor can the full arteries be able to receive the blood drove into them by the heart, unless they are either dilated, or a portion of their contained blood transmitted through them into the veins, so as to make way for that which is to succeed; or unless both of these are effected at the same time. If therefore the vessels are so firm as powerfully to resist dilatation, and remain very full in their ultimate contraction, either from the quantity of the blood, or the difficulty of its passing through the ultimate extremities of the arteries; in that case the fluid contained in the arteries will be pressed by two opposite powers, namely, the action of the heart urging from the basis towards the apex of the converging vessel, and those resistances which may be likewise considered as powers acting with an opposite motion
and

and direction from the apex towards the basis; hence there must happen a very great compressure of the fluid contained in the arteries, which will again urge itself with great force against the sides of the arteries themselves. If therefore the powers of the heart are so great, as to overcome these resistances however considerable, the blood will be moved through the arteries, and suffer a violent attrition against their sides; but otherwise, if the force of the heart was not superior, the motion of the blood would be suppressed. But when the action of the heart ceases, the distended arteries, by their own elasticity and contraction of their muscular fibres, re-act again with an equal force upon their contained blood, and urge it forward; and therefore the compressed blood will suffer an attrition with an equal force from the sides of the arteries, and the globules themselves, being pressed powerfully against each other, as they move along through a converging vessel, will suffer a mutual attrition against each other, as they are every moment changing their places. But attrition is always the more violent, as the bodies rubbing are more forcibly pressed together: But since from the increased motion of the blood from the heart, and the great resistance of the vessels, there must follow a violent pressure of the vessels against their contained fluids, and of the parts of the fluids against each other, it is evident that the attrition will become more violent, and consequently its effect, namely, a greater heat must ensue.

S E C T. DCLXXVII.

THE great motion of the blood propelled from the heart is estimated from the density of the propelled fluid, and its velocity through the vessels.

Motion in itself, so far as it is considered in a moving body, we call force or impetus, namely, that which distinguishes the body from another of the same kind at rest, and by which the body acquires a faculty of acting upon or against some obstacle or resistance^o. But the inherent force or powers in moving bodies, differ according to the quantity of their matter or density, and the velocity with which they move^p: from whence mathematicians have demonstrated a general rule for comparing forces, namely, that the powers in moving bodies are in a ratio compounded of their masses, quantity of matter, and the square of their velocity. The motion of the blood therefore, driven forward by the heart, may be measured by the same rule. (For although very great philosophers differ in their opinions concerning this matter, yet the truth of what is affirmed in the text, is equally demonstrable from the opinion of others.) But the greater or less density of the blood, supposes a greater or less quantity of matter contained in it: for the quantity of matter in a body, considered with respect to its bulk or the space which it occupies, is called the density of the body^q. By these two therefore, namely, the density of the blood and its velocity through the vessels, may be estimated the motion

^o 'sGravesande Element. Physic. Tom. I. pag. 196. ^p Ibidem pag. 213.

^q Ibidem pag. 417.

motion of the blood driven out of the heart, and consequently the force which it exerts against the sides of the arteries, and against the blood already contained in them: all which was necessary to be premised here from the principles of mathematical learning.

S E C T. DCLXXVIII.

THE density of the blood is known from the appearance of it when extravasated, from a dissipation of its more rare or light particles preceding, and from the hardness of the pulse.

The chyle prepared from the aliments is always less dense than our blood; and therefore, when mixed with it, it floats upon the surface, as is evident when a healthy person is bled four or five hours after a meal (see the comment to §. 80); but after the chyle has circulated with blood for sixteen or more hours, and suffered the actions of our vessels, it loses its own nature, and is changed first into serum and then into blood, and by that means acquires a greater density. But, as this density acquired depends upon the action of the vessels on the fluids, it is evident that a greater density in the human fluids is to be expected, if the condensing causes are more powerful. Therefore in strong and exercised men the blood is always more dense than in the weak and idle; and therefore we may certainly foresee such a density of the blood from a known habit of the body. Moreover, if the blood itself, being discharged either by a spontaneous hæmorrhage or the opening of a vein, can be examined by the eye and touch, we may

easily judge of its density, which is known from the greater or less degree of concretion in the blood. The blood taken from the vein of a rustic daily exercised with hard labour, almost instantly congeals into a solid mass, and after some hours standing, only a small quantity of serum separates from it: but, on the contrary, if a weak girl is let blood, the whole continues fluid for some time, and afterwards a great quantity of a thin serum swims above a small cake or island of the red cruor.

Another sign by which we know that the blood has a greater density is, when it appears to have lost its most thin and fluids parts expelled from the body by urine, sweats, a diarrhœa, &c. for then the remaining blood must of necessity become more dense as is very apparent. Whence also in acute diseases, Hippocrates so much condemns the wasting of the more fluid parts of the blood; this likewise Sydenham observes, which we took notice of before upon another occasion. (See §. 386 and 590.)

The hardness of the pulse is likewise a sign of the density of the contained humours. and the pulse is said to be thus hard, when it seems to the touch of the finger, as if a solid body was protruded thro' the artery, and at the same time the artery violently resists the pressure of the finger. Hence the pulse is always harder in robust and exercised people, and softer in those who are weak; and in inflammatory diseases, where a greater density of the blood offends, a hardness of the pulse is reckoned among the principal signs, as we shall declare hereafter.

S E C T. DCLXXIX.

THE the velocity of the blood is computed from the number of the contractions of the heart compared with the magnitude of the pulse.

The celerity of the blood through the vessels is increased, when the powers moving that fluid act with a greater force, or are applied oftener to the blood in a given time. But the contraction of the heart, when it expels its contained blood into the arteries, communicates its motion to that fluid, by which the arteries always full are dilated, and the blood is pressed through their extremities into the veins. But when the heart is in its dilatation, the arteries by their elastic and muscular force re-act again upon the blood which distends them, and by that means urge it forward. If therefore the contractions of the heart are increased in their number in a given time, we know that the powers moving the blood are applied oftener in a certain space. But yet for the celerity of the blood to be thence increased, it is required likewise for the more frequent contractions of the heart to be so strong, as to be able to propel all the blood contained in its cavities into the arteries. For in the cold fit of a fever the contractions of the heart are indeed very quick, as they also are in dying animals; and yet the celerity of the blood's motion through the arteries is not increased, because the contractions are at that time weak or imperfect. But magnitude of the pulse of the arteries denotes that they are powerfully distended, by a great quantity of blood expelled into them from the cavities of the

the heart at each of its contractions; and therefore if a large pulse is accompanied with a more frequent action of the heart, we know for certain that the moving powers are strong, and oftener applied in a given time to the blood, and consequently that the velocity of this fluid is increased. But the magnitude of the pulse is measured by the difference to be observed betwixt the diastole or dilatation of the artery, and the systole or contraction of it; for the greater this difference, the pulse is said to be so much the larger; for the pulse may be full without being great, as when the arteries being filled with blood cannot empty themselves for the increased resistance which is made to their extremities; and then the contraction of the pulse will appear small, because the artery cannot lessen its diameter without expelling the blood from its cavity. But since the dilatation of the artery is made at that time when the heart is contracted, and the artery contracts when the heart is dilated, it is evident that a greater quickness of the pulse denotes a more frequent action of the heart; and therefore a quick pulse, which is also large, demonstrates that the velocity of the blood is increased.

S E C T. DCLXXX.

A GREAT resistance against the heart is known from the quantity and inertia, (thickness or resistance) of the solid or fluid parts to be moved; and from the fewness, narrowness, or immobility of the vessels, through which the humours are to be transmitted.

When the heart propels the blood contained in its cavities into the arteries, which are always full, those vessels must be dilated to receive the blood; or if they are not dilated, so much of the blood ought to pass out of the arteries into the veins, as is equal to the quantity driven by each stroke of the heart into the arteries. But both these we know are performed in the living animal; for the arteries are dilated during the systole of the heart, and at the same time a portion of the blood is expelled from the arteries into the veins, as we are assured from the uninterrupted motion of the blood through the vessels. The heart must therefore, by its muscular force urging the blood into the full arteries, move all the mass of blood which they contain: for at the time when the heart is contracting, the arteries are dilating; and therefore they will not act by their elasticity and muscular force at that instant upon their contained blood. If therefore the mass of the fluid to be moved lodging in the cavity of the arteries is increased, it is evident the resistances to the blood to be expelled from the heart into the arteries will be increased. But the greater the space is into which the heart has an opportunity of expelling the blood contained
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in its cavities, the more easily will it be emptied, and the less resistance will it meet with. Hence therefore if the diameters of the arteries are diminished by any cause, or if the number of the small pervious arteries is lessened, it is again very evident that the resistance must increase. But since the arteries are converging vessels full of incurvations, the blood expelled from the heart must strike against their sides and consequently remove them from the axis, so as to enlarge the capacity of the vessels, and make a space for the blood about to enter next into them. If therefore the sides of the arteries are so firm as not to yield easily to the blood impelled from the heart; from thence again the resistance will be increased. Hence appears the reason why in weak people there arises so great an anguish from too tight cloathing; for many of the small vessels being compressed, the resistance is increased to the weak powers of the heart; but they are immediately relieved by relaxing their cloaths. The reason is also evident, from what has been said, why weak people, and those who are recovering after violent diseases, are so often oppressed with great anxiety by taking a large quantity of food or drink; since the mass of the humours to be moved, being suddenly increased, augments the resistance to the heart. But when the heart has force enough to overcome this increased resistance, there arises a feverish heat from the greater attrition after a large meal, as it also happens from a violent compression of the body; and from hence the robust are so well able to bear the winter's cold by tight cloathing.

S E C T. DCLXXXI.

THE mass of humours to be moved is perceived to be great, by signs of a plethora (§. 126.) or cacochymy, or from humours being suddenly dissolved and put into motion, which were before stagnant, as in fat people; but more especially a turgescence of the veins, with a large and swift pulse of the artery at the same time, denote the mass present to be great.

All the humours, which being received by the veins are returned to the heart, from whence again they are distributed by the arteries, belong to the mass to be moved. The quantity of the blood therefore being increased, however healthy, will increase the mass to be moved; and when this increase is grown to such a degree that so much good blood abounds that it cannot undergo the changes which are inseparably joined to life, without inducing disorders, it is then called a plethora (see §. 106). The presence of which is known from a greater redness of the body, and a great heat with the other signs before enumerated §. 106. ε. But a great heat attends in plethoric people, because the resistances to the heart being increased, the attrition is likewise increased; and because the red part of the blood abounds, which is most disposed to generate heat by attrition, and to retain the heat when generated, as we said before at §. 675.

But the quantity only of good blood being increased is called a plethora, and not any increase of the humours whatever can be thus called, as we said before from Galen in the comment to
§. 106.

§. 106. *a.* For when the humours abound in quantity, but so degenerate from the nature of healthy fluids as to injure the functions, it is then termed a cacochymy. Thus in the leucophlegmatia or pale disease of virgins, the body is swelled with unactive and mucous humours, and the mass to be moved so much increases, that they are almost suffocated by the least exercise or muscular motion, although there is but very little good blood present in such bodies. But it is evident, that the resistances to the heart may be increased by such a cacochymy, upon the account of the increase of the mass to be moved.

It is to be well observed, that not all our humours are perpetually moved through the vessels, but that there are some, and often in a great quantity, which, being separated from the blood, and collected in cavities for that purpose, are reserved for their particular uses; and which, if they are not consumed, are often accumulated in very great quantities, so as greatly to oppress and load the body. This is more especially true of the fat, a due quantity of which has very good uses to serve in the body, such as to cover and defend parts, and retain them flexible and fit for motion, &c. for which reason the fat is placed not only round all the muscles, but also betwixt their several fibres and bundles of fibres. But when the body is daily exercised by muscular motion, this collected oil is attenuated and returned into the veins, and thus, mixing with the blood, is discharged from the body either by urine or sweats. But when animals are idle, or not sufficiently exercised, and in the mean time use a plentiful diet, this fat or oil is accumulated in the cellular membrane, and, by increasing its quantity, compresses all the adjacent vessels: and from hence there is often not so much
blood

blood in fat as in lean people, as we are assured from the smallness of the pulse and of the veins in the former. But when the heat and motion of the humours is increased by a fever, the accumulated fat is dissolved, and, entering the veins, is conveyed together with the blood to the heart; hence the mass of humours to be moved is suddenly increased, and often so great a plethora is raised, that the vessels burst, extravasate their humours, and sudden death ensues. For this reason an agitation of the stagnating humours is justly ranked amongst the effects of a fever (§. 587). For if a fat person lies ill of an acute continual fever for fourteen days, he sometimes loses half the weight of his body within that space, which loss proceeds mostly from the consumption of the fat by the fever; for fat people, recovering after such diseases, appear perfectly lean and fallen away. It is therefore evident how much the mass to be moved may be increased from a dissolution of the fat by a fever. But how great difficulty often arises from hence in the cure of diseases, will be explained hereafter at §. 693.

But the principal sign of too great a mass to be moved, is a large and quick pulse of the artery, while at the same time the veins are turgid, as if they were inflated; for then we know that all the blood-vessels are extremely full. For the pulse of the arteries may be sufficiently large and quick, though in the mean time there is no increased quantity of the liquid to be moved, namely, if the blood thickened with an inflammatory density passes more difficultly through the extremities of the arteries; but then the veins are emptied, because they receive less, and almost all the blood is accumulated in the arteries, as hath been frequently observed in opening the bodies of those who have died.

died of acute inflammatory diseases. But on the contrary, in languid diseases the humours are often accumulated in the veins, which are more easily distended, while in the mean time there is a less quantity of them flowing through the arteries. But, when both the arteries and veins are turgid at the same time, we know for certain that the mass of humours to be moved is increased. But for a greater quantity of humours to flow in the same time through a like number of vessels, the celerity of the moving liquid must of necessity be increased; and therefore in this case there will be also a quickness of the pulse. Yet it must be observed, that in a great plethora almost all the motion of the blood is suffocated by the too great mass to be moved, whence the increased heat and quickness of the pulse are scarcely observable; and therefore in such a case the absence of this sign may deceive a person. A remarkable instance of this is given us by Sydenham^r, which we mentioned upon another occasion, in the comment to §. 590. A young man ill of an acute fever seemed to be almost expiring; but the heat in the mean time was perceived to be so moderate in the extreme parts of the body, that his friends, who attended him, did not believe he had a fever. But blood being plentifully drawn by opening a vein, the fever raged so forcibly, that Sydenham confesses that he never saw one more violent, though it yielded to a third or fourth bleeding. But such a suffocation of the blood's motion attends only in the greatest degree of a plethora, which a skilful Physician can easily discover by its proper signs.

^r In *Schedula monitoria de novæ febris ingressu*, p. 683.

S E C T. DCLXXXII.

THE paucity of the vessels pervious may be known from the history of obstruction, (§. 107, to 124.) and of wounds. (§. 145, to 331.)

When the vessels are so obstructed by an impervious humour, that they are able to transmit nothing, they then continue distended before the obstructed part, from the impetus of the vital liquid urging against the obstructed vessel; but that part of the liquid which is lodged beyond the obstruction passes on into the veins; and therefore that whole length of the vessel which is intercepted betwixt the obstruction and the vein will remain empty. If therefore this obstruction takes place in many of the vessels, the number of the transmitting canals will be lessened, while in the mean time the mass of the liquid to be moved remains the same; the resistance therefore to the blood propelled from the heart will be increased, and the liquids must consequently pass more swiftly through the canals as yet open, so long as the circulation of the humours is carried on through the vessels. But it is very evident, that both the resistance and celerity of the motion arising from this cause must produce a considerable effect, if the number of the impervious vessels be great, compared with those which remain open. See what has been said under the head of obstruction, especially in the comment to §. 120, as also in the comment to §. 382. N^o. 8. concerning the effects of inflammation. But it is evident enough that the same things happen, when great numbers of the pervious vessels are destroyed by

by wounds; more especially when a great portion of the body has been removed by amputating or cutting off a limb (as was demonstrated at §. 474); and then the effects of a plethora frequently follow.

S E C T. DCLXXXIII.

A Narrowness of the vessels is known by inspection, by the touch, and the patient's habit being dry, so as to produce a great increase of heat from a small increase of motion.

The vessels appear conspicuous in many parts of the body, whence we may have an opportunity of judging by inspection concerning the increase or diminution of their capacity. For the veins, even very large ones, are placed in the surface of the body; and in the lips, internal parts of the mouth, white of the eye, &c. the arterial vessels, however small, lie exposed to view. But the larger arteries are more deeply buried for their security. But we are more especially able to judge concerning the diminished capacity of the vessels, from the decrease, fulness, or bulk of the conspicuous parts. For the greatest part of the bulk of the body arises from the fluids distending the vessels; and therefore as soon as the vessels are strengthened, all the parts shrink up, or contract: thus we see in a sudden and great fright, that the face is wonderfully agitated, the lips are contracted, the eyes and cheeks look pale, so that the straightened or contracted vessels no longer admit the red blood by which they are usually pervaded. But we are likewise able to distinguish the greater or less capacity

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of the arteries in many parts of the body, by the touch; namely where the larger arteries come nearest to the skin or surface of the body, especially if they lie upon bones, as in the wrists and temples, where we most plainly distinguish the pulse of the arteries. But since the capacity of our vessels is measured by a ratio compounded of the force of the impelled liquid directly, and of the resisting sides inversely (see §. 26); it is therefore evident that the vessels may be straightened, if the force impelling the fluids into them is diminished, or the resistance of them, by which they contract, increased. The first cause of a narrowness of the vessels is known from the signs of a weakness in the heart; but the latter is known by those signs which accompany an increased elasticity of our vessels. For if the quantity of liquids to be moved continues the same, while the vessels are rendered more narrow, anguish, palpitation of the heart, &c. will immediately attend, as we always observe in one struck with great fear. But we are here to treat chiefly of the latter kind of narrowness in the vessels, namely when the contractile force of their sides is so much increased as to lessen their capacity; that is to say, when the solid parts of the body overpower the fluids; for then a dry habit is said to attend, which is usually accompanied for the most part with a greater heat, and always with leanness^s. Hence we may likewise understand why people of a lean and dry habit often grow hotter by repletion, and more easily bear the external cold of the atmosphere. But when the vessels are rendered narrow, the quickness of the circulation is at the same time increased, because the vessels do not so easily yield or dilate; whence a great attrition must follow of the humours and sides of the vessel, and

^s Herm. Boërhaave, Instit. §. 892,

consequently a great increase of heat will ensue: for when a greater quantity of blood is urged into the arteries in the same space of time, if they are contracted and less easily dilatable, all that blood must move with a greater celerity, and be pressed into the veins, and therefore the attrition will be increased. Hence the reason is evident why there is so great an increase of the heat, when those who have a pulmonary consumption, are troubled with a slight fever after meals; because in these greatly emaciated bodies the vessels are very narrow or contracted. And hence the quantity and velocity of the liquid to be transmitted being increased, will immediately augment the attrition to a considerable degree, whence the pulse in the arteries of these is observed quick and small. From hence likewise we have another reason why acute and inflammatory diseases are so fatal to strong and exercised bodies (see the comment to §. 386. and 588). For in these the rigid and more narrow vessels immediately produce a great heat from the increased motion of the circulation; whence follows a dissipation of the most fluid parts of the humours, and a conversion of the remaining mass into an imperious and irrefolvable matter (see §. 689); hence the inflammation increases, and all its worst consequences follow in a short time.

S E C T. DCLXXXIV.

AN immobility of the vessels greatly resisting their dilatation, is known from all the signs of rigidity in the fibres, vessels, and viscera (§. 32, 33, 34, & §. 50, to 54).

A narrowness of the vessels, so far as it is to be ranked amongst the causes of heat, always supposes

poses that they are less moveable, or more powerfully resist their dilatation. For we do not here consider that narrowness of the vessels, which arises from a diminution either of the quantity or impetus of their distending liquid; because by such a narrowness heat is not produced, since the attrition cannot be increased thereby. But this immobility of the vessels we here consider arises from a greater cohesion of the solid parts, concerning the signs and causes of which we treated at the numbers here cited in the text.

S E C T. DCLXXXV.

FROM so many proximate causes (§. 674 to 685.) does the origin of heat in fevers proceed; which proximate causes may again proceed from an infinite number and variety of other more remote causes.

We have now enumerated in order the proximate causes of heat in fevers, and distinguished their several kinds, that we might be afterwards able to deliver the cure of each; and it appears that however different they are, yet they all conspire together in this, that they produce a more violent attrition of the fluid parts against each other, and against the vessels, and of the vessels against them. But these proximate causes of heat again acknowledge others for their proximate causes, which with respect to the febrile heat are only remote causes. Of these there is a great number, and almost an infinite variety, and therefore it would be of no use to enumerate them, since it is sufficient for the cure of the febrile heat, to remove its proximate causes, and these being rightly understood, it will be easy to discover the remote causes, if at any

time the knowledge of them is necessary. Thus, for example, the mass of humours to be moved being increased, has been reckoned among the causes of heat in fevers, of which again there may be various causes, according as it arises either from a plethora, different kinds of cacochymy, or from stagnant juices put in motion. But for the cure of febrile heat arising from this cause, it is sufficient only to lessen the mass to be moved, without having any regard to the remote causes of the plethora or cacochymy. The same is also true of the density of the blood, its velocity, &c. It is likewise evident from what has been said, that the causes of heat in fevers, so far as they reside in the fluids, may be reduced either to their quantity, density, or motion increased through the vessels, but in the solid parts these causes depend on a diminution of the number of the transmitting vessels, while there is the same quantity of liquid to pass through them, or else on a greater narrowness or immobility of them, by which they resist the dilatation of themselves from the impelled fluids. At the same time it is likewise evident, that what some authors have said concerning putrefaction, fermentation, effervescences, or the like, as the productive causes of heat in fevers, is vain and without foundation. For if, as Helmont well observes, this heat arose, for example from putrefaction †, *Cadaver caleret post mortem, & febrī torqueretur ardentius, quam dum viveret; eo quod eadem numero materia, cujus obsequio mors advenit, etiamnum perstet in cadavere: cumque eam supponunt calidam, proprio putredinis calore, magisque sit putrida per mortem, ut & potentius à morte putrefaciens, pluresque afficiat partes sibi conterminas, quam dum viveret: idcirco etiam plus actualiter caleret post mortem, quam in vita.*

At

† De Febris cap. 1. pag. 741. N°. 24. &c.

At sane hic error proditur. Nam febris. quæ vivum calefecit, statim cum vita cessat, omnisque calor cum vita expirat. Unde conclusit, quod, quidquid in sanis edit actiones sanas, id ipsum in morbis edit actiones vitiatas. “The dead body would grow

“hot after death, and be tortured with a more
 “ardent fever than while it was living; and this the
 “more, because there is the same quantity of mat-
 “ter, in consequence of which death comes, whe-
 “ther it continues in the body or not: and as the
 “dead body is supposed to be hot by its own
 “heat from putrefaction, it will become more pu-
 “trid after death, so as to corrupt more power-
 “fully and affect more parts when the body is
 “dead than while it was living: for which reason
 “it should be actually hotter after death, than while
 “it was living. But this is in reality an error im-
 “posed upon us. For the fever which heats the
 “living body immediately ceases together with
 “life, and all its heat likewise expires together.
 “Therefore we may conclude that whatever the
 “actions produce in healthy people who are well,
 “the same effects do those actions likewise produce
 “ill when they are vitiated in diseases.” Since there-
 fore heat in healthy people proceeds from an attri-
 tion of the fluids against the vessels, and against
 each other, and of the vessels against them, the in-
 crease of the healthy heat in fevers is to be ascribed
 to the same causes, only more violent. Hence also
 medicines which are called heating do not render
 the body hotter when they are applied to it, because
 they contain more heat in themselves, which they
 communicate to the body; but because by a pow-
 erful stimulus they increase the motion, and con-
 sequently the attrition of the humours through the
 vessels. For the fiery hot pepper, oil of cinna-
 mon, and the like, examined by the thermometer,

have the same heat with the ambient air, and although they are applied in great quantities to a dead body, yet they do not produce any heat.

S E C T. DCLXXXVI.

BUT the febrile heat may increase from an augmentation only of one of these causes, and then the increase of the heat will be in proportion to the augmentation of the cause.

Since therefore the causes of heat in fevers may be considered abstractly, and one of them may be conceived alone without the rest, it is evident that a greater effect ought to follow from the increase of such a solitary cause, since every effect is proportionable to the cause from whence it is produced. If therefore the density of the blood be supposed double in a febrile patient, the increase of the heat arising from that cause, must be in the same proportion; and the same is apparently true of the other causes separately considered. But it is very rarely that the solitary or individual causes of the febrile heat remain long alone; for the density of the blood being increased, for example, from a previous dissipation of its more fluid parts, its impervious particles will soon hesitate in the ultimate extremities of the arteries; and therefore the resistance to the blood about to flow through the vessels will be increased; and therefore there will be likewise an increased heat from the increased resistance. Thus also the velocity being increased will be soon followed with a greater density in the blood,

as it was demonstrated in the comment to §. 100. But it should be observed, that in this computation the increase of the heat is not always in the same proportion to the increase of the particular cause; but as the augmentations of these causes are to each other, so does the excess of the heat seem to be which they produce above the natural healthy degree. This may perhaps appear more evident by example. If the celerity of the blood is double when the artery of a febrile person beats twice in the time, wherein during health it beats only once, the heat in this case ought not to double, for besides the velocity of the motion, there are other causes which conspire to produce the healthy heat, namely, the density and elasticity of the blood, the strength and narrowness of the vessels, &c. which do not always increase in proportion with the velocity of the blood. Even it is very apparent that if the quickness of the blood's motion was increased in this manner, there would not only ensue a degree of heat intolerable to the human body, but speedy death likewise. For if the heat which in a healthy person exceeds the ninetieth degree of Fahrenheit's thermometer, was to become double, that is to exceed one hundred and eighty degrees of the same thermometer, the blood and its serum would be coagulated in the vessels, and consequently all their motion would cease: But yet in the mean time we observe in fevers, and in people exercised by hard running, that the velocity of the blood is increased more than double. But in comparing the increase of heat from the augmentation of the particular cause, it seems to follow that the excess of the heat above the healthy degree, which arises from a duplicate celerity in the motion of the blood, is, to a like excess of heat arising from a triplicate celerity, as one to two; namely, in

the same ratio as are the excesses of the velocity with respect to each other. But concerning these proportionable augmentations of the particular causes of heat, and their effects, there is room for much disputation, though for the uses of the Physician the various intensity of the febrile heat may be better known from those signs, concerning which we treated before at §. 673. For there will be always the greatest difficulty attending the determination of the particular causes which serve to augment the heat. However, we know how to distinguish the increased velocity, by the number and magnitude of the pulse, or by comparing the number of the heart's contractions with the size of the pulse; but in what degree the density of the blood is increased, in what the inertia or mass of the liquid to be moved, with the elasticity of the canals; or what proportion are there of impervious vessels, with respect to those that remain open, &c. ? hardly any one will pretend to determine. Who again can distinguish how much the density of the blood contributes to increase the heat, or how much the velocity of its motion, and how greatly the resistance of the liquid to be moved, &c. ? We are indeed able to distinguish the heat arising from all these concurring causes, but, how much each of these contribute to produce this effect, I believe we are ignorant. Moreover, by the heat raised, those causes are changed which produce it; for the globules of the blood have their bulk increased by heat, while their mass or matter continues the same, and therefore their density is diminished, while the capacity of the canals is increased by the heat generated, and therefore in this respect the resistances are lessened, &c. Hence therefore in the general we may affirm, that the heat is augmented when its particular causes

causes are increased, other things continuing in the same state; and when we consider these causes abstractly, we may be able to make a computation: but, in the concrete, when all the causes concur together, to determine any thing in this respect must be extremely difficult, if not wholly impracticable.

S E C T. DCLXXXVII.

IF again two of these causes increase together, the increased heat will be as the product of the increments of the causes, if they are multiplied by each other.

S E C T. DCLXXXVIII.

WHICH calculation may also take place in the same manner in the rest of the causes.

If now several causes increase together, the heat will doubtless be increased, but by the reasons before explained it will be very difficult to know in what proportion the increase is made. Hence we may understand why strong and exercised bodies are in so much danger when they are taken with acute diseases. For the vessels being rigid in these patients greatly resist the heart, while the dense humours strike and rub more impetuously against each other, and against the sides of the vessels, and longer retain the heat which is once raised, while at the same time the velocity of the humours through the vessels is increased by the fever. From whence it is evident that the most effectual causes concur in such patients, whereby a great heat is produced.

S E C T. DCLXXXIX.

THE increased heat dissipates the most fluid parts from our blood, that is to say, the most spirituous, watry, subtile, saline, and oily particles, while it dries, condenses, and inspissates the rest into an impervious, irresolvable matter; it sets at liberty the saline and oily parts, attenuates and renders them more acrid, exhales, and puts them in motion; hence it grinds away and breaks the smallest vessels, dries up the fibres, and renders them rigid and contracted; from hence of a sudden it produces many swift, dangerous, and fatal diseases, which are easily deducible from an increased heat as the cause.

We come now to treat of the effects, which are observed to follow from an increased heat, as well in the solid as fluid parts of the body. But we do not here so much consider what the causes producing heat can effect; for when the causes of heat are increased, they at the same time make many alterations in the body, inasmuch as they produce a more violent attrition of the fluids against each other, against the vessels, and of the vessels against them; and as this increased attrition in the febrile heat supposes an increase of motion in the humours through the vessels. But concerning this more may be seen in the comment to §. 100, upon the same subject. In this place we only examine what may happen from a greater quantity of fire collected in the body; yet it will appear that the effects thence arising agree very much with those which happen from

an excess of the circulating motion, and which we enumerated among the effects of a fever, §. 587.

The increased heat dissipates the most fluid parts, &c.] When the blood of a healthy person is taken from a vein to prevent a plethora, in a cold season it manifestly exhales a subtle vapour, which being condensed against a looking-glass, or put into an alembic, appears in the form of drops adhering to the sides. At the same time also blood lately taken from a vein affords a sort of urinous smell, like unto that which exhales upon opening the abdomen of a living animal. By a chemical examination, it appears, that the lightest and most moveable part of the human blood is water, which ascends from it with a very gentle heat; yet this is not pure water, but contains in it something odorous, which seems to arise from the highly attenuated oil. But it has been a custom to call the most subtle part of the blood by the name of spirit, because it is the most moveable, and escapes the most penetrating eye. Yet is this different in every individual person; for hunting dogs know how to distinguish their masters by the perception of this effluvia, even though they should be intermixed with a thousand other people; and when they have once smelt the footsteps of the hare, they are able to follow her even to her form or seat; and this more especially when there is a viscid dew upon the surface of the earth to imprison those vapours which are in their own nature so volatile, and by that means retain them longer, otherwise they soon vanish. The heat therefore being increased, it is evident that this more moveable part of the blood will be soon dissipated. But also the salts and oils, though they are not reduced to so great a subtlety with the former, yet do they exhale from

from the body when the heat is much increased. Thus we see in the greatest heats of the summer, that even people at rest run down with sweat; and which gathering upon the face, as it sometimes happens, distils over the lips into the mouth, and manifestly affords a saltish taste. But also the linen of sweating people is spotted with a yellow fatish oil; and we see that in acute diseases fat people lose a great quantity of their fat, even though not so much as a single drop of mere oil can be found in the excrements; but it is all so attenuated in the form of a soap with the salts rendered more acrid, as to be able to mix with water, so as to pass out therewith from the body.

Dries, condenses, and inspissates the rest into an impervious irresolvable matter.] For the most watery, thin, and subtle parts of the blood are dissipated, and therefore what remains being deprived of a great part of its watery diluent vehicle, by the interposition of which the other parts were prevented from uniting, will become drier, denser, and more inclined to a morbid concretion. For this reason all things expelling the more moveable parts of the blood, are hereafter ranked among the causes of an arbitrary cacochymy (§. 1093.) But also by an increased heat our blood and its serum may be disposed to concretion without any great loss of their more subtle parts. For the serum of the blood poured into scalding water is immediately congealed into a white opaque mass, something like the white of an egg, even though it continues in the midst of the water, the heat of which, though much less than boiling, we know will congeal; and when the heat of our body begins to exceed the hundredth degree of Fahrenheit's thermometer, there is then great danger of the
blood's

blood's concretion, only from the increased heat^u, though at the same time this easy aptitude to concretion is a great deal increased by the dissipation of the most fluid parts. But the blood, when once concreted in this manner by an increased heat, can either not at all, or very difficultly, be dissolved again: for which reason inflammations arising from such a coagulum of the blood are hardly ever to be cured by a resolution; since this way of terminating an inflammation requires the obstructing cause to be not over solid or compact (see §. 386.). Hence therefore this concretion of the blood into an irresolvable and impervious matter is justly ranked among the effects of an increased heat in fevers.

Sets at liberty the saline and oily parts, &c.] For we see that in the most inflammatory diseases the fat of the body is so dissolved and attenuated, that it soon passes out of the habit, although it is in its own nature so inactive and sluggish. But that the salts are likewise attenuated and rendered more acrid when the body acquires a greater heat, appears from the alteration in the urine; for in a little time it becomes more red, saline, and almost alkaline or putrid in the hottest inflammatory diseases. Hence it is that a redness of the urine is esteemed as a sign of internal heat (as we observed before at §. 673). But how much great heat may conduce to cause putrefaction, by which the oily and saline parts of our blood are attenuated, moved, and rendered more acrid, has been said before in the comment to §. 84. N^o. 5.

Hence it grinds away and breaks the smallest vessels.] For since the increased heat supposes a more violent attrition of the solids and fluids, it is evident the vessels must suffer a greater violence.

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If now at the same time the fluids begin to change their mild nature, and become acrimonious, there is the greatest danger, lest by increasing the impetus with the density and acrimony of the fluids to be transmitted, the vessels may be broke, more especially the smallest of them, which are the least able to resist. For if we consider that a matter is lodged in those very tender small vessels in the pulpy cortex of the brain, which is rendered impervious by the increased heat, and behind which matter the impulse of the vital fluid urges; or if we only consider the fluids passing with a rapid motion through these vessels, being rendered more acrid from the alteration of the saline and oily parts of the blood, ought we not therefore to conclude, that these very tender vessels must be soon destroyed, since they are able to make so small a resistance, even in the strongest person. Hence also the ill effects of an increased heat usually appear, first by injuring the functions of the encephalon or lungs, because in these parts the vessels are the smallest and tenderest, and the blood is carried with a most rapid motion through the lungs.

Dries the fibres, and renders them rigid and contracted.] For since heat dissipates the most fluid parts, the quantity of that fluid will be lessened, which ought by the laws of nature to flow through the very smallest vessels. And since the rest of the mass deprived of its most thin and fluid parts, begins to hesitate in the ultimate extremities of the larger arteries, this will produce an obstruction of those vessels; and therefore the smaller arteries, which ought to receive their thin fluid from those arteries, will be empty (see the comment to §. 120); and the sides of those small vessels being no longer distended by a fluid, will collapse and grow together; and from hence so often remain incurable

ble diseases, which continue as long as life itself, after the person has suffered acute diseases. But all this will be farther increased, when the larger vessels obstructed and distended compress the adjacent smaller ones. For we see very evidently this sad effect of the increased heat in ardent fevers, when the whole skin of the body appears dry and juiceless, the tongue becomes perfectly rigid and contracted with drought, the fauces are parched up, and the eyes appear dry and dusty for want of that lymph which ought to moisten and cleanse them. Hence Hippocrates justly pronounces that all those perish with drought, who die of ardent fevers, see the comment to §. 100.

Hence of a sudden it produces many swift, &c.] If now we consider all the effects of heat, the reason will evidently appear why it may produce a great many and suddenly fatal diseases. For the integrity of all the vital, natural, and animal functions depends on a free motion of the humours through the vessels. But by an increased heat those motions are disturbed or entirely abolished; whether this happens either from a rupture of the smaller vessels, or from the larger vessels distended with impervious matter and compressing the smaller, &c. When therefore these injuries happen from too great a heat in those parts of the body upon which life more immediately depends, speedy death ensues; and this most suddenly of all, if the serum of the blood begins to coagulate by the immense increase of the heat: for in a little time it will hesitate impervious in the smallest vessels of the lungs, and intercept all the passage of the blood from the right to the left ventricle of the heart through the lungs, whence a most acute and fatal peripneumony will attend. The same thing will happen if the fabric of the cerebellum is either

either destroyed, or so stuffed up with impervious humours as to hinder the influx of the vital spirits through the nerves from the cerebellum to the heart. It is therefore evident with how much care one ought to attend to this febrile symptom, in order to prevent these fatal events, by artificially lessening the too great heat. But by what remedies the febrile heat may be mitigated, we are now to declare.

S E C T. DCXC.

FROM what has been said, we may at length be able to understand well what is required to mitigate the heat, and what various remedies conduce to the same purpose.

Since from what has been said it appears what are the causes of increased heat in fevers, and how various they may be, it is evident that in the cure serving to mitigate this heat, one ought carefully to distinguish from what cause it arises, and whether it ought to be ascribed only to one, or several of those causes acting together: for thus we shall have an indication which will direct us what is to be done, and pointing out at the same time what remedies are convenient to answer the intention. The cure therefore of each of the causes increasing heat ought to be delivered by itself: and when this is done, it will be evident what course must be taken when the increased heat proceeds from several of those causes acting conjunctly.

S E C T. DCXCI.

IF the velocity only occasions the increased heat, the remedy will be every thing that lessens it; such as rest of the muscles and of the mind, blood-letting, a gentle and short compressure of the veins in the limbs: the application of things moderately cool both internally and externally, together with diacordiate medicines prudently used, are the chief.

When therefore too great a quickness of the motion of the fluids through the vessels offends, every thing will be convenient that is capable of lessening that motion. But this velocity proceeds from two causes, namely the action of the heart impelling by its muscular force the blood into the arteries; and then the contraction of the arteries distended by the blood drove into them by the heart, and by which the blood moves forward at the time when the heart is dilating. These causes ought therefore to be lessened, in order to diminish the velocity. But if the action of the heart is weakened, the reaction of the arteries contracting themselves upon the blood will be likewise lessened; for the arteries react more powerfully as they are more distended or dilated: therefore such things are required as diminish the frequency and force of the heart's contraction, as we demonstrated before at §. 102, when we treated of the cure of diseases arising only from an excess of the circulatory motion. But it appeared from what was said at §. 574, that the quicker contraction of the heart, proceeds from a quicker reciprocal influx of the nervous fluid into the muscular fibres of the heart, and of the blood

into its vessels and cavities; and it there appeared, that the most powerful among these causes was that which supposes an increased quantity and impetus of the venal blood conveyed into the cavities of the heart; since by that only the motion of the heart might be renewed even after death, when the other causes cease to act; and in a living person the motion of the venal blood being accelerated towards the heart, for example, by frictions, the velocity of the circulation, and the heat thence produced may be almost increased to any degree. And therefore the reason is evident, why to diminish the velocity of the blood also requires

[Rest of the muscles and of the mind.] For the muscles when they move, swell and compress the adjacent veins; and by that means they accelerate the motion of the venal blood towards the heart. Moreover, the muscles, when they act, look pale, by expressing all their contained blood, which will therefore return swifter through the veins to the heart. This is the reason why the motion of the humours through the vessels is so much accelerated by violent exercises of body. But how great an influence passions of the mind have towards increasing this velocity was said before in the comment to §. 99. and in the commentaries to §. 104, & 605, N^o. 5. we treated of the remedies which are found to be the most effectual in quieting commotions of the mind. Therefore the ancient Physicians have ordered, that patients afflicted with acute diseases should lie in a dark still place, remote from all noise, that thus all things may be avoided, which are capable of violently affecting either the internal or external senses.

[Blood-letting.] For we are able at pleasure to diminish the increased velocity even to fainting by this means; and then all the humours begin to rest,

rest, and in a little time a coldness ensues. For where there is so great an increase of heat perceived in a febrile patient, that there is danger of the more tender vessels being destroyed in a short time, or of the blood and its serum beginning to be coagulated into a mass irresolvable for the future, we cannot then trust those remedies which slowly and gradually diminish the heat, because there is the greatest danger in delaying: and therefore in such a case blood-letting is to be immediately performed, and the evacuation made sufficiently large; and the same is to be repeated again if the heat increases too much. For thus the mass of the liquids to be moved is diminished, as the most dense part of our fluids which is most disposed to generate and retain heat, namely the red blood, is evacuated from the body. Room is also made for diluent liquors, which thus mix more easily with the remaining blood, now become too much inspissated from the too great heat. See also what has been said of blood-letting in the comment to §. 610. where we treated of allaying the too great force of the fever.

A gentle and short compression of the veins in the limbs.] For by this means the venal blood is prevented from flowing so violently and plentifully into the heart, so as to irritate it into more violent contractions. But this compression by bandages or ligatures ought only to be gentle, so as to lessen the diameter of the larger venal trunks seated towards the skin, but not so as entirely to compress them; because then likewise the arteries, which empty themselves into those veins, would not be able to send forward their blood; whence the number of the pervious vessels would be diminished, and consequently the heat would be increased (see §. 682.) and therefore in such a

case the diminution of the heat arising from a retention of the blood by a stricture upon the veins would be of little service. But when there is only a moderate compressure of this kind made upon the veins of the limbs, they dilate and swell more below the stricture; and even the whole limb, if this compressure continues a long time, will be increased in bulk from the liquid here accumulated. But how much use a gentle compressure of the limbs is of to abate the velocity of the blood moving through the vessels, we are taught from hæmorrhages, which are usually well suppressed by the use of such ligatures; when by this means there is a sufficient quantity of blood retained in the limbs, and a less pressure of it made against the divided vessels, which then usually contract and close; and afterwards when these ligatures are gradually loosened, the blood does not so easily escape through the contracted mouths of the open vessels. But it is most adviseable to apply such ligatures alternately, at one time to the thighs, and at another time to the arms, removing them every half hour, rather than let them continue too long upon the same parts, for fear of suffocating the vital motion: For although the bandages were but slightly applied at the beginning, yet when the subjacent parts begin to swell, the ligatures will be too strict, so as not only to lessen the capacity of the veins, but entirely compress them together with the arteries; whence a sudden gangrene might frequently happen. Nor is it any objection to this, that in the comment to §. 105, we recommended a relaxation of the veins to diminish the velocity of the blood's motion; for this has the same effect, inasmuch as it renders the relaxed veins more easily dilatable, so that they may contain a greater quantity of blood: But this same effect may be obtained by a
gentle

gentle compressure of the veins. The principal use of such a compressure of the veins is to mitigate the febrile heat, when it returns again too violently after repeated bleeding; and when there has been so great a quantity of blood taken from the body, that the same evacuation cannot be repeated again without danger.

The application of things which moderately cool and quiet the blood both internally and externally.] It appears from experiments, that bodies which contain a greater quantity of fire than the ambient medium, or adjacent bodies, lose that heat, when other bodies less hot are applied to them; and this more especially if they are immersed into colder fluids, and the immersion often repeated: and therefore it seems that the application of cold things as well internally as externally will be of use, when the body burns with too great a febrile heat. But it will readily appear, that the greatest caution is necessary in the application of these; for the density of the blood and constriction of the vessels are often increased by the indiscreet application of cold things, and therefore the causes producing heat are from thence also increased: as those experience who handle snow, whence afterwards there follows a great heat in the parts which were before very cold. But since the febrile heat is accompanied with a violent inflammatory tenacity of the blood, or at least is soon after followed with such a tenacity from the dissipation of its more fluid parts, and an inspissation of what remains; therefore there is the greatest danger, lest by a sudden cooling, the vessels should be contracted, and the blood condensed, so as to produce the worst consequences. See what has been said in the comment to §. 640, N^o. 1. concerning cold drink to allay thirst in fevers, where we treated

more at large also upon this subject. It is therefore better first to apply things that are not much less hot than the healthy body, and to descend gradually to things colder, rather than all at once to give drinks extremely cold, or make such applications externally, while the body is extremely hot; which can hardly ever be done without danger, more especially if the fever is accompanied with an inflammation. Add to this, that warm water may introduce a considerable coolness thro' the body by relaxing the vessels, by diluting the blood, and removing its too great density, and consequently it will diminish the causes of the febrile heat. Yet a prudent use of a cool air surrounding the patient may be of the greatest service: and this will more especially succeed if the patient is not over-loaded with bed-cloaths, but either sits up in a chair, if his strength will permit, or else lies down upon a bed with his body lightly covered; in the mean time the windows being opened, the air of the patient's chamber wherein he lies may be renewed several times in a day; or if the external air is too hot in the summer-time, an agreeable coolness may be communicated to it according to the method before recommended at §. 605. Hitherto more especially will conduce the filling of the air with exhalations of cold water sprinkled about the chamber; that thus the air containing a greater quantity of water may not so easily grow warm, by the hot atmosphere with which the human body is encompassed; and hence (*cæteris paribus*) healthy people likewise perceive themselves cooler in a moist air than in a dry one. At the same time also the moisture of the air is useful, inasmuch as it corrects the driness of the body, which is an effect of the too great heat. Hence Galen w orders an agreeable coolness to be

w Method. Med. Lib. X. cap. 8. Charter. Tom. X. p. 234.

be communicated to the air, by pouring water out of one vessel into another, by sprinkling cold water about the house, and lastly, by strewing roses, vine-twigs, or tops of brambles, &c. about the floor, and at the same time to be careful not to make the house too warm, nor let the patient be disturbed by too many visitors.

Diacodiate medicines prudently used.] When all these means are tried, and the too great velocity of the blood still continues, nothing is more serviceable than to allay this too great impetus by diacodiate medicines, as Sydenham frequently observes to us. Indeed, in the beginning of acute diseases he tells us the use of these is less safe, but if they are given in the declension of the disease, after evacuations have been used, he assures us they always prove of great service*. But he more especially experienced the use of these in the cure of the confluent small-pox, and principally in that most dangerous stage of this disease, wherein the whole surface of the body is covered with matter, or often a gangrenous ichor, which being returned into the blood, excites an intense fever, which often kills the patient suddenly, unless the increased velocity is allayed by prudent use of diacodium or liquid laudanum; he would therefore have such a medicine given every eight hours in this case, and to keep it by the patient in readiness to be immediately given, upon any sudden occasion in this doubtful stage of the disease: and he assures us that he is firmly persuaded some that he knew perished of this disease, only because they were destitute of this remedy†. But the dose ought to be gradually and prudently increased, beginning only with the most gentle paregorics, 'till their effects answer the Physicians expectations.

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But

* Sydenham. Sect. I. cap. 4. pag. 82.
Epistol. pag. 468.

† Ibid. Dissertat.

But what we said before concerning moderating the febrile impetus, so that it may be neither too violent nor too sluggish (§. 609.); ought also to be particularly observed here in allaying the febrile heat; since the various intensity of the febrile heat is usually accompanied with different degrees of impetus, as we observed before in the place cited: and therefore the too great heat is not to be lessened so far as to make the patient cooler than he used to be in health; but rather a greater heat is to be left, provided it be not so immoderate as to give us reason to apprehend too great a dissipation of the fluids, or a destruction of the very tender vessels. The reasons for this practice were given before in the comment to §. 609.

S E C T. DCXCII.

IF the cause of the febrile heat is from too great a density of the blood, §. 678, it is cured by such things as diminish its velocity, §. 691, as also by the drinking of water and oxymel, with such things as relax the vessels.

The density of the blood (as we observed before at §. 678) proceeds from the action of the vessels upon the fluids, and of the fluids against them: since therefore the velocity of the humours thro' the vessels being increased, the causes condensing the blood act more powerfully and frequently in a given time, it is evident that this velocity must be lessened, in order to remove the present, and prevent a future too great density of the blood. Add to this that by the increased velocity there is always a loss of the most fluid parts, and consequently

quently an inspissation of what remains. To this end therefore will conduce every thing recommended in the preceding aphorism. But since the most fluid and moveable part of our blood consists almost entirely of water, it will be one of the best remedies to restore that which has been once lost from the blood by a plentiful drinking of watery liquors. But because the particles of the blood cohering together from a loss of its most thin juices, by the interposition of which the concretion of these parts was prevented, cannot be again easily divided by intermixing water only, more especially if the blood is already impervious and hesitating in the extremities of the vessels; therefore to water are added such things, as by a saponaceous dissolving power may remove these concretions, and at the same time powerfully resist all putrefaction, which is always much to be feared, when there is too great a heat. Hence oxymel appears to have been so much in use, and is so highly recommended among the ancient Physicians in the cure of acute diseases; and in the same manner likewise the juices of elder-berries, currants, mulberries, inspissated or prepared with sugar, are very serviceable if made into a drink with water, concerning which see what has been said of the cure of inflammation, §. 398, where we treated of those remedies by which the obstructing matter might be rendered fluid. For here such remedies are required as are able to dissolve and attenuate the too thick blood without increasing the velocity, while at the same time they resist putrefaction; therefore not all dissolvents are here convenient, and the alkaline salts both fixed and volatile, together with the soaps prepared from them, are not made use of in this case, because they offend by their stimulus, and incline the humours to an alkaline nature.

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But such things as relax the vessels greatly cool, as the vessels being relaxed act less upon their contained humours, and yield more easily to the impulse of them: and hence there is less danger of obstructions for the future, while those already formed are resolving, and while the relaxed vessels more easily transmit what is already hesitating in their narrow extremities; therefore at the same time such things as relax diminish the resistance arising from the narrowness or immobility of the vessels, which we ranked among the causes of heat (§. 680). The drinking of warm water, warm bathing, fomenting, and the application of vapours, make the chief remedies for relaxing, more especially if they were boiled with farinaceous and emollient ingredients. Hence the decoction of barley with oats or oxymel, emulsions of the mealy seeds, decoctions of mallows, marsh-mallows, and the like, satisfy all these intentions; for they dilute by their water, attenuate and resist putrefaction by the oxymel which is added, and at the same time relax the vessels by their soft glutinous substance plentifully diluted in water.

S E C T. DCXCIII.

THE too great mass to be moved in a mere plethora is easily lessened (§. 109. N^o. 6.), but in a cacochymy it is to be removed slowly, by repeating evacuations at intervals, and by correcting the humours at the same time; but when the fat is dissolved and put into motion, which before stagnated, there is the greatest difficulty in lessening the offensive mass: then watery drinks with ascids, honey, the yolks of eggs, and sugar, are of the greatest use, together with evacuating remedies constantly used.

When there is too great a quantity of good blood in plethoric people, that may be easily removed by blood-letting, which may thus directly evacuate what offended by its too great quantity, and this too at pleasure, according as there may be occasion. But if a redundant cacochymy increases the mass to be moved, we are not able to remove that altogether and at once, as in a plethora; because by making a large evacuation of blood in this case, the humours degenerating from their healthy state still are left behind in the vessels, while the good part of the blood is equally diminished by the discharge, though the quantity of that is always deficient in a cacochymy, notwithstanding there is too great a mass of humours to be moved. For when in a pale girl the whole body is turgid with mucous and unactive humours, there is often but a very small quantity of good red blood in them; and therefore by large or repeated bleedings an insuperable weakness may be brought on afterwards. But when the stagnant humours

mours which occasioned that white tumour of the body are put into motion by a fever, the mass to be moved too much increases, so that from thence one may fear a rupture of the weak vessels; indeed part of the distending liquid ought to be removed here but slowly and by repeated evacuations, using blood-letting with moderation; or by the use of such purges as do not increase the motion, nor much dissolve the healthy humours, but evacuate those which oppress the body by their too great quantity; for in this case, though there is a greater quantity of juices in the body, yet there is not so great a heat raised thereby, because the red part of the blood is absent, which is most apt to generate heat, and preserve it a long time when produced, as we demonstrated before. But the greatest difficulty of all is, if the cacochymy be joined with a great acrimony, as in a very bad scurvy, or atrabilis dissolved and put in motion, &c. for there is the greatest danger lest the vessels distended by acrid humours put into motion by the fever, should be broke through by them; and as the whole mass of humours is infected with the same acrimony, how much soever you lessen the mass by evacuating, yet the same malignity continues in what remains, and may there be able by its acrid stimulus to continually increase the circulation; and hence the most acute fevers are often excited, as we shall hereafter declare in the history of the scurvy and atrabiliary melancholy. In that case therefore it is principally necessary to correct by opposite remedies, as much as possible, the known acrimony of the prevailing cacochymy, as it appears by its proper signs, and then by a prudent evacuation to subtract the redundant quantity.

But the mass of juices is never more suddenly, or more dangerously increased, than when the fat being

being dissolved by an acute fever in corpulent men is attenuated by the increased heat, and mixed with blood. For it appears from the most certain observations, that a fat person may in a few days time be rendered perfectly lean by an acute fever; and even as we mentioned before upon another occasion in the comment to §. 587. that a fever raised by bitters and warm medicines often happily removes too great fatness. But this great quantity of fat after being dissolved enters the veins and mixes with the blood; and therefore we cannot, even by the most profuse bleeding, evacuate so much of this fat as is daily dissolved, and mixed with the circulating humours. Hence all the effects of an extreme plethora are renewed every day; and these disorders are increased, because in fat people the blood-vessels are often very narrow, and therefore less capable of bearing a sudden increase of their contained mass. For fat animals, as Aristotle² long ago observed, have less blood. Moreover, when the blood is charged with so great a quantity of dissolved fat, the worst inflammations are to be feared; because this oil passes more difficultly through the smallest vessels, and hinders the passage of the other humours; for thus we see an erysipelas is raised in many people by the application of fat substances externally to the skin. If now we also consider that this oil inclines to a rancid and very bad acrimony, from the rapid febrile motion and increased heat, it will readily appear what disorders are justly to be feared in such a case. Here therefore we may apply the admonition of Hippocrates³, when he says, *Natura admodum crassos celerius interire, quam graciles.* “That those who
 “ are very corpulent die sooner than those who are
 “ lean.” The curative indication in this case
 therefore

² Hist. Anim. Lib. III. cap. 19. Tom. II pag 257.

³ Aphor. 44. Sect. II. Charter. Tom. IX pag 83.

therefore is to remove the fat as much and as soon as possible. But we observed in such a case that the urine is very red, frothy and saponaceous, and the sweats often smell very strong, and are almost greasy: Here therefore it will be convenient to use plentiful drinking of watery liquors to afford a vehicle for the urine and sweat; but since by urine only such a quantity of the oil can be evacuated, as can be intimately mixed with the acrid salts of the blood, so as to unite with the urine, and be thus as it were reduced into a kind of soap soluble in water; therefore it will be convenient to give with watery liquors such things as are capable of rendering oil and water miscible together. It is well known that sugar and honey have this power, as they are a kind of native soaps, and being ground a long time with oils render them capable of being dissolved in water. The yolks of eggs have also the same power, as we know from the daily uses to which they are applied in the shops, where sperma ceti, turpentine, and the other native balsams, and expressed oils being ground with the yolks of eggs are afterwards dissolved in draughts, or aqueous drinks: But since by heat in fevers there is danger of putrefaction supervening, we therefore use yolks of eggs more sparingly, because they are very easily changed into the very worst kind of putrefaction; or if they are used, plenty of acids are likewise added to correct their inclination to putrefy. But for sugar or honey, or the medicines prepared of these to produce the desired effects, they ought to be given in a great quantity; nor will it do any harm to give them, even to the quantity of a pound or upwards, within the space of a day or night, if they are plentifully diluted with water and the addition of acids; and then likewise they usually loosen the bowels, which is of
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the greatest service in this case. Hence the syrups of violets, the juice of citrons, of elder-berries, currants, simple oxymel and the like are of the greatest use here, when the fat, dissolved by an acute fever, occasions this oily plethora. But as this too great fulness ought to be diminished, evacuations are required at the same time, either by bleeding repeated according to the circumstances, when the blood-vessels are thus much distended, not without danger of a rupture; or by a flux of the bowels which may discharge a great quantity of this load, without so great a loss of the good blood, as would happen by repeated and profuse bleeding. For this purpose therefore such medicines are chiefly recommended, which by a gentle stimulus sollicit the humours towards these parts, and in the mean time do not increase the velocity of the circulation, nor much disturb the body; such as cream and crystals of tartar, sal-polychrest, nitre, tamarinds, manna, and rhubarb, &c. which if given at the same time when the oil is rendered miscible with water, by the previous use of honey and sugar, as directed, they often evacuate almost an incredible quantity of most ill smelling matter from the bowels, to the great relief of the patient: and in the use of these ought one to persist until the heat is lessened, and the sensible depletion of the vessels, before too much distended, denotes that the mass to be moved is sufficiently lessened. Whey made of skimmed milk, being destitute almost entirely of oil, drank in great quantities is very useful; and by this alone life may be supported in such diseases without giving any other food.

S E C T. DCXCIV.

AN obstruction of the vessels causing heat (§. 682.) may be understood from the cure of obstruction (§. 125, to 144.), and from the cure of those symptoms or disorders which supervene in wounds from a loss of the vessels (§. 145, to 331.).

Since every obstruction supposes a hinderance to the passage of the fluid to be transmitted through a vessel (see §. 107.) therefore an obstruction being formed will increase the resistance to the blood expelled from the heart through the vessels; and therefore in this respect obstruction may be ranked among the causes of febrile heat. But concerning the cure of obstruction, so far as it depends either on the fault of the transmitting vessels, of the fluid to be transmitted, or of both together, we have already treated at large in the aphorisms here cited in the text, under the title of obstruction, from whence may be derived what is necessary to be known in this place.

But when by wounds, and especially after amputations of larger limbs, a great number of the vessels are destroyed, it is out of the power of art to supply that defect: and nothing more then remains than to lessen the quantity of the fluid to be transmitted, that thus the resistance may be diminished, and the too great fulness of the other vessels removed; concerning which see what has been said before at §. 474.

S E C T. DCXCV.

IF the heat proceeds from a narrowness of the vessels (§. 683.), a dilatation of them is required by relaxing remedies (§. 54.).

The capacity of the vessels, as we said before in the comment to §. 683, depends on two causes which mutually oppose each other; namely the impulse of the fluid by which the sides of the arteries are removed from their axes, and the resistance of their sides opposing the impulse of the liquid. The too narrow vessels may be therefore dilated by increasing the force of the impelled fluid, or by lessening the resistance of their sides, or by procuring both of them together. But if the impulse of the liquid is increased, the heat will likewise increase, as we demonstrated before: and therefore nothing remains in this case, but to lessen the resistance of the sides; for then the impulse of the fluid remaining the same, the sides of the vessels more easily yield, and their cavity will be dilated. This will be best of all obtained by relaxing and emollient remedies, and especially by a vaporous bath, by which we know that the most solid and hard parts of animals are so much softened in a short time, that they almost dissolve into a fluid. At the same time also too great dryness by this method, which usually accompanies a narrowness of the vessels, may be corrected, (see §. 683) while in the mean time the mouths of the inhaling veins being relaxed, the watery warm vapours easily insinuate themselves.

S E C T. DCXCVI.

BY which same means also is removed too great heat of the vessels arising from rigidity (§. 54).

See what has been said concerning the cure of too great rigidity in the vessels and viscera in the comment to §. 54.

S E C T. DCXCVII.

BUT whenever the excess of heat arises from these two causes conjunctly, then the remedies hitherto described (§. 690, to 697) will be most effectual, combined together.

Hitherto we have considered the cure of febrile heat so far as it is produced from single causes; but now several of these causes may concur together at the same time (as we have already seen before at §. 686, 687); and therefore in the like case such remedies are required as are known to be proper for subduing the discovered causes of the heat. Nor yet does the curative indication arise very intricate from hence, although several of the causes of febrile heat should be combined together; and it is easy to understand all these from what has been already said. For frequently one and the same method of cure serves to subdue several causes of the febrile heat at the same time. Thus for example, blood-letting is useful when the velocity of the blood is increased, and likewise it lessens the

too great density of it, and quantity of the mass to be moved, and in the cure of obstructions it is often of the greatest use, &c. The too great density of the blood with a narrowness and rigidity of the vessels require such remedies as relax, &c. and therefore it will not be difficult to discover, from what has been said, the proper methods to be taken for the cure of febrile heat, proceeding from combined causes.

S E C T. DCXCVIII.

FROM all this doctrine of heat (§. 673, to 698) we may be able to understand why the hottest fever is also acute, putrid, and of short duration; and even pestiferous in the most intense heats? why the heat of the bed, confined air, diet, and medicines, are so very injurious in these febrile heats? why a burning heat about the heart and hypochondria is so bad? Heat indeed putrifies, but putrefaction of itself does not cause heat in fevers.

But from what has been said concerning febrile heat, we may be able to understand many particulars in diseases, of which several are enumerated in the present aphorism.

Why the hottest fever is acute and of short continuance, &c.] A fever which runs through its course swiftly and with danger is termed acute. (See §. 564.) But in every fever where there is a great heat there is great danger, because by the increased heat the most fluid parts of the humours are dissipated, and the blood with its serum is inclined to a concretion hardly resolvable; and at the

same time there is great reason to fear, lest the violent attrition of the fluids against the vessels, which always attends an increased heat, should destroy the most tender canals, whence sudden death usually ensues: and therefore since the hottest fever is of necessity attended with danger and celerity, it is always deservedly termed acute. But since it was demonstrated in the comment to §. 689, that an increased heat sets at liberty the salts and oils of our humours, attenuates them, renders them more acrid, dissipates, and puts them in motion; the reason is therefore evident why the hottest fever is also putrid: namely, when the forementioned salts and oils of the blood are thus changed, then our humours begin to incline to putrefaction. Hence also in the hottest fevers we observe a stinking breath, a discharge of corrupt bile, often changed into a most ill-smelling liquid in a flux of the bowels, and evacuation of foetid, scalding, or acrid urine causing the strangury, stinking sweats, &c. But where there is the greatest heat, in consequence of which all those bad symptoms suddenly follow, the patient cannot long survive: and in that case the fever is termed pestiferous, because it kills the patient in the very first attack of the disease. Hence it is evident, with how much care we ought immediately to have recourse to the most efficacious remedies, when the febrile heat is very great; because frequently, in a few hours time, the tenderest vessels are so far destroyed, that the very best medicines will be used to no purpose; or else the humours are so coagulated by the heat, that they cannot pass through the narrow extremities of the arteries.

Why the heat of the bed, confined air, &c.]
 The human body is always hotter than the ambient air in which we live, and therefore the heat
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of our body is diminished, when the air has free access to it. If now a patient burning with too great heat is confined to his bed, and so covered with bed-cloaths, as to exclude the air on all sides, in that case the whole body will be retained in a hot atmosphere of vapours, exhaling from the patient's own skin, and consequently the heat will be increased, because the cool air is prevented from taking off the heat. Moreover, in the hottest diseases that which exhales from the patient's body is often so malignant, that it disorders the by-standers: what then must it do to the patient, who continues day and night immersed, as it were, in these putrid exhalations confined to his bed, and smothered up with cloaths; and frequently great care is also taken to prevent any new or fresh air from entering into the apartment where the patient lies? But the incomparable philosopher Dr *Stephen Hales* ^b has demonstrated, that the air is consumed, and its elasticity lessened, when it has been inspired by animals; and therefore it is evident how badly the welfare of the patient is consulted, when he is deprived of this necessary renovation of the air, and the agreeable coolness which it naturally communicates to the body. This perverse method was more especially encouraged, because there were Physicians formerly of opinion, that the febrile matter might be the most safely evacuated from the body by sweats; for which reason they always insisted upon having the whole surface of the body covered up in the warm bed. But as Sydenham has very well demonstrated, in the end of the disease, the subdued and concocted morbid matter is sometimes thus expelled; but in the beginning of diseases the industrious raising of sweats by art, carries off the most fluid

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parts

^b Vegetable Staticks, pag. 232. & seq.

parts of the blood, and always renders the disorder more malignant. For this reason the great Sydenham^c generously opposed himself to the torrent of so bad a practice, and at that time also without the assistance of any other; and he assures us, that he was not able to moderate the too great violence of the fever by bleeding, and the other assistances of art, if the patient was confined to his bed, and thus loaded with cloaths. He therefore ordered that the patient should sit up in a chair for a few hours every day, or if the weakness was so great as to prevent this, to lie at least slightly covered upon the bed. This heating method is also wisely condemned by the Ancients. For thus Celsus^d, speaking of the cure of an ardent fever, says: *Etiam amplo conclavi tenendus, quo multum & purum aërem trahere possit; neque multis vestimentis strangulandus, sed admodum levibus tantum velandus est.* “ That the patient ought to be kept in a large
 “ chamber, where he may breathe much pure air;
 “ nor should he be smothered with many bed-
 “ cloaths, but only be covered over with such as
 “ are very light.” At the same time it is also very evident, how pernicious it must be to increase the heat (which is already too great) by a full diet, especially of flesh-meats, and by stimulating medicines so often recommended under the title of cordials. The antient Physicians gave only the most thin and cooling diet in all acute diseases, with medicines of the like kind. See what has been said upon this subject in the comment to §. 610, and 611. where we treated of increasing and quieting the force of a fever.

Why a burning heat about the heart and hypochondria is so bad?] The very ingenious Dr Martine
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^c In Dissertatione Epistolari, pag. 454. & aliis pluribus locis,

^d Lib. III. cap. 7. pag. 134.

tine^e has demonstrated by the most just reasoning, from measuring the proportion of the diameters of the arteries with respect to the trunks from whence they arise, and by direct experiments^f confirms, *Calorem in variis partibus animalis sani, ab aëre externo non frigentibus, ullove modo mutatis, esse fere æqualem.* “ That the heat in various parts of the
 “ healthy animal body, not being cooled by the
 “ external air, or any other way altered, is nearly
 “ uniform or equal.” Even in the heart itself of a living animal, which the Ancients made the fountain of natural heat, there is no greater heat perceivable than in the other parts^g. The heat of the body is therefore so uniform in health, that every part is cherished almost with the same degree of heat, and therefore Hippocrates^h justly esteems it one of the best signs in diseases when the whole body is equally warm and soft: for then we know that the pervious fluids are freely moved through the open vessels. But in those parts, where there arises a greater resistance to the fluids propelled through the vessels, whether this happens either from a fault of the fluid to be transmitted, or of the transmitting vessels, or from both, the attrition, and consequently the heat, will be increased, as we demonstrated a little before. It is therefore with the greatest reason that Hippocratesⁱ makes the increased heat in any part of the body a sign, that the disease there fixes its seat, when he says: *Et qua parte corporis inest calor, aut frigus, ibi morbus insidet.* “ In that part of the body where there is
 “ heat or cold, therein is the disease seated.” But

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cold

^e Medical Essays, Tom. III. pag. 150.

^f De similibus animalibus & animalium calore, pag. 168.

^g H. Boërh. Instit. Med. §. 169.

^h In Prognost. Charter. Tom. VIII. pag. 622. Et in Coac. N^o. 492. *ibid.* pag. 880.

ⁱ Aphor. 39. Sect. IV. Charter. Tom. IX. pag. 161.

cold in the affected part denotes a diminished attrition, and consequently a deficiency of the vital circulation; but heat on the contrary denotes an increased resistance in some of the vessels, and generally a greater velocity of the fluids through the adjacent pervious vessels; therefore in both these cases the part affected deviates from the laws of health. When therefore there is a burning heat perceived about the heart and hypochondria, we know that from the attrition of the vessels and humours being increased, we are to expect all those disorders in the viscera, there seated, which we before enumerated among the effects of heat (§. 689). But here the lungs are seated, through which the blood ought to pass freely to continue life; and when the humours begin to stagnate impervious in the ultimate extremities of the pulmonary vessels, from the inspissation of them by heat, or if these very tender vessels are broke by the increased impetus of the fluid to be transmitted, there is the greatest danger threatened, as no one can in the least doubt. But in the hypochondria are placed the liver and spleen, such tender viscera, that there is the greatest danger of a rupture in their vessels, when an increased heat about these parts denotes a more violent attrition; and from hence again the worst consequences are to be expected. Thus the reason is evident why the ancient Physicians (who always very diligently are used to consider the hypochondria in diseases, deriving many prognostics from their swelling, pain, heat, pulsation, &c.) always suspected something bad, when they perceived a greater heat about these parts than in the rest of the body. Thus Hippocrates^k *Qui in hypochondrio, refrigerata febre, ardores relinquuntur,*

^k Hippoc. Lib. I. prorrhetic. Charter. Tom. VIII. p. 705.

linquuntur, tum alias, tum in sudoribus, malum. In febribus circa ventrem æstus vehemens, & oris ventriculi dolor, malum. Quod si caput & manus pedesque frigeant, ventre & lateribus calentibus, malum. “ In those who have a burning heat left in
 “ the hypochondrium, after the fever is abated, as
 “ also in sweats and other diseases, it is a bad sign ^l.
 “ A violent burning about the abdomen in fevers,
 “ and a pain about the mouth of the stomach is a
 “ bad sign. But if the head, hands and feet, are
 “ cold, while the abdomen and sides burn with
 “ heat, it is also a bad sign ^m.” For then we know
 that the greatest resistances are seated about the vital viscera, and that the blood is no longer propelled with its due force and quantity to the extreme parts of the body. From hence also we may understand why Physicians foreknow a phrenzy to be instantly at hand from a great heat of the head, as we shall explain more at large hereafter at §. 772.

Heat putrefies: But putrefaction of itself does not produce heat.] The ancient Physicians placed the nature or essence of a fever in heat; and after them many of the moderns have persisted in the like opinion, as we observed in the history of fevers in general. But among those causes from whence heat arises, or is increased in febrile patients, they have reckoned putrefaction ⁿ. This opinion seemed to them reasonable, because when vegetables putrefy, they produce a great heat; and sometimes they even break out into actual flame, as appears from many fatal instances, when hay being gathered-in too damp, has from thence, beginning

^l Aphorism. 65. Sect. IV. Charter. Tom. IX. pag. 176.

^m In Prognostic. Charter. Tom. VIII. pag. 622. & in Coac. N^o. 492. *ibid.* pag. 880.

ⁿ Galen. de Febr. Lib. I. cap. 4. Charter. Tom. VII. pag. 109.

ginning to putrefy, taken fire. Hence many have believed that the intolerable heat of fevers ought to be ascribed to putrefaction as the cause. But I believe it will appear to every one who considers, that putrefaction is rather the effect of heat in our body, and not the cause of it; and even that putrefaction once formed does not excite heat by its own proper force, but only inasmuch as the celerity of the humours through the vessels, and consequently their attrition, are increased; from whence we proved before that heat is generated in the body. That heat putrefies was said before in the comment to §. 84, N^o. 5. as also at §. 100, where we treated of the effects of an increased motion of the blood thro' the vessels, which is always accompanied with greater heat; even putrefaction never happens without a considerable heat^o. And hence in the severest winter's cold many things continue a long time uncorrupted, which would soon putrefy by the summer's heat. But when putrefaction is once finished, the heat which attended during the action ceases. When moist vegetables are laid in a heap to putrefy, a great heat arises, but when they are once converted into a putrid liquid, they then return to the temperature of the ambient air: It is therefore evident, that heat is both present and necessary during putrefaction, but when that is once accomplished, the putrefaction of itself does not excite heat. Putrefaction is therefore unjustly reckoned a proximate cause of increased heat in the body, of which it is rather the effect; and the great heat in fevers is often observed before there are any apparent signs of putrefaction arising. Moreover, if putrefaction occasioned heat, the body after death would grow so much hotter, as it inclines more to putrefaction; as Helmont justly argues

^o H. Boërhaave Chem. Tom. II. pag. 292.

gues against the opinion of the schools, as we observed before in the comment to §. 685. When a violent phlegmon invades any part of the body, a great heat is perceived in that part; but when such a phlegmon degenerates into a gangrene or sphacelus, the very worst putrefaction ensues; yet is the heat absent, though the parts thus corrupted dissolve into the most ill-smelling matter. But when the gangrenous matter absorbed by the contiguous living vessels, increases the velocity of the humours by its stimulus, a greater heat ensues throughout the body, even though the same coldness continues in the parts already dead. Therefore that increased heat then in the patient, does not in the least acknowledge putrefaction for its immediate, but only for its remote cause; by which the motion of the humours being accelerated thro' the vessels, the attrition whereon increases the heat depends as its proximate cause. For if putrefaction formed produced heat of itself, the heat of the sphacelated part would then be greater than that in the rest of the body.

S E C T. DCXCIX.

FROM what has been said likewise the origin, nature, and effects of driness may be plainly perceived: And the cure may be thence pointed out, consisting in drinks, fomentation, baths, clysters, and gargles, made of watery, subacid, and relaxing ingredients, with honey.

Driness is reckoned among the effects of febrile heat, as is evident from what was said before at §. 689. where it was demonstrated that driness both
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in the solid and fluid parts of the body is produced when too great heat attends. Therefore from what has been hitherto said concerning febrile heat, the origin of driness with its nature and effects may be likewise understood. But a driness of our fluids is said to attend when there is a deficiency in the due quantity of their watery vehicle to dilute them; whence the remaining particles of the fluids congregate and unite together into large masses, incapable of passing through the ultimate extremities of the artery: but in the solid parts of the body the same disorder is said to attend, when they become withered, rigid, and contracted. And therefore a driness in the solid and fluid parts always supposes a deficiency of the aqueous fluid, which ought naturally to be present. But that a driness attends, the Physician knows if those parts of the body appear rough and dry, which naturally are always moist; which may be therefore more especially distinguished in the external surface of the body: and thence it is reasonably concluded that the like disorder takes place in the internal parts. Our skin is always moistened and relaxed by a very thin vapour expressed from the exhaling arteries; and when this moisture is deficient the skin becomes dry and rough, or hard and scaly, as we so often observe as a fatal sign in an ardent fever. The internal parts of the nostrils, tongue, gums, palate, fauces, and whole internal mouth appear all over moist in healthy people; and the eyes are continually watered with a very thin lymph, which, when absent, makes them appear dry and dusty. If therefore the natural moisture is absent in these parts, which a prudent Physician ought always to inspect in the cure of diseases, we know that driness attends; and that therefore all those disorders are to be feared, which proceed from an obstruction

tion of the course of the humours through the smallest vessels. Upon another occasion we mentioned the signs by which one may be able to discover too great a dissipation of the fluids, that is to say, driness from too intense febrile motion (§. 609, N^o. 2) where those signs are enumerated.

But since driness supposes a scarcity of our diluent humours, and that therefore they are in danger of concretion and imperviousness, with a drying up of the smallest vessels, for want of being moistened with their usual fluids, it is evident enough what remedies are required for the cure of driness. For here we endeavour by all means possible to restore that moisture to the humours which they have been deprived of, namely, their diluent vehicle, which we know for the most part to be watery: whence the drinking of water, with fomentations, baths, clysters, and gargles of the like, are taken into the body, or applied to those parts in which driness is perceived; and by the same means the small vessels are relaxed, which being contracted by driness deny any passage to the fluids to be transmitted. To the watery liquors are also added soft farinaceous substances, that the dry rigid parts may be sooner mollified; and that water united with such a soft glutinous substance, may, as it were, longer adhere to the parts, and not so soon escape from the body. But as driness is always accompanied with a greater tenacity of the blood, therefore preparations with honey, the juices of summer fruit, syrups and jellies made of these are added; that by these joined with water, the particles of the fluids may be more happily dissolved, and by that means the free motion of the humours may be restored through the pervious vessels: for this being effected, driness will be absent, and the former moisture will return to all the parts

of

of the body. But as driness usually follows a greater heat, and heat disposes to putrefaction, therefore acids are likewise added, and more especially those which dissolve and attenuate the blood, such as the acid juices of vegetables, crude or fermented, tart wine, vinegar, &c. By these means the driness may be very easily allayed, and at the same time these disorders will be corrected, which usually accompany or follow driness.

Of Delirium in Fevers.

S E C T, DCC.

A Delirium is the production of ideas not answerable to external causes, from an internal disposition of the brain, attended with a wrong judgment following from those ideas, and an affection of the mind and motion of the body accordingly: and from these increased through various degrees either alone or joined together, various kinds of deliria are produced.

Etymologists derive the term delirium from *de* and *lira*, *i. e.* a departing from the right way; for *lira* denotes a strait ditch, carried through fields to receive the moisture of the earth; therefore a person is said to be delirious, when he thinks and acts not in the right road or channel. Others rather chuse to derive the word ἀπὸ τῆς ληρηεῖν, which is from λῆρος, trifles or absurdities.

When a fierce and continual delirium attends with an acute fever, from the brain itself originally affected, it is called a phrenzy (see §. 771): but in this place we only treat of a delirium as a symptom in fevers, which is neither constant or perpetual, nor always derived from the brain itself originally affected. Thus, for example, many people are delirious in the height of a violent fit of an intermitting fever, but when the paroxysm is off the delirium is again absent: and such a disorder is justly distinguished by Physicians from a phrenzy, by simply calling it a delirium. The ancient Greeks

Greeks call this symptom *παρακοπήν, παραφροσύνην, &c.*

But to rightly understand what is properly meant by a delirium, we ought to consider the following particulars.

An idea is some thought or image of a thing perceived in the mind either at one time or at another. But so far as the ideas arise in us from external causes without ourselves, they seem to depend on a change of the surface of the nerve excited by the contact of some moving object ^p, but in such a manner that the change may be propagated through a free nerve to some part in the medulla of the brain. But this ultimate change made in the medulla of the brain seems to be so simple, that it can hardly be searched out, much less can it be explained. But in the mean time from this change, whatever it may be, there arises a change in the thoughts of the perceiving intellect, which represents nothing either in the action of the object, or passion of the organ; but yet the same action of the same object upon the same organ always is followed with the same idea. But for the connection of the idea with that change of the brain, it is no ways conceivable, nor has it been explained by any one: yet it appears from the most certain experiments, that the same changes are connected with the same alteration of the thoughts. Thus if I see a circle a thousand times, I shall so often have the idea of the circle. If therefore the nerves, spirits, or medulla of the brain within the body are affected in the same manner from any cause conceived within the body, as they usually are from external causes, changing the ultimate surface of the nervous sensitive organs, the like ideas will be excited. But this perception of an idea arising from a physical change in the internal inner-

^p Herm. Boërh. Instit. §. 566, 568, &c.

innermost sentient organ, or common sensory from an internal cause is called imagination.

But that there are such changes in the common sensory, as arise without any external causes acting upon the organs of the senses, we know from the ideas raised in us when we see, hear, and reason about various things in dreams, and are moved with passions of the mind, &c. so that nothing can affect a person who is awake, but the same may at one time or other offer itself in the sleep. Moreover, we find in ourselves a power of retaining that condition in the common sensory by the will, which arises from a distinct and vivid action of an object: and it is called attention, by which an idea is perceived a long time present in the mind, distinct, clear, and vivid. We have also the power of renewing ideas which have been before perceived by the actions of objects on the organs of sense, even without a renewal of the action of the objects upon the senses, as we are taught by the memory. We are also able to excite such ideas as we never before perceived by the senses, as when, for example, we invent something chimerical in our imagination. From all which it is evident, ideas may be raised from an internal change of the common sensory, without any assistance from external causes:

A person is therefore said to be delirious, when the origins of his ideas do not correspond to external causes, but proceed from a change in the internal condition of the brain, raised without the influence of the will. For we sometimes observe when patients begin to be delirious, that they see frightful appearances, which they so much detest that they endeavour to efface the ideas with all the force of their will, but yet are not able. But there are various degrees of deliria observable; for some-

times this change, arising from an internal cause in the common sensory, is so slight as to be less than those actions which are usually impressed by the force of things perceived by the senses; and in this case the ideas produced are easily effaced, and give way to those which arise by the perception of the senses: this is in a manner esteemed the first degree of delirium, when the patient begins to think he perceives objects by the senses, though at the same time by the admonition of those who were present, they readily find they were deceived. But when this internal cause acting upon the common sensory is so violent as to equal, or even exceed those changes which arise from the organs of sensation, no reason can then persuade the patient that such causes are not existing without himself; from whence these ideas were excited, and this more especially, if formerly the like ideas were excited from external objects: for then they most firmly believe such causes are renewed without themselves, and are very angry at their friends who are bold enough to deny such things as so evidently appear to them. This has been very well distinguished by Celsus *, where, in treating of a phrenzy, he says, *Phrenitis verum demum est, cum continua dementia esse incipit, aut cum æger, quamvis adhuc sapiat, tamen quasdam vanas imagines accipit: perfecta est, ubi mens illis imaginibus addita est.* “ But it is at length a
 “ phrenzy, when there is a continual absence of
 “ right reason or perception in the mind, or when
 “ the patient, though able to perceive any thing,
 “ yet forms to himself nothing but vain or false
 “ ideas: but a perfect phrenzy is when the mind
 “ attends to, or believes those imaginary ideas.”
 For if this change, arising from an internal cause lodged in the common sensory, is so powerful,

* Lib. III. cap. 18. pag. 148, 149.

ful, as to exceed the effects of all other causes acting upon the sensory, then that idea will always remain present in the mind, and cannot be corrected by any manner of reasoning. Yet in these unhappy patients, the consciousness of the mind and basis of the ideas remain equally firm as in those who are well: but if any thing happens unexpectedly and of a sudden to them, they talk reasonably for a moment, but soon after these vivid impressions being effaced, they relapse again into the same depravity of imagination.

But judgment follows from the ideas perceived. For there is in us a faculty of thinking of several ideas at one time, which ideas seem to be the same, or different from each other, and by simple intuition the thinking part in us sees whether such ideas agree, or are different from each other, and by that means judgment is formed. For all that in us which is called judgment, proceeds from the contemplation of the ideas in the cogitative part. Therefore in a delirious person, an idea is raised from a change in the common sensory by an internal cause, and that idea being compared with its like formerly produced by external causes, acting upon the outward organs of sense, and represented by the memory, there follows a judgment affirming that the like ideas proceed from the like causes; and therefore a delirious person firmly persuades himself that such causes are existing without, as formerly acting upon the organs of sensation excited the like ideas in the mind; namely, if the impression from the internal cause is equally vivid in altering the common sensory, with that which before arose by the organs of sensation affected by external objects.

But, as we observed before upon another occasion (see the comment to §. 104.), certain ideas are accompanied with something pleasing or displeas-

ing, which by inevitable necessity draws the whole mind to cause that which is agreeable to continue, and to remove or destroy that which is displeasing. Each of these commotions of the mind arising from the pleasure or displeasure attending the ideas, are called affections or passions of the mind. But these affections of the mind are followed with certain motions of the body, by which the person endeavours to remove or destroy that which is displeasing, and to retain that which is agreeable; and hence when delirious people have such ideas raised, as are able to excite violent passions of the mind, they jump out of bed, and injure those who are present, exerting the greatest exercises of body often with incredible force, and even for a long time together, in order to avoid what they believe injurious to them, or to get possession of that which they desire. These are the deceptions of the mind, which Hippocrates^q calls ravings, (Ἐπιώδεις) when neither reason, nor threatnings, nor dangers, deter the unhappy patient from doing mischief often to himself and others.

But since the ideas perceived are sometimes adiphorous or indifferent, having nothing in them either pleasing or displeasing: therefore the common sensory may be so affected in diseases, that the patient becomes delirious even without any violent passions of the mind, or motions of the body attending the delirium. Of this kind seems to be those deliria, concerning which Hippocrates^r says, *Tremulæ, obscuræ, desipientiæ, & ubi ægri continuo quasi atrestando aliquid palpant.* “They are obscure, trembling deceptions, wherein the patient is continually handling and feeling for something, being very phrenitic.” For Galen in his commentary

^q Prædiction. Lib. I. text. 24. Charter. Tom. VIII. pag. 715, & alibi sæpius.

^r Ibid. text. 33. pag. 721.

mentary to this place observes that this is the sense of the word $\Psiαλλαφώδες$, and that many people, and sometimes even Physicians err, when they do not believe patients are phrenitic unless they jump out of bed or roar out; and therefore these are justly called obscure deceptions, when at the same time they are often of the very worst consequence, and therefore the knowledge of them is highly necessary. For since every delirium supposes the medullary part of the brain to be disordered, as we shall declare in the aphorism next following, therefore in such a case there may be great danger, though there does not appear to be any great tumult.

But if from such a change of the common sensory, produced by an internal morbid indisposition, such ideas arise as never had their like before existing in the mind, in that case the mind is wholly surpris'd and disturbed. Thus epileptic patients testify, that in the fit they have an idea of colours, smells, tastes, &c. which they cannot compare to any as yet known. Thus in sleep we have sometimes ideas of such things, concerning which we never before thought; whence it seems very probable that the like may sometimes happen in diseases. Perhaps this may be what Hippocrates points at in his Coan Prognostics^s, where he says, *In febribus mentis emotiones taciturnæ, in eo qui voce privatus non est* ($\mu\grave{\eta} \acute{\alpha}\phi\acute{\omicron}\nu\omega$) *perniciosæ*. “That
“ silent commotions of the mind in fevers, in one
“ who is not deprived of the voice, are of bad
“ consequence.” For when such unusual ideas are raised, the patient is in a manner astonish'd, and, as in great fear, they can hardly speak. I remember to have sometimes seen such a delirium

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^s Prædiction. Lib. I. &c. text. 33. pag. 721. N^o. 68. Charter. Tom. VIII. pag. 856.

in acute diseases, where the patient has lain silent, and in a manner astonished; while in the mean time their countenance has expressed the greatest fear and admiration; and in many, not long after, dreadful convulsions have followed. If now something greatly pleasing or displeasing attends this unusual idea, it is sufficiently evident what disturbances are to be expected.

There are therefore apparently different kinds of deliria, according as the ideas arise simply, or from a change only in the disposition of the brain by internal causes, differing again according to the greater or less violence of the impression which such ideas make. When judgment follows from the ideas thus perceived, it again makes another kind of delirium; and if the ideas are accompanied with pleasure or displeasure, they usually raise passions of the mind, more or less impetuous, which are again usually followed with motions of the body; whence again there is evidently another difference in deliria.

But since the passions of the mind have so great an influence (see the comment to §. 104.), it is evident how wonderfully they may change the body, and that very different consequences may ensue from a delirium, according as one kind or other of the passions of the mind are excited. For anger produces a very different change in the body from that of fear, and joy from that of sorrow, &c. Hence Hippocrates^t justly pronounces, *Quæ deliria cum risu fiunt, tutiora; quæ cum studio, periculosiora.* “That those who are delirious with a
 “laughter are safer, but those who are studious in
 “their delirium are more in danger.” If now delirious people suspect others have an ill design upon them, and refuse all kinds of meat and drink, as we sometimes observe, or if they avoid sleep, through some vain fear of an imaginary enemy at
 hand,

^t Aphor. 53. Sect. VI. Charter, Tom. IX. pag. 285.

hand, it is evident enough what dangerous consequences are to be expected in a body already exhausted; and this again Hippocrates observes in his Coan Prognosticks *“ Deliria circa necessaria, pessima. “ That a delirium with respect to necessary, is the very worst.”* Having thus explained the nature of a delirium, and enumerated the principal varieties, from whence the rest may be easily understood, it remains for us to examine into the causes, from whence it appears by faithful observations that a delirium may be produced.

S E C T. DCCI.

A DELIRIUM therefore always supposes a morbid affection of the medullary part of the brain, arising from any kind of obstruction, impeding the influx, transflux, and efflux of the humours through the brain, from a greater velocity, stagnation, and a great many other causes, whence it may arise, and to discover which diligent enquiry ought to be made in order to a cure.

Since therefore the internal disposition of the brain is changed in a delirium, so that from thence arise ideas like those which proceed from the actions of external causes upon the organs of sense in healthy people; and as from those ideas passions of the mind are raised, and these again are often followed with violent motions of the body; it is evident that this morbid indisposition must affect that part of the body, upon which the perception of those changes depends, which are excited from external objects by the nerves in all parts of the body,

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dy, and from which part motions are excited by the nerves distributed to the muscles. But it appears directly from experiments, that a free communication is required by the nerves, betwixt the encephalon from whence the nerves derive their origin, and the organs for exciting the perception of the senses, and exercising the motion of the muscles: for if this communication is intercepted by ligature, or any other way, the sense and motion of the part is destroyed, to which the tied nerve is conveyed. Thus also when the brain is compressed by humours extravasated within the skull, all the senses and voluntary motions are effaced, as we said before in the history of wounds of the head. There is therefore a certain part in the brain from whence all the nerves, destined to the performance of the senses and voluntary motions, derive their origin; and to which part the changes produced in the nerves are conveyed, and there excite ideas, passions of the mind, motions of the body, &c. but this part of the brain, wherever it is, has been usually called by Physicians the common sensory, from whence proceeds a change of the thoughts from a change of the body, and a change in the body from a change in the thoughts. But, as all the nerves, so far as we have been able to discover by anatomy, are perfectly distinct both in their course and origin, and are never united with each other, like the blood-vessels, but remain separate, it is evident the common sensory is a collection of all those parts in the brain, from whence the medullary fibres, constituting the substance of the nerve properly so called, derive their origin from that part of the brain, which is termed the cortical substance. It is therefore evident, that a delirium always supposes a morbid affection of the medulla of the brain, because in that medulla is the part upon which our ideas depend.

But

But as it seems evident from physiology^w that the whole medullary substance of the brain arises from the vascular compages of the cortical substance, whose vascular fabric is demonstrated by anatomical injections, and as the medulla seems to consist of small vessels continuous with the cortex, and transmitting the thinnest fluid of the whole body, it is evident that in this part all those disorders may take place, which are observed in the larger vessels containing the gross fluids. For here obstruction may take place, while, for example, these very tender vessels are straitened by some external compressing cause. For whatever impedes the influx, transflux, and efflux of the humours through the brain, may produce a delirium, because it disturbs the secretion and motion of the nervous spirits, through the nerves and medulla of the brain itself. Moreover, we see that in the other viscera, it is necessary for the humours to flow through the vessels constituting their substance with a certain determinate velocity, and that the functions of those viscera are disturbed either from their too rapid, or too slow motion, and therefore the same will be also true in the brain. Perhaps many are delirious in the greatest severity of the fit of intermitting fevers, only from a greater velocity; and therefore the delirium ceases in these, when the velocity is diminished by the declining of the paroxysm; all the causes therefore of obstruction and inflammation, together with their consequences, may here take place; and every thing capable of accelerating or retarding the circulation too much may likewise produce a delirium, inasmuch as they impede or disturb the motion of the humours through the brain; and therefore it is evident,

^w H. Boërhaave Institut. Medic. §. 284.

dent, that this disorder may arise from many causes.

But all the causes hitherto mentioned, whereon the morbid disposition of the medulla of the brain arises, producing the delirium, are seated in the brain itself. But in the mean time the common sensory may be so affected by other parts of the body injured, as if the physical cause pre-existed in the brain itself, when at the same time the origin of the disorder lies in parts very remote. This is a thing of the greatest moment in the practice of physic, as is easily apparent, and therefore it deserves a serious consideration.

The ancient Physicians have remarked the signs of a future delirium, from the changes observed in other parts of the body. Thus Hippocrates * says, *Quod si in hypochondrio pulsus quoque insit, perturbationem significat vel delirium. Juxta ventrem in febre palpitationes mentis emotiones faciunt.* “ That if a pulsation attends in the hypochondrium, it signifies either a delirium or a disturbance. That palpitations about the belly in a fever cause disturbances of the mind †.” Even Galen ‡ openly pronounces, *Quod fiant epilepsie, cari, comata, catalepses, deliria, melancholie quibusdam ob stomachum imbecillum, consentiente principio, quod in cerebro & nervis est.* “ That epilepsies, cari, comata, catalepsies, deliria, and some kinds of melancholy, arise from a weak stomach, by its consent with the principal part contained in the brain and nerves.” And in another place †, speaking of the mouth of the stomach, he has the following passage: *At quedam (partes)*

* In Prognost. textu 28. Charter. Tom. VIII. pag. 611.

† Coac. Prænot. N°. 299. Charter. Tom. VIII. pag. 869.

‡ De Symptom. causis. Lib. I. cap. 7. Charter. Tom. VII. pag. 60. † Commentar. 2. in Hippocrat. de victu in morbis acutis, Charter. Tom. XI. pag. 71.

(partes) quamvis propius appositæ non sint, ob generis tamen communitatem, vel quandam affectionis proprietatem, partes facultatum, principia continententes ledunt. Os igitur ventriculi, quum vitalem facultatem ad sympathiam ducat, syncopas infert; quum vero animalem proprie appellatam, deliria vel convulsiones.

“ But some parts, though
 “ they are not seated near, yet injure the principal containing parts of the faculties, either from
 “ their consent, or from some peculiar affection.
 “ Therefore the mouth of the stomach drawing
 “ the vital faculty by sympathy, occasions faintings; but when it injures the animal faculty properly so called, deliria or convulsions ensue.”

But altho' it appears, from the history of wounds, that the common sensory may be disturbed from injuries in various other parts, and some of them very remote, which also appeared from what was said under the titles of pain and convulsions; (and as will hereafter be proved when we come to treat of melancholy, raving madness, epilepsy, &c.) yet a delirium, considered as a febrile symptom, is very frequently observed to attend, when the cause of the disorder is seated about the præcordia, which cause being removed, the delirium is also removed, though no remedies at all be applied to the head.

But the term præcordia has been used in various senses. Thus Pliny^b calls by this title the bowels or viscera: But in another place^c he says, *Extra homini ab inferiore viscerum parte separantur, membranis, quæ præcordia appellant, quia cordia prætenduntur, quod Græci appellaverunt phrenas.* “ That
 “ the viscera of the thorax in a man are separated
 “ from the lower viscera by membranes, which they
 “ call the præcordia, because they are extended under
 “ der the heart, and which membranes the Greeks
 “ have

^b Lib. XXX. cap. 5. pag. 736.

^c Lib. XI. cap. 37. pag. 285.

“ have called phrenæ.” And it is evident, from what follows this passage, that Pliny ascribes the name of præcordia to the diaphragm. But in many other places he speaks of the softness and hardness of the præcordia as obvious to the touch, and therefore he ascribes this name to other parts. Also in Celsus^d there is frequent mention made of the præcordia being hard, soft, swelled, &c. whence it is sufficiently evident, that the term præcordia is used to signify the same in him with hypochondria, used by Hippocrates and the other ancient Greek Physicians. But this name seems intended not only to include those parts seated under the cartilages of the ribs, but likewise the whole contained also in the epigastrium. Therefore at present it has been customary, to understand by the name præcordia all those parts lodged in that space, which may be conceived betwixt the diaphragm and a perpendicular plane erected about the end of the diaphragm upon the loins, dividing the abdomen into two; and therefore the term præcordia includes the cardia, hypochondria, and epigastrium.

A faithful observation in diseases has taught us, that foul humours lodged about the præcordia, (whether from an indegestible matter taken in and corrupted, or from a morbid contagion, or from humours spontaneously separated and not discharged, but stagnating and corrupting here) may disturb all the actions of the brain, and produce deliria, ravings, and other symptoms of the worst consequence. There are even some marks of this to be found in Hippocrates^e, for he says a phrenzy may arise *A bile, quando commota ad viscera & septum transversum resederit.* “ From bile, when, “ being disturbed, it is lodged about the viscera “ and

^d Lib. III. cap. 20. pag. 159, 160, & pluribus aliis locis.

^e De affectionib. cap. 3. Charter. Tom. VII. pag. 622.

“ and diaphragm.” How great a power medicines and poisons sometimes have upon the brain, though they lie only in the stomach, from whence being discharged, all the disorders are immediately relieved, was said before upon another occasion in the comment to §. 229, N^o. 2. Helmont observing this to happen in many diseases, namely, that the material cause of the disease was seated very distant from that part in which the effects of the morbid cause were observed; he therefore called this power, by which one part being affected, disturbed another, the action of rule or government; a new kind of phrase, but not very improper ^f. But this seems to have been the opinion of Helmont, that there is a sort of power inherent in every part of the body, by which they can act upon other distant parts without any corporeal contact; but so that there is not the like rule in each part, but only in some ^g. *Hæc est enim actio regiminis, sive dependentiæ, quaquaversum radians, penetransque, absque colligationis lenocinio: attamen nonnisi ad objectum proprium.* “ For this, says he, is the action “ of regimen, or of the dependance spreading it- “ self every way in rays penetrating without being “ confined or determined, unless to the proper ob- “ ject.” And therefore soon after ^h he says; *Regimen est, quia una pars paret alteri;* “ Regimen is “ that whereby one part governs another.” But experiments only demonstrate this action of regimen, or rule of one part upon another, though the manner in which that action is brought about is not well understood. Thus the beard begins to grow in man at the age of puberty, when the prolific semen begins to be formed, and the beard is absent

^f J. B. Helm. in Capitulo: *Ignota actio regiminis*, p. 268, &c.

^g Ibid. pag. 269. N^o. 38.

^h Ibid. pag. 270. N^o. 40.

absent in those who have been castrated, and in such there is often a wonderful change in the whole body and the inclinations of the mind: But by these effects following after a removal of the testicles in those who are castrated, Helmont endeavours to demonstrate the action of regimen, which the testicles have upon the other parts. Hitherto he refers the various affections of the uterus in the female sex, which sometimes disorder the gula, sometimes the lungs, stomach, &c. with great anguish, and often surprizing symptoms; and he explodes the opinion of the schools, who derived all these disorders from malignant vapours ascending to these parts from the uterus. Moreover, he believed this action of regimen might be considered ¹, *Vim, quæ lucis instar totum corpus, vel objecta saltem sua, afficit & disponit, juxta donum & fines sibi à Creatore seminaliter implantatos.* “As a force which
 “ like light diffused itself thro’ the body, or
 “ like that at least ruled and disposed the body, or
 “ its proper organs, according to the uses or ends
 “ assigned them by the Creator.” For unless this force, which he calls the action of regimen, was limited to certain parts by the Creator, why should the beard rather grow out of the chin than the forehead or any other, since the influence of the testicles is diffused throughout the whole? It is sufficient for the Physician to know by experience those wonderful powers which some parts of the body have over others, although perhaps those, who do not indulge themselves in subtle disputes, will ingenuously confess, that they do not plainly understand the manner in which this was brought about. Helmont indeed would have this action upon distant parts to be performed without any intervention of the body, but this would be very difficult to
 prove.

¹ Ibid. pag. 272. N^o. 47.

prove. For all the parts of the body are so united together, that Hippocrates^k says, *Principium corporis mihi quidem nullum videtur, sed partes omnes peræque principium, omnesque finis. Descripto namque circulo, principium non invenitur. Eademque ratio morborum in toto corpore.* “ There seems in
 “ my opinion to be no beginning to the body,
 “ but every part is equally the beginning, and
 “ equally the end; as when a circle is described
 “ no beginning can be found. And the same
 “ reasoning takes place with respect to diseases
 “ throughout the whole body.” And a little
 after he subjoins the following words, which ought
 more especially to be remarked, *Singule vero corporis partes, altera alteri, quum huc vel illuc impetum fecerit (ὀρμήσιν), statim morbum facit. Venter capiti, & caput carnibus ac ventri; & reliquæ omnes eadem ratione, quemadmodum venter capiti, & caput carnibus ac ventri.* “ But every part
 “ of the body labours the one for the other, and
 “ when once the impetus has settled upon this or
 “ the other part, it immediately produces a dis-
 “ ease. Thus it is betwixt the belly and the head,
 “ and betwixt the head, muscles, and abdomen;
 “ and all the rest, in the same manner as the belly,
 “ are affected from the head, and the head from
 “ the belly and viscera.” This whole chapter of
 Hippocrates deserves to be read, wherein are
 contained many other passages belonging to the
 same subject; whence I believe it will appear,
 that Helmont had not this opinion as a new one,
 tho’ he delivered it in other words, and endeavoured
 to explain it by various and extraordinary instances.
 Nor is it wonderful that this uncommon sort of
 writer should have extracted many things from
 the

^k De locis in homine cap. 1. Charter. Tom. VII. pag. 357.

the ancient Physicians, since he confesses¹ that he had twice read the works of Galen, and once those of Hippocrates, whose aphorisms he had almost got by heart; that he had read Avicenna through, with above six hundred more of the Greek, Arabian, and modern writers, not only reading them with care and attention, but writing down in a common-place-book whatever he thought singular, and worthy of his notice. He says indeed, that it gave him some uneasiness to reflect upon the work he had undertaken, and the number of years it employed, when reading over his collections he found them of such little worth. But it seems very probable, that he had not entirely lost the memory of what he had read, though he afterwards indulged himself only in meditations upon what he had exhausted from the Ancients, laying down the most valuable part of others in different words, as new and unheard-of, though perhaps he might have forgot that he originally extracted those ideas from the ancient Physicians, to whom he does not seem to do justice throughout his writings.

But since the nerves are dispersed throughout the whole, and every part of the body, all arising from the same origin, namely, the encephalon, and all entertaining the same free commerce with their origin: and as the spirits, or *impetum faciens* of Hippocrates, is by the efficacy of the will determined to certain parts of the body, very remote from the encephalon through the nerves, without any sensible interval of time betwixt the will and consequent motions; and, on the other hand, the nerves being changed by external objects, the thoughts are immediately altered; it therefore seems

¹ J. B. Helmont. in Capitulo: *studia authoris*, pag. 16. No. 15.

seems very probable that this action of regimen, whereby one part of the body influences another, proceeds from the nerves. This opinion seems to be farther confirmed, because this influence upon other parts, and even upon the common sensory itself, is observed to be greatest where the nerves are most numerous, and more especially where the large trunks of the nerves are placed; which, by branching out into very small twigs, are distributed into many other parts. Hence such an influence has been in all ages observed in, and ascribed to, the upper orifice of the stomach, by the sides of which pass the trunks of the eighth pair, which give numerous branches to the stomach. It is therefore no wonder that foul humours collected here, or bile rendered spontaneously more acrid, or corrupted, and put in motion by the fever lying in the stomach, should disturb the whole common sensory, or that these foul humours being evacuated, all the disturbances should immediately cease. But in the mean time we find nothing in such cases except only a simple contact of the nerves in the fabric of the stomach, irritated by these foul humours, nor do we understand the manner in which those changes are made in the common sensory from such a cause. Yet it is sufficient for a Physician to know that deliria, convulsions, &c. may arise from such things lodged in this part, though he continues perfectly ignorant of the manner in which it is brought about; because if he knows this, he will easily find his curative indication, which directs the immediate removal of these humours. *Optimum enim est, ad curationem ægrotantium partium accedere per eas, quæ morbos faciunt; sic enim quàm optimè quis ægrotantis partis principio medebitur.* “ For it is the
 “ best to endeavour the cure of diseased parts, by
 “ applying remedies immediately to those which
 VOL. VI. T cause

“ cause the disease; for by this means one may
 “ best relieve the part which is principally disor-
 “ dered ^m.”

Being admonished by the incomparable Boërhaave, that the cause of delirium in fevers was frequently foul humours collected about the præcordia; by attending afterwards to this symptom I often found it true; for immediately after giving a vomit, by discharging the corrupt humours, I recollect many have instantly recovered themselves.

Since therefore a delirium happens in fevers from such very different causes, it is evident enough that these ought first to be carefully discovered, in order to enter upon a proper method of cure. The signs of too great a velocity, stagnation, obstruction, inflammatory, or cold glutinous lentor, whereby the influx, transflux, and efflux of the humours may be hindered through the brain, have been given before in their proper places. But, that foul humours are collected about the præcordia, we know chiefly from the following signs: a foul tongue, a bitter disagreeable taste in the mouth, nausea, vomiting, and oppression or anguish; and this diagnosis is confirmed, if there are no signs teaching that there are other causes from whence a delirium may be expected.

^m Hippocr. de locis in homine cap. 1. Charter. Tom. VII. pag. 358.

S E C T. DCCII.

FOR a various method of cure and different remedies are to be chose agreeable to the difference of the causes (§. 701); but the chief of these remedies are warm bathing or washing of the feet, with the application of blisters to them, and to the hams; frictions upon the same parts, diluent clysters often applied, thin diet, and healing, quieting, deobstruent, and diluent drinks; emollient remedies applied to the head, vomits sometimes, and purges, gentle anodynes, bleeding in the foot, a bringing down of the piles or menstrual discharge, &c.

But as this internal disposition of the brain, upon which the delirium depends, is observed to take place in different degrees (see §. 700) so as to raise only simple ideas easy to efface, since there is a less change in the common sensory, arising from the internal cause, then are those impressions, which arise from the actions of external objects upon the organs of sensations; or such ideas raised in those who are delirious, have so violent a change in the common sensory for their cause, that it equals, or even exceeds, the actions of external objects, and then it affects the judgment with the passions of the mind, which are often followed with the most impetuous motions of the body; and then it is often hardly practicable to efface the present condition of the common sensory, even though the cause be removed, which first gave rise to the disorder. And

since, from the violent passions of the mind and motions of the body thence following, the very worst consequences are to be feared in diseases, it is evident that all possible care ought to be taken to discover and cure the delirium at its first appearance, by attending to those signs which denote a delirium is already beginning, or will speedily follow. Galenⁿ illustrates this by a very good comparison: For as plants of the most common use, when they first rise up out of the earth are only to be known but by skilful gardeners, but when adult are easily known by every one; so also a fierce delirium, in which the patient rises out of his bed raving, roars out and endeavours to injure the bystanders, &c. is concealed from no one; but when that internal disposition of the brain begins to be formed as the cause of a future delirium, the disorder lying as yet concealed in obscurity, can only be known by skilful Physicians. This is the reason why Hippocrates^o so carefully enumerates those signs which indicate the danger of a future delirium: *Curacionem enim optime instituet, qui ex presentibus affectibus futuros praeviderit.* “For
 “ he will be best able to make a cure, who fore-
 “ sees the disorders that are about to happen from
 “ the present symptoms.” But since it is of so much importance to foresee a future delirium, it will be of use to collect together these signs from Hippocrates, who says; *Pronum in ventrem cubare, cui non assuetum est etiam sano sic decumbere, delirium significat, aut dolorem locorum circa ventrem. Dentibus stridere, quibus non consuetum est a pueritia, insaniam & mortem portendit. Magna, & longo tempore facta respiratio delirium significat.*

Si

ⁿ In Commentar. in Lib. I. Prædict. Hippocr. Text. 1. Charter. Tom. VIII. pag. 693. ^o Hippocrat. in prognost. Sentent. 3. Charter. Tom. VIII. pag. 584.

Si in hypochondrio pulsus insit, perturbationem significat, vel delirium; verum oculos eorum intueri oportet. Si enim crebro moveantur, expectanda insania est. Vigilia futurum delirium presagit. Si abscessus critici in morbis prodeuntes dispareant iterum, delirii periculum adesse & interitus, monuit. Auris dolor acutus, cum febre continua & vehementi, gravis. Periculum enim est, hominem delirare & interire. In capitis doloribus aruginosi vomitus cum surditate & pervigilio citam insaniam significant. Linguam asperam & aridam inter Phrenitidis signa recensuit. Linguam tremulam pro signo non constantis mentis habuit. Faciem bene coloratam & torvum aspectum huc pariter retulisse videtur.

“ For one to lie upon his belly, who is not
 “ accustomed to lie so when he is well, denotes a
 “ delirium, or a pain about the parts of the abdo-
 “ men ^p. A gnashing of the teeth in those who
 “ are not accustomed to it from their childhood,
 “ denotes madness and death ^q. A great respira-
 “ tion which is a long time in performing, de-
 “ notes a delirium ^r. If there is a pulsation in the
 “ hypochondrium, it signifies a disturbance or de-
 “ lirium, but then the eyes of such ought to be
 “ examined. For if they are moved about swiftly
 “ madness is to be expected ^s. Watchings presage
 “ a future delirium ^t. If critical abscesses appear-
 “ ing in diseases vanish again, there is danger of
 “ a delirium and death ^u. An acute pain of the
 “ ear with a violent continual fever is bad, for
 “ there is a danger that the person will perish de-
 “ lirious ^w. Vomitings of eruginous bile in pains
 “ of the head, with deafness and severe watchings,

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“ signify

^p Hippocrat. in Prognost. pag. 603.^q Ibid. pag. 604.^r Ibid. pag. 607.^s Ibid. pag. 611.^t Ibid.^u Ibid. pag. 625.^v Ibid. pag. 657.^w Ibid. pag. 670.

“ signify a speedy delirium or phrenzy ^x. A rough
 “ and dry tongue he ranks among the signs of a
 “ phrenzy ^y. A trembling of the tongue he
 “ makes a sign of an inconstant or unsound mind ^z.
 “ The face well coloured and of a fierce aspect he
 “ likewise adds to the former signs ^a.” But among
 the principal signs of a future delirium, he has the
 following: *Præter consuetudinem aliquid facere, vel*
aliquid magno studio curare (προθυμείσθαι) *prius non*
consuetum, aut contrarium: parvum ac delirio proxi-
imum. “ For a person to do any thing unusual,
 “ or to be very careful or intent upon any thing
 “ to which he has not been accustomed, or even
 “ averse, is bad, and denotes the delirium to be
 “ at hand ^b.” For it denotes that the sensorium
 begins to be disturbed, whence the judgment and
 passions of the mind proceed. Hitherto are also
 referred, *Ferox responsum in homine moderato*; “ A
 “ fierce answer from a person of a mild disposi-
 “ tion ^c; and indecent actions in a well behaved
 person, such as the *flatus sonori emissio*, “ blowing
 “ out of his breath with a noise ^d,” unless this ap-
 pear to be done by the patient with design: *Ma-*
nus ante faciem attollere, muscas quasi venari inani
opera, floccos carpere de vestibibus, vel pariete. “ The
 “ lifting up his hand before his face, a catching
 “ as it were at flies, when there are none, pulling
 “ of lint from off the bed-cloaths or curtains ^e.”
 And this last Galen ^f experienced in himself. For
 in his youth lying ill of an ardent fever from over-
 heating

^x Hippocr. Prorrhetic. Lib. I. Charter. Tom. VIII. pag. 706.

^y Ibid. pag. 698.

^z Ibid. pag. 713. & Coacis N^o.

234. ubi instar dubii proponitur hoc signum pag. 865. ^a In

Coacis N^o. 214. ibid. pag. 864. ^b Ibid. N^o. 48. pag. 855.

^c In Prorrhetic. Lib. I. Charter. Tom. VIII. pag. 730.

^d In Prognosticis ibid. pag. 630, 631. ^e Ibid. pag. 606.

^f De locis affectis, Lib. IV. cap. 2. Charter. Tom. VII.

heating himself, he imagined straws of a black colour to stick out from the sides, and fleeces of wool of the like kind from the bed-cloaths, which when he endeavoured to pull off, and found nothing in his fingers, he attempted it again with more diligence. But while he was employed thus, he heard two of his friends standing by say, *Jam & floccos hic evellit & festucas colligit.* "He now pulls off the flocks and gathers straws." But immediately when he understood he did this, he advised his friends to use their endeavours to prevent him from falling into a phrenzy; from which history also fairly appears that first degree of delirium, in which the ideas arising from the internal disposition of the brain are not followed with judgment, nor passions of the mind. For Galen observes, that it thus appeared to his mind, *Ut rationalis facultas non vacillaret*; "that the rational faculty was not wandering," and therefore he advised his friends to be careful of him. There are many more signs of a future delirium to be found interspersed in several parts of the writings of Hippocrates; but the forementioned are the chief and most frequent.

But since the causes of a febrile delirium may be so different, it is evident enough that no universal method of cure can be delivered, but that different remedies are required according to the variety of the causes. For a very different method of cure is required, when an inflammatory thickness occasions the blood to hesitate in the vessels of the encephalon, than if the person was delirious from his body being exhausted by the continual fever. But since a delirium considered as a febrile symptom is generally accompanied with a greater velocity of the circulation, therefore every thing which diminishes the quantity of the humours, or diverts

their impetus towards other parts, and which act by weakening or removing the stimulus, and, by diluting or attenuating the humours, render them duly pervious, or allay their too great impetuosity, are here to be esteemed as the principal remedies. But such are those hereafter enumerated.

Warm bathing or washing of the feet with the application of blisters to them, and to the hams, with frictions upon the same parts] All these derive the impetus and quantity of the blood towards the lower parts of the body, and consequently divert it from the head or encephalon. For the blood propelled from the heart by the aorta ascends partly upward, and partly downward by the descending trunk of the aorta; if therefore the vessels of the lower parts are relaxed, by that means the resistance to the blood will be lessened, which is about to flow into those vessels; whence it is evident a greater quantity of blood must flow towards the lower parts, by which means a true revulsion will be made from the encephalon. But for this purpose a vaporous bath is principally of use, because it more powerfully relaxes and softens, while at the same time there is no danger of compressing the vessels by the weight of the fluid into which the parts are immersed. For it appears from hydrostatics, that fluids press upon bodies immersed into them, and that this pressure increases in proportion to the height of the incumbent fluid. If therefore the feet are immersed to a small height in warm water, while at the same time care is taken to let the vapours of the water come into contact on all sides with the lower parts of the body, this intention will be fairly answered; and at the same time likewise the erect posture of the body will be very serviceable (see the comment to §. 610). But the tumor and redness of the parts exposed to such a bath
suffici.

sufficiently prove that the humours are derived in a greater quantity towards them. But blisters act inasmuch as by their stimulus they irritate the vessels of the part to which they are applied into more frequent and violent contractions, that is to say, they accelerate the motion of the vital humours through the vessels, which by this means emptying themselves oftener in the same time, they will transmit a greater quantity of fluids. But frictions by emptying the veins make way for the blood to pass more easily through the arterics to empty themselves into the depleted veins, and therefore both the quantity and impetus of the vital humours will be derived towards those parts to which the frictions are applied. But it is very evident that epispastics, if made of the more acrid substances, and frictions, ought to be applied with such moderation as only to increase the motion of the humours through the lower parts, without increasing it much through the whole body. (See what has been said concerning all these in the comment to §. 134 and 396, N^o. 4.)

Diluent clysters often applied.] For thus the fæces are washed out, the vessels of the intestines are relaxed and fomented, and consequently the impulse of the humours is diverted from the head, while at the same time a diluent liquor may by these passages be communicated to the blood to advantage. But how much use clysters are of in quieting the too great impetus of a fever, as it is frequently the cause of a delirium, was said before upon another occasion in the comment to §. 610. If therefore a fierce delirium urges, such a clyster ought to be injected every three hours, 'till the disorder abates; but care is to be taken in the decline of the disease, not to weaken the patient's strength too much by the too frequent use of these.

Thin

Thin diet.] Namely, nothing ought to be given that can either increase the resistance or stimulus of the blood: But what sort of diet is convenient in this case has been said more at large in the comment to §. 599. Decoctions of barley, oats, rice, and the like, emulsions prepared from these, and the mealy seeds, saponaceous acidulous substances, as oxymel, the juice of summer fruits, or their syrups and jellies which are kept ready prepared in the shops of confectioners are very useful and sufficient for this purpose. For as Celsus^s very well observes in the cure of a phrenzy; *Moderatio in cibo quoque adhibenda est: nam neque æger est implendus, ne insaniat; neque jejunió utique vexandus est, ne imbecillitate in cardiacum incidat. Opus est autem cibo infirmo, maximeque sorbitionis, & potione aquæ mulsæ, &c.* “Moderation is likewise to be observed in the food, for the patient is neither to be filled to prevent a phrenzy, nor yet is he to be punished with fasting, lest by weakness he should faint. But there is occasion for weak food, more especially supplings, and drinks with honey, &c.”

Soft, quieting, deobstruent, diluent drinks, &c.] These may be prepared of the like ingredients, for the only diluent in this case is water, to which afterwards such things are to be added as are fit to dissolve the obstructing cause. Decoctions of the roots of grass, scorzonera, German vetches, &c. are here of the greatest use. Spirit of vitriol dropped in small beer has been very useful, as Sydenham^h testifies, who gave this as common drink to such patients.

Emollient remedies applied to the head.] For when emollient and relaxing medicines are applied

^s Lib. III. cap. 18. pag. 153.

^h Sect. V. cap. 2. pag. 289.

to foment the external parts of the head, the resistance is diminished in those vessels distributed to these parts, and which arise from the external carotides. Thus the impetus and quantity of the blood is therefore diverted from the encephalon, and in this respect such medicines are useful. For the blood, drove through the carotid arteries, will press with a less force against their internal trunks, as it meets with a less resistance in the external carotides. And hence Hippocratesⁱ says, that to wash the head much with warm medicines is very useful even in a phrenzy.

Vomits sometimes.] For although the face swells in vomiting, the eyes water, and look red with blood, a vertigo, and noise in the ears, with many other symptoms are observed, which plainly denote that in vomiting the blood distends the vessels, and is derived in a greater quantity towards the head, yet sometimes emetics fairly cure the deliria. But these are of use in that case where corrupt bile or other foul humours are lodged about the præcordia producing the delirium (as we said before in the comment to §. 701); for then these humours being evacuated, the disorder ceases. But by what signs this may be distinguished was likewise said in the place last cited. But if the delirium arises from an inflammatory cause, it is very evident that emetics are entirely pernicious; because then in vomiting, as the blood is urged with a greater quantity and force to the head, the distending vessels will be in the greatest danger of bursting; or else the impervious blood will be further propelled into the narrow extremities of the vessels, so as to increase the disease. But when the signs teach that foul humours, lodged about the præcordia,

ⁱ De Affectionibus cap. 3. pag. 622. Charter. Tom. VII. pag. 622.

præcordia, are the cause of the delirium, though at the same time there is some reason to believe that the blood abounds in quantity, or retains an inflammatory thickness, in that case a vomit may be given with much more safety after bleeding has been first premised. Concerning this cause of a delirium Helmont well observes ^k: *Helmontius quod sagittator delirii & amentiarum habitat in præcordiis, &c. Quod autem sagittatoris scopus sit cerebrum, ut deliria & sopores excitet, non debet movere Medicum, ut proinde capiti remedium adhibeat: siquidem id semper est ad posterius, ad tela vibrata, non autem ad sagittatorem remedia adhibuisse.* “That it resides in the præcordia, but exerts its effects in the brain, so as to excite deliria and sleepy disorders; but the Physician ought not therefore to apply remedies to the head, as that is not the seat of the cause, but rather to the præcordia.” But Helmont was mistaken in supposing this to be almost the universal cause of a delirium, when yet it is certain a delirium may arise from other topical causes seated in the head itself.

Purges.] These may be useful two ways; first, inasmuch as they evacuate the offending humours lodged about the præcordia: 2. inasmuch as they lessen the too great impetus of the arterial blood, (see §. 396. N^o. 2.) and derive it from the head towards other parts; (see §. 396. N^o. 4.) and at the same time they diminish the too great quantity of the fluids distending the vessels. But in this case those purges are principally recommended, which dissolve the humours without exciting any great disturbance in the body; such as tamarinds, cream of tartar, leaves of senna, rhubarb, sal polycreft. and the like.

Gentle

^k De Febris, cap. 11. N^o. 13. pag. 771.

Gentle anodynes.] Here more especially are recommended wild red poppy-flowers, with the syrups and distilled waters prepared from them in the shops, for in these there is not so great a stupefying power observed, but they are only gentle anodynes which allay too great an impetus of the humours, and gently quiet the disturbances raised in the spirits. But the stronger narcotics are to be avoided in a febrile delirium as pernicious, by the universal testimony and consent almost of every Physician, unless the disorder has continued a long time. Sydenham¹, in treating of this febrile symptom, observes that blood-letting, clysters, and cooling remedies, support patients who are thus affected so long, that the disease runs out to a considerable length, and then a narcotic given in a large dose has always a very good effect. But, when such a medicine is given in the beginning, increase, or height of the fever, accompanied with this symptom, he has remarked that it was either of no use, or else frequently mischievous; and therefore he never gave it before the twelfth day of the disease. But when a vomit or purge was given in the beginning of such a disease, he then gave a purgative the same evening, in order to quiet the disturbance which they had raised in the body. Otherwise he abstained from anodynes, 'till the disease manifestly declined.

Bleeding in the foot, bringing down of the piles or menstrual discharge.] For by all these means the quantity of the distending blood is diminished, and the too great velocity of the circulation lessened, while the impetus thereof is diverted from the head, by giving the blood a free discharge through the open vessels in parts very remote from the head. Physicians have in all ages observed these salutary
endeavours

¹ Sect. I. cap. 4. pag. 81.

endeavours of nature, by which a profuse hæmorrhage being raised by an opening of the vital arteries, has often freed the patient from the most dangerous diseases. How useful a profuse hæmorrhage from the nose is in acute diseases, when it arises spontaneously, will be made appear more evidently in the history of those diseases. And that a phrenzy itself is sometimes thus terminated, Galen^m informs us. Hence the ancient Physicians have given us so many signs, whereby it might be known whether any such evacuation is to be expected in diseases. But the bringing down of the piles has always been observed to be useful in diseases of the head: and no wonder, since the hæmorrhoidal vessels and carotid arteries convey the blood in opposite directions, whence a very great avulsion might be reasonably expected. That the piles are useful to apoplectic patientsⁿ, and that even madness itself has been this way removed, is remarked by Hippocrates^o. But it is not in the power of the Physician to perform these spontaneous evacuations at pleasure for the cure of diseases; but the whole power of art consists in forwarding and directing nature in the way to which she naturally inclines, and to open and lubricate the passages, by which she endeavours to make these evacuations. If therefore the Physician knows that the patient being delirious was before subject to the piles, or if the pain, redness, and itching about the anus, with a tenesmus or fruitless endeavour to go to stool, teach that something of this nature is to be expected, these parts are to be continually fomented, by a vaporous bath, soft cataplasms applied

^m De Crisibus, Lib. III. cap. 3. Charter. Tom. VIII. pag. 430. ⁿ In Coacis Prænotionibus, N^o. 478. Charter. Tom. VIII. pag. 880. ^o Aphor. 21. Sect. VI. Charter. Tom. IX. pag. 26.

plied to the anus, or clysters prepared with the same ingredients; this being done, if the piles do not yet appear, the parts may be irritated with suppositories, sal gem boiled with honey, and especially with the addition of aloes, which by continual observation we know to be a most effectual remedy to excite the piles. As soon as these varicose swellings begin to appear about the anus, they are to be fomented with the most emollient applications, that they may swell the more; and afterwards it is usual to rub them with the rough leaves of a fig-tree, in order to break them, or else to puncture them with a lancet, that the blood may have a free discharge from them. But the most frequent practice is to apply leaches to the turgid piles, which kind of insect making a wound, usually sucks the blood 'till it is full, and then drops off, after which the piles continue to bleed, more especially if at the same time the patient sits in a chair with a hole at the bottom, so that the parts may be fomented with the vapours of hot water. But the delirium is commonly relieved immediately as soon as the piles begin to bleed; nor will it ever be hurtful to try these remedies, because by fomenting and irritating the lower parts of the body, there is always reason to hope for a revulsion from the head.

For the same reason likewise it will be useful to provoke the menses in women; but then this is to be attempted by such remedies as relax and mollify the parts, and not by those remedies which are called emmenagogues, most of which increase the impetus and velocity of the circulation, being often applied with success in women of a lax and cold habit; and therefore a relaxation or bringing down of the menses is justly recommended in the text, to which purpose conduce washing of the feet, epispastics

spastics and frictions of the lower parts, which we recommended before under the present aphorism; and which may be therefore safely used. But it is very evident that this may be more especially attempted with hopes of success, when the usual time of this periodical discharge is at hand, or when the pains in the loins, groins, thighs, and tension in the neck, with other signs, denote that the menses are about to flow sooner than usual, as is frequently observed in acute diseases. When these means are tried, if an irruption of the menses does not follow, a vein may be opened in the foot, after the performance of which the menses frequently break forth. Such a blood-letting likewise supplies the deficiency of the piles or menstrual discharge, by making this artificial evacuation of blood in a part the most remote from the head. But all these evacuations are only useful, when the vessels are distended with too great a quantity of blood, or when the force of the circulation is too violent, and a revulsion of the humours is necessary to be made from the head. For when in the end of acute diseases a delirium continues, though the disease has almost exhausted the patient's strength, all evacuations are then prejudicial, and an imprudent use of them is frequently attended afterwards with an incurable foolishness. But a weak and small pulse, slight heat, and collapſion of the vessels, readily denote that in the present case such evacuations are not to be used.

But all the remedies which have been hitherto proposed, are either by discharging the offending humours from the body, or by lessening the quantity of the blood, and diverting the impetus of it from the head, and directing it towards other parts; or, lastly, by quieting the disturbances excited in

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the body by the use of gentle anodynes. But besides these, there are still other methods of cure, by which that disposition of the brain from whence the delirium proceeds, is either lessened or quite changed by raising other ideas. For as sometimes such ideas are raised as continue a long time in the sensory, and cannot be removed without difficulty, when the action of the external object is extremely vivid, and especially when it is perfectly new and unusual; so it seems very probable, that such ideas may be raised from an internal disposition of the brain made by disease, which ideas can hardly be effaced, even tho' the morbid cause from whence they proceeded is already moved. Thus I knew a man, who having seen the punishment of breaking upon the wheel, he could not efface the idea which it raised for three whole days, but it returned every moment in his mind, even against his will. Almost the same thing obtains in some delirious people, and in such a case it seems convenient to expunge the impression by exciting other ideas.

There are many observations in medical history which favour this opinion. A celebrated musician, extremely skilful in his art, lay ill of an acute, continual, remitting fever, and on the seventh day of the disease was taken with a very bad kind of delirium, almost without any intermission, attended with great clamours, weeping, frights, and perpetual watchings. On the third day of the delirium, the patient insisted on having a concert of musick performed in his chamber, to which the Physician with some difficulty complied. But immediately hereupon the patient's serenity of mind and countenance returned, the convulsions ceased, and he cried with joy, from the perceiving of such a pleasure, which he never before or after that disease perceived from the most agreeable harmony

whatever. Even what is wonderful, the fever went off as long as the concert of music continued, and when that ceased, all the disorders immediately returned. This unexpected success gave occasion for repeating this wonderful remedy, which was always followed with the like success, namely, a cessation of the fever and delirium. The patient having experienced this relief, obliged his nurse to sing, and even to dance in the night-time; and thus by continuing this remedy for ten days he was perfectly cured ^p. The like instance is likewise recorded in the memoirs of the Royal Academy of Sciences at Paris ^q, where the cure was thus obtained sooner in a dancing-master. Thus I have seen (as I mentioned before upon another occasion in the comment to § 11.) a patient immediately recover from a very bad delirium, upon hearing that his neighbour's house was on fire, and being alarmed by the cries of the people running up and down the yard. For having hitherto spent both day and night delirious, of a sudden he asked the by-standers what was doing without doors, and upon hearing there was a fire in the neighbourhood, he was greatly frightened, but at the same time soon recovered himself, and was no longer delirious. Even in those deliria where the patient is every moment supplied with new ideas, as their inconsistent discourse testifies, it is often useful to offer such things as may fix the attention of the mind. Thus I have known the dropping of water from a high place into a copper basin, affording a gentle ringing noise, to have been of great use when made in the chamber of a delirious patient. For the patient, by attending some time to the sound, has grown less delirious, and sometimes

^p Academ. des Sciences l'An. 1707. hist. pag. 8.

^q Ibid. l'An. 1708. hist. pag. 27.

times fallen into a soft sleep, which has afforded great relief. Something of this nature has been already observed by Celsus^r; when he says, *Interdum etiam elicienda ipsius intentio: ut fit in hominibus studiosis literarum, quibus liber legitur, aut rectè, si delectantur; aut perperam, si id ipsum eos offendit. Emendando enim advertere animum incipiunt.*

“ Sometimes also the attention itself is to be
 “ engaged; as happens in studious or learned
 “ men, to whom a book may be read either right-
 “ ly, if they are delighted with it, or corruptly if
 “ it offends them; because they begin to apply their
 “ minds towards correcting it.” Many things of
 the like kinds may be tried to fix the attention of
 the mind in the cure of a delirium: nor will it per-
 haps be amiss to endeavour to change the present
 condition of the common sensory by exciting a sud-
 den fear, joy, or some other violent affection of the
 mind. But at the same time the greatest pruden-
 ce is necessary not to raise new disturbances; and
 at the same time the passions of the mind thus
 excited, ought to be contrary to those which are
 already present in the delirious patient, as Celsus^s
 prudently observes; *Quorundam enim vani metus le-
 vandi sunt: sicut in homine prædivate, famem ti-
 mente, incidit, cui subinde falsæ hæreditates nuncia-
 bantur. Quorundam audacia coercenda est: sicut in
 his fit, in quibus continendis plagæ quoque adhiben-
 tur. Quorundam etiam intempestivus risus objurga-
 tione & minis prohibendus est. Quorundam discuti-
 endæ tristes cogitationes: ad quod symphoniæ, &
 cymbala, strepitusque proficiunt. Sæpius tamen as-
 sentiendum, quam repugnandum est: paulatimque &
 non evidentur, ab his, quæ stultiè dicuntur, ad meli-
 ora mens abducenda.* “ For some (says he) are to
 “ be immediately relieved of their vain fears; as

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“ when

* Lib. III. cap. 18. pag. 151.

s Ibidem.

“ when a rich man falls into a fear of starving, to
 “ whom false reports ought to be made of estates
 “ left to him. Some again are to be restrained by
 “ threatning attempts, as happens in those who
 “ require to be confined also by stripes. Some
 “ again are to be restrained by unseasonable laugh-
 “ ters, quarrellings, and threatnings. Some require
 “ to have sorrowful thoughts removed ; for which
 “ purpose concerts of musick and great noises are
 “ useful. But they are oftner to be humoured
 “ than opposed in their way of thinking, and the
 “ mind is to be brought by degrees, and not all
 “ at once, from thoughts said to be foolish to such
 “ as are more reasonable.”

Although therefore it may be laid down in ge-
 neral as a practical rule, that such patients as are
 in danger of a future delirium, or are already de-
 lirious, ought to be kept in a dark place free from
 all noise ; which method is justly recommended by
 the antient Physicians, as Celsus ^t testifies : Yet it
 is sometimes serviceable, at least in some cases, to
 depart a little from this rule. Asclepiades ^u re-
 commends the contrary method, condemns dark-
 ness, and chuses to have the patient exposed to
 the light. But neither of these can be perpetual,
 as Celsus ^w rightly affirms ; for some are disturbed
 by darkness, and others are offended by light ;
 and therefore he orders both of these to be tried,
 that it may appear by their effects which is the
 most convenient. I well remember to have seen
 some delirious, who fearing an invasion from an
 enemy, were greatly enraged if they were con-
 fined to darkness ; but they raved much less if
 the light was admitted. But it is not proper to
 expose

^t Lib. III. cap. 18. pag. 149.

^u Ibidem & apud Cœlium Aurelianum acut. morbor. Lib. I.
cap. 15. pag. 46. ^w Ibidem.

expose such patients to a strong light, but it is sufficient for them to be able to distinguish the adjacent objects in a faint light. But in all these cases respect must be had to the custom of the patient before he was taken ill. For as Aretæus* says, in treating of those phrenitic patients, to whom sleep may be reconciled: *Cuique' vero usitata somnum accersunt: nautis in cymba decubitus, & in mari navigatio, & littorum sonus, & undarum murmur, & ventorum bombus, & maris navisque odor. Musico tiliarum exercitatio quietem adfert, aut lyre cantus, aut citharæ:* "Such things incline people to sleep, to which they are accustomed: As to sailors, the lying in a boat, the tossing upon the sea, the noise of the shore, and murmuring of the waves, with the rattling of the wind, and smell of the ship and sea air. To a musician, the playing upon a pipe, or singing to the harp or lute give rest or sleep." Which is fairly confirmed by the two instances lately mentioned from the memoirs of the Royal Academy of Sciences at Paris.

* De Curat. morbor. acutor. Lib. I. cap. 1. p. 75.

Of a Coma or Dozings in FEVERS.

S E C T. DCCIII.

A COMA or Drowsiness in Fevers is a continual inclination to sleep, either with or without its real effects; and it always supposes the brain to be in such a state as impedes the free exercise of the senses and animal motions; which may arise from a defect of the arterial fluid propelled to the brain; or from its circulation impeded through the brain, or from an impeded secretion of the spirits from the blood into the nerves; or, lastly, from the flux and reflux of them being intercepted through the nerves.

The term Coma is sometimes only supposed to denote sleep among the poets and other authors ^y, but in Hippocrates, and other Physicians after him, it is used in a different sense; for a Coma is the introduction of sleep, although sleep is not always present together with a Coma, but sometimes there are also watchings, as is evident from many passages cited from Hippocrates and Galen. But the term Coma simply taken seems to be used by Hippocrates only to denote a deep sleep, and is often opposed to watchings: but when watchings attended together with the coma, he calls it a coma vigil, or a coma without sleepiness. Whence afterwards,

^y Vide de his Galen. de Comate, cap. 1, 2, 3. Charter. Tom. VII. pag. 192, &c.

terwards, for distinction's sake, Physicians have been accustomed to call it *coma comatodes*, or *hypnodes*, where there is a perpetual inclination to a deep sleep in diseases, hardly to be avoided; but so that the patient may be wakened by any strong stimulus, tho' they soon after fall again into a sleep. But they called it a *coma agrypnodes*, or *coma vigil*, when the patient laboured under an insuperable sleepiness, but meeting with frightful dreams as soon as they are on the brink of sleep, they suddenly awake in a fright, and often with convulsions, but soon after they again fall into the like sleepiness. This disorder is often so troublesome to the patient, that his friends desire he would be careful not to sleep again afterwards. This disorder is very frequent in children 'till they are seven or eight years old, when they are afflicted with continual or intermitting fevers. Galen² treating of these two kinds of comata or cataphora, very well distinguishes betwixt them in the following manner: *Commune enim ambarum est, quod tollere non possint oculos, sed mox graventur & dormire velint. Proprium vero alterius, quod illi statim dormiant profundè & diu: hi vero vigiles versent se, alia super aliam phantasia adveniente, & mentem movente, & somnum intercidente: unde semper quidem vigiles manent, surgere verò non possunt, & agere illa, quæ vigilantium, sed deficiunt magis quam si vigilarent, & gravantur, & cataphora detinentur, ut speres, si concesseris eis, facile dormituros: concesso autem iis hoc, nedum dormiunt, sed ne spem quidem, quam habebant ut dormituri, servant.*

“ That it is common to both of them, for the patient not to be able to open his eyes, but they are soon again heavy and inclined to sleep. But it is peculiar to one kind, that the patient im-

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“ mediately

² Galen. de Comate, cap. 2, pag. 195.

“ mediately falls into a profound sleep, and con-
 “ tinues so for a long time : but in the other kind,
 “ the patient continues watchful, one thought ari-
 “ sing after another, disturbing the mind, and in-
 “ terrupting the sleep : whence indeed they al-
 “ ways remain watching, but are not able to rise
 “ up and perform those things which are usual in
 “ a person who is awake, but they are more stu-
 “ pid than if they were awake, and are continual-
 “ ly inclined to sleep, so that one would hope they
 “ would readily fall asleep, if an opportunity was
 “ given them : but such opportunity being given,
 “ they neither sleep, nor entertain the hopes of
 “ sleeping, which they had before.”

Since therefore a coma supposes a continual
 sleepiness, whether sleep follows or not, this symp-
 tom may be best understood from what we ob-
 serve in natural sleep. But it is demonstrated in
 our theoretical lectures or institutes^a, that sleep is
 that state of the medulla of the brain, wherein the
 nerves do not receive so strong and copious an in-
 flux of spirits, as is necessary to render the organs
 of sense and motion easily and readily capable of
 performing their several actions. The like dispo-
 sition therefore takes place in the present disorder.
 The spirits being consumed in health by the actions
 of the external and internal senses with the motions
 of the muscles, natural sleep follows : thus likewise
 a coma will attend when the spirits are deficient, or
 when the free course of them from the brain to the
 nerves, and from the nerves to the brain, is im-
 peded by any cause. For, since a due quantity
 of the spirits is necessary for the exercise of the
 senses and animal motions ; and likewise a free
 course of them is equally necessary, it is evident
 those actions will be impeded when either of these
 are deficient.

But

^a Herm. Boërh. Instit. §. 593.

But we know from physiology, that the arterial blood, drove from the left ventricle of the heart through the carotid and vertebral arteries, supplies the matter from whence that most subtle fluid which we call the spirits is separated by the fabric of the brain, and therefore a deficiency of the spirits may also proceed from an impediment of the impulse of the arterial blood to the brain; whether that proceeds from a diminution of the quantity of the arterial blood, or from an obstruction any way formed in the arteries conveying the blood. But, since a secretion of the spirits requires not only an impulse of the arterial blood, but likewise a free circulation of it through those vessels of the brain, which constitute its cortical substance, it is evident the disorder may also lie in these vessels obstructed. But for a due secretion of the spirits to be made, requires the blood from whence it is separated, to be applied with due force to the secreting organs, and that the vessels be pervious which receive the secreted fluid. If therefore by too great a velocity of the circulation, or any other cause, the small vessels of the cortical substance are filled with the grosser humours, they will swell and compress the adjacent smaller vessels, since they are all in this part so soft, and like a pulp; and therefore the secretion will be impeded or disturbed, so that although the spirits are separated, they may yet be denied a free course through the smallest transmitting vessels, if they are compressed by the other adjacent vessels too much distended. Lastly, although the secretion be duly made, and a sufficient stock of spirits be present in the medullary vessels of the brain, which receive that most subtle fluid prepared by the cortical substance, yet the same disorder may follow if the motion of the spirits is impeded through the

nerves.

nerves. But for this to be performed in all the nerves which are subservient to the senses and muscular motions, it is sufficiently evident that the disorder must be lodged about their origin: for it can hardly be conceived, that the free motion of the spirits can be impeded at the same time through all the other nerves, from such a cause as is able thus to affect each of them alone, but not together in their common origin. But all the nerves pass out of the medulla oblongata, which contains the medullary substance of the brain and cerebellum collected together, or else from the medulla spinalis, which is a production of the medulla oblongata, continued through the cavities of the vertebræ. But the medulla oblongata is covered with the pia mater, which we know abounds with great numbers of vessels demonstrated by injections; and the nerves extended from the medulla oblongata, receive membranous coverings from the dura mater, as soon as they pass out of the skull. If therefore these membranes, investing the medulla oblongata, or the nerves propagated from thence, are inflamed and swelled, the motion of the spirits may be impeded through the nerves, even though there is a good secretion of them made in the brain, and a sufficient quantity supplied by the arterial blood. All the causes therefore of what kind soever, which too much lessen the quantity of the arterial blood to be impelled to the brain, which impede the free circulation through the vessels of the brain, obstruct the secretion of the spirits, or intercept the free motion of them through the nerves, when secreted, may produce a coma; namely, a coma somnolenta, if all the animal actions are laid asleep equally by such an impediment: but a coma vigil seems to take place when the motion of this most subtile fluid is not impeded through the
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most sensible parts, as it is through many others; hence some parts of the common sensory are agitated with a greater impetus and irregular motion than others, and the spirits flow into certain nerves more powerfully than into others; and therefore when some patients are awaked in a fright with convulsive motions, they soon after relapse again into their former sleepiness; and thus are they tortured alternately by these disorders.

S E C T. DCCIV.

HENCE a great many very different, and often opposite causes produce this disorder in fevers, such as all profuse evacuations or repletions, all inspissations of the blood to too great a degree, whether glutinous, oily, or inflammatory; all causes of what kind soever, compressing the brain itself; which same causes acting upon the nerves produce almost the same effects.

From what has been said under the preceding aphorism, it is evident that a great many and different causes, which are almost opposite, produce a coma; which yet for the sake of method may be reduced to some certain general heads.

Profuse evacuations.] Namely, so far as by these the mass of the circulating humours is diminished, or as the quantity of the arterial fluid to be sent to the brain is deficient. This symptom is often observed after profuse hæmorrhages at the nose, and when after a miscarriage or delivery, almost the whole mass of blood is evacuated by the open vessels of the uterus. Thus we see in slaying animals, that when almost the whole quantity
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of blood is run out, they begin to snore, and are soon after violently convulsed. The like symptoms also follow after other profuse evacuations, either by purging, vomiting, &c. as is more especially observable in the cholera morbus; in which disease there is a profuse evacuation of the humours both upward and downward with great violence, so as to exhaust the body of the strongest man even in a few hours time.

Repletions.] This we are taught from a plethora, or too great a quantity of good blood. For since naturally there are no red blood-vessels in the cortical substance of the brain, but the meninges of the brain only are thus vascular, and there are considerable arteries and veins which run down perpendicularly through the medullary fabric, invest the medulla oblongata, and are found interwoven within the ventricles of the brain; it is very evident, that all these vessels being distended with too great a quantity of blood, must compress the cortex of the brain with the medulla and origin of the nerves; because the hard scull will not stretch or give way. Hence the reason is evident why plethoric people are lazy and sleepy, as we said before in the comment to §. 106. *ε*, where we treated of the signs of a plethora. Hitherto also belong all these causes which urge the humours in too great a quantity towards the head; such as too great a repletion of the stomach, which then contracting both its mouths with a convulsive force, becomes greatly distended by the rarefaction of its contents, compresses the descending trunk of the aorta and adjacent viscera, and by that means occasions the blood to flow in a greater quantity thro' the upper branches of the aorta (as we said before upon another occasion in the comment to §. 586, N^o. 1.)

All

All inspissations of the blood to too great a degree, whether glutinous, oily, or inflammatory.] For to continue the due exercise of the senses and animal motions, requires a free circulation through the vessels of the brain, which supposes a due perviousness of the humours. But now there are principally two kinds of inspissation observable in the blood, and which are produced from opposite causes; namely, the one glutinous and inactive, usually attending coldness and a slowness of the circulation, concerning which we treated under the title of diseases arising from a spontaneous glutinosity; and this is known from a pale colour and a bloated leucophlegmatic habit of body, being a disorder most frequent to virgins, and women of a lax habit leading an idle life, and also to such as are far advanced in years. The other has an inflammatory lentor of the blood for its cause, and is usually accompanied with a greater heat and increased velocity of the circulation; and thus it is easily distinguished from the former. But when in corpulent people the fat is dissolved by the febrile heat, and returning into the veins is mixed in a great quantity with the blood, it occasions an oily imperviousness of the humours; for oil has a greater tenacity or inaptitude to motion than water, and therefore it will be more difficult for it to pass thro' the smallest vessels. See what has been said upon this subject in the comment to §. 693.

All causes compressing the brain itself, &c.] In the history of wounds of the head we made it appear, that if the brain was compressed by an indentation of the scull, or an extravasation of the humours, the consequences were drowsiness, sleepiness, giddiness, delirium, and an injury of all the animal functions even to a fatal apoplexy; and that according to the different degrees of compression,

pressure, all these disorders were either more slight, or more violent. No wonder therefore if a coma may be produced from the same causes compressing the brain. But in a febrile coma this compressure of the brain generally arises from a distension of the larger vessels, either from too great a quantity and impetus, or an imperviousness of the blood; or else likewise from humours extravasated in the ventricles of the brain, or collected in other parts. But if the same causes capable of compressing the brain act upon the nerves about their origin, or upon the medulla oblongata, from whence the nerves arise, the same disorders will evidently follow: for the exercise of the senses and animal motions requires a free communication by the nerves betwixt the brain and the organs of sense and motion.

S E C T.

S E C T. DCCV.

HENCE again it is evident, that the particular cause ought first to be discovered by its proper signs, before the Physician can determine what remedies are proper to be used, and the manner how they are to be applied: for often contraries are necessary, and frequently a coma continues obstinate a long time, inflexible to all means that are tried, but at length it ceases spontaneously, when the concoction of the febrile lentor is accomplished.

It is therefore evident from what has been said, that proper attention must be given to a febrile coma, by first carefully examining into and detecting the cause from whence this febrile symptom derives its origin: For, according to the variety of the cause, often a different, and even sometimes an opposite method of cure is required. For if, for example, a coma arises after profuse evacuations, only mild juices filling the vessels will be serviceable; but, on the contrary, in a plethoric person, or when the humours being rarefied by an intense febrile heat too much distend the vessels of the brain, in that case blood-letting, cooling purges, &c. are serviceable, which would have been very prejudicial in the former case. Thus also very different remedies are required when a cold glutinous lentor has rendered the blood impervious, to what are necessary when the disorder is from an inflammatory tenacity. Therefore no general method of cure can be prescribed, but the
the

the whole depends upon first knowing the particular cause of this disorder.

But since a coma frequently arises in fevers, because the larger blood-vessels, being over distended, compress the pulpy fabric of the cortex, and by that means hinder the secretion of the spirits into the nerves; therefore such a coma has been frequently observed to remain inflexible, though the most efficacious remedies are used. Nor will this be surprizing, if we consider that the arteries dispersed through the encephalon are destitute of their callous coats, and are therefore but little elastic. But in the cure of an inflammation in this part, we highly recommended the method of diminishing the vital impulse of the fluids urging against the obstructions, by making a copious evacuation with a lancet (see §. 400), that the vessels, by their proper elasticity contracting, might repel back their obstructing particles towards the larger capacity of the vessels, from whence they may pass into the larger branches; and this being effected, the inflammation is resolved. At the same time also the obstructing matter is rendered fluid, when the quantity of the distending blood being lessened by bleeding and purging, the vessels recover their elastic vibrations (see §. 398, N^o. 1.), by which they grind the impervious particles together with the diluent liquid, and by that means dissolve them. But this can hardly be expected from the very tender vessels of the encephalon, since they are destitute of these elastic coats. The interest of the patient is therefore badly consulted, when Physicians continue lessening the quantity and impetus of the humours too much by bleeding, purging, clysters, &c. because in a delirium, or coma arising from hence, the symptoms do not lessen according to expectation. For the vital powers are then so far
weakened

weakened, that they cannot afterwards subdue, move, separate, and expel the morbid matter (see §. 609, N^o. 3): from whence afterwards many and often incurable disorders follow. The best method that can then be taken, seems to be so to moderate the force of the fever by evacuations and other proper remedies, that there may be no danger of the impervious blood being drove farther into the narrow extremities of the vessels, and in the mean time the patient should sit up erect several times in a day; the impetus of the blood is to be derived from the head by bathing the feet, with the application of epispastics, and the patient's strength is to be supported by such food and drink, as will not be in danger of increasing the circulatory motion and resistances. For thus by the moderate and gentle heat of the body, with the use of diluent and attenuating liquors, the obstructing matter may be dissolved, which is impacted into the vessels. For in the history of contusions we made it appear, that thus very large ecchymoses are dissolved by degrees, when the coagulated blood is lodged immediately under the entire skin, spontaneously dissolving and disappearing.

What has been already mentioned is fairly confirmed by the observations of Sydenham^b. Namely, in an epidemical fever attended with a sleepy coma, there was sometimes a slight delirium preceded the coma: nor was the coma inconsiderable, for the patients sometimes slept for several weeks; and could not be waked but by the most violent clamours, soon after relapsing again into their former sleep. But as here the violent pains of the head and sides frequently returning, and the blood extravasated appearing as it usually does in a pleurisy, demonstrated that this fever was attended with

^b Sect. V. cap. 2. pag. 278, & seq.

a violent inflammation, he therefore treated it as an inflammatory disease. But as this great Physician was always very attentive in observing whether the means used in diseases were of service or disservice; he found that this fever would not admit of so large an evacuation in bleeding, as was necessary in a pleurisy. Therefore after once bleeding he ordered a clyster to be injected every day, to moderate the too great violence of the fever (see §. 610), and at the same time he endeavoured to divert the febrile matter from the head, to which in this disorder it had great inclination. He took care to have a large blister-plaister applied to the neck, and at the same time ordered the medicines and diet to be cooling; and by this means he says the disease went off almost spontaneously, even tho' it raged very severely if it was treated in a method different from this. But he ordered the clysters every day, only 'till the violence of the disease abated; for afterwards he found that they were not necessary, and therefore he left the disease to take its own course, to burn out, or, as it were, destroy itself by its own force. But although in this comatous fever the forerunning signs of recovery were generally referred to the thirtieth day, yet he found that there was no further occasion for evacuations after the fourteenth day, nor did he from that time order clysters, or hardly any other medicines, unless the importunity of the patient's friends urged him to prescribe some innocent julap. He only gave a very thin diet, and took care to let the patient sit upright a few hours every day out of his bed; or if the patient's great weakness forbid this, he only ordered him to put on his cloaths, and to lie upon the bed, with his head raised pretty high. But almost the first sign of the disease going off, was the patient's having a strong,

strong, but absurd desire for improper food or drink, to which he usually consented, even though it did not seem convenient.

See also what has been said in the cure of febrile weakness at §. 670, where the same methods were recommended when the weakness arose from the same cause.

But great care must be taken to prevent such comatous patients from having a gangrene in those parts, which are too long compressed by the weight of the body, lying a long time in the same posture: which may be prevented if the posture of the body is frequently changed, and the naked skin is covered with the softest leather.

S E C T. DCCVI.

BUT those remedies recommended for a delirium (§. 702.) are here also convenient; more especially fomentations applied to the head and neck.

For since a coma arises almost from the same causes as a delirium; and as a delirium is often observed either to precede, accompany, or sometimes follow after a febrile coma, it is evident that the remedies recommended for the cure of a delirium will be likewise useful for that of a coma, having always a regard to the known causes of the disorder, with the epidemical nature of the fever, of which the coma is a symptom. But anodynes which are useful when given prudently, and at a due season of the disease, for the cure of a delirium, are more seldom to be used in the present case, and they are hardly ever given, unless required by some other symptom. Thus Sydenham^c

^c Sect. V. pag. 290, 291.

condemns the use of them in that febrile coma, which he has described as epidemical. But yet when a dysentery or diarrhœa accompanied this disease, as sometimes happened, he gave narcotics to allay these new symptoms; namely, if they were so violent as to endanger the patient's health. But when a coma attended the disease from too great a velocity of the circulation, even then Sydenham endeavoured to allay the raging orgasm or disturbance of the spirits by anodynes; namely, in that secondary fever of the confluent small-pox, which derives its origin from the putrid and almost gangrenous humours absorbed; as we shall hereafter explain more at large in the history of the small-pox.

S E C T. DCCVII.

BUT if there are present the signs of a great inflammation, it is then to be treated as a primary or principal disease, according to the directions we shall hereafter give for a phrenzy.

For then the whole cure of the disease depends upon resolving the inflammation, concerning which we shall treat hereafter under the title of a phrenzy.

Of Wakefulness in FEVERS.

S E C T. DCCVIII.

WAKEFULNESS or watching is a disorder contrary to the former (§. 703), whence the nature of it may be understood: it has for its cause generally a slight beginning inflammation in the brain, which, gradually increasing, is often changed into a coma.

When the organs of the internal and external senses, and the instruments of the voluntary motions are so disposed that they readily perform their usual motions, and are easily affected by objects, then a healthy person is said to be watchful or awake^d. But although in diseases the usual motions are no longer exercised with ease, yet the organs of sensation are easily affected by external objects, or if the internal disposition of the brain is such, that thereby is made a sort of continual irritation upon the common sensory, like that which is made by external objects through the sensitive organs; in that case watchfulness attends, which is a disorder opposite to that of a coma, in which we observe a continual sleepiness.

But although watchfulness is observed to follow most certainly from pain, anguish, violent passions of the mind, cares, &c. yet watchings considered as a symptom in fevers, usually proceed from another cause. Namely, when there is the beginning of a very slight inflammation arising in the brain,

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from

^d H. Boërhaave, Institut. §. 587.

from a too swift motion of the humours thro' the vessels of that part, from a greater determination of their impetus towards the head, or from an incipient imperviousness of the humours at the same time, whereby all the vessels are so much distended that the brain may be very easily affected by external objects; or else such an irritation is continually made in the common sensory from the same cause, that sleep cannot steal upon the patient. For a certain determinate degree of fulness and tension is required in the vessels of the encephalon, to enable it to carry on the exercises of the senses and motions; and that from a greater degree of these a person must be wakeful, is evident from hence, that too great emptiness of the vessels is always followed with sleepiness, as we declared before at §. 704. But this tension and repletion of the vessels being a little increased, seems to be the cause of wakefulness in febrile patients; but the same being increased to a greater degree, seems to occasion a coma or perpetual sleepiness, by a compressure of those very tender and minute fibres of the encephalon, upon which the exercises of sense and motion depend.

Thus we see that sleep is prevented while the feet and lower parts of the body remain cold; because the course of the humours is thereby too much increased towards the brain. Sleep is also prevented in many people by their drinking of warm watery liquors in an evening, because the vessels are thus more distended by increasing the quantity of their contained fluids, but in drinking more plentifully of fermented liquors, as wine, strong ale, &c. as these become more rarefied by the heat of the body, they cause a much greater distention of the vessels, whence a very profound sleep often ensues. Hence likewise in acute disea-

ses, when a salutary and critical hæmorrhage is about to happen from the nose, watchings or wakefulness often go before; namely, because the blood is carried towards the head more plentifully and with a greater force; and therefore at that time we usually observe a pain of the head, tightness about the neck, redness of the eyes, &c. by which signs the truth of this assertion is confirmed; and therefore it is that Hippocrates^e ranks wakefulness among the signs of a future hæmorrhage.

Since therefore febrile wakefulness generally owns for its cause a very slight inflammation in the cortical part of the brain, the disorder may be esteemed of no danger. But if we consider, that if the same cause still continues, or is increased, it may produce a coma, delirium, and convulsions, it will be evident enough that our endeavours ought to be used to remove it immediately. For if this wakefulness continues long, it exhausts the spirits, which can be repaired by no art but by sleep; and when the most subtile parts of our humour are once dissipated, the rest are inspissated; at the same time the smallest vessels will be too much worn away for want of their alternate rest, while the humours are in continual motion: hence the powers will be weakened, and consequently many and very dangerous evils may from thence ensue. Therefore Hippocrates has justly condemned it as one of the worst signs, if the patient can get no sleep either in the day or night. See the place cited from him in the commentaries to §. 605. N^o. 12.

^e Coac. Prænot. N^o. 112, 113. Charter. Tom. VIII. pag. 858. & Prorrheticor. Lib. I. textu 137, 138, 139. *ibid.* pag. 794.

S E C T. DCCIX.

FEBRILE wakefulness is cured by rest of body; by peace or quietness of mind; by absence of all sensible objects; by a moist and moderately cool air; by insipid and emollient nourishment; by mealy, soft, and emollient drinks; by a low, constant, and agreeable humming or whispering, or a soft ringing of some sonorous body; by medicines farinaceous, oleaginous, moistening and soothing; by the exhalation or scent of soporiferous plants; by the use of medicines which are anodyne, paregoric, soporiferous or narcotic; observing always to premise first the use of such remedies as are able to remove the inflammation, and abate its increase.

Two things are principally recommended to us in the cure of febrile wakefulness: the first is to remove the known cause of this disorder, namely the incipient inflammation of the brain, by a just treatment; and this will be obtained by the use of such means as dilute, attenuate, relax, and make a revulsion of the force and quantity of the humours from the head, and which lessen the too great quickness of the circulation: the other is to administer those things to the wakeful patient, which we know are able to procure sleep in healthy people: for we may hope by these means to induce sleep, tho' the cause of the wakefulness be not yet wholly removed; and therefore by these at least we may avoid the ill effects to be feared from long continued watching, and in the mean time we need

not neglect those remedies which are able to remove the cause itself of the wakefulness. But the principal means for this end are enumerated in the present aphorism.

By rest of body and peace in mind.] How much these two are able to effect in the cure of diseases which arise from an excess of the circulation, was declared before in the commentaries to § 104, and 105. But the first sign of an agreeable sleep creeping on, is a rest or inactivity of the voluntary muscles. For in a person about to sleep, all the voluntary motions grow slower and weaker by degrees 'till they quite cease, and the muscles destined to the exercise of those motions become flaccid, as if they were paralytic, and therefore it is evident that the rest of the muscles disposes to sleep. But sleep above all things requires a peaceable tranquillity of the mind. For all violent passions, and more especially distracting cares, are able to prevent sleep, even in healthy people, tired with daily labour. Hence the Poets have justly given the epithet, *Vigilas curas*, "Watchful to cares." And hence Celsus † rightly cautions: *Si qua sunt, quæ exasperatura eorum animos sunt, optimum est ea, dum ægrotant, eorum notitiæ subtrahere: si id fieri non potest, sustinere tamen post cibum, postque somni tempus, & cum experrecti sunt, tum exponere.* "That if there
 " are any affairs which may disturb the mind of a
 " patient, it is best to keep the knowledge of them
 " secret whilst they lie ill: but if this cannot be al-
 " lowed, yet it may be deferred, and after the
 " patient is got up, refreshed with sleep and food,
 " the matter may be then made known."

By absence of sensible objects.] Even a healthy person sleeping is awaked by the action of objects violently affecting the external senses, and so long

as

† Lib. III. cap. 6. pag. 127.

as the senses are strongly affected all sleep is usually prevented. Hence when people incline to sleep they spontaneously close their eyelids, that the eyes may not be affected either by light, or sensible objects. And for this reason the ancient Physicians order those who are ill of acute diseases to be laid in a dark apartment, remote from all noise. But it is evident these precautions are still more necessary, when in a febrile wakefulness the organs of sensation are more strongly affected by objects, occasioned by the inflammatory tension of the brain. All these particulars are elegantly remarked by the Poet §, where he describes the pleasing retirement of sleep.

*Quo nunquam radiis oriens, mediisque, cadensve
Phæbus adire potest. Nebulæ caliginæ mistæ
Exhalantur humo : dubiæque crepuscula lucis.
Non vigil ales ibi cristati cantibus oris
Evocat auroram : nec voce silentia rumpunt
Sollicitive canes, canibusve sagacior anser.
Non fera, non pecudes, non moti flamine rami
Humanæve sonum reddunt convicia linguæ.
Muta quies habitat, &c.
Janua, quæ verso stridorem cardine reddat,
Nulla domo tota ; custos in limine nullus.
At medio torus est, ebene sublimis in atra,
Plumeus, atricolor, pullo velamine tectus :
Quo cubat ipse Deus, membris languore solutis.*

By a moist and moderately cool air.] In violent summer-heats even healthy people can scarce sleep well, if they lie in a chamber that has been exposed to the diurnal rays of the sun. But since the heat of the body is greater in those who have a fever, a hot air will be still much more troublesome

some to them. We see the night-time is naturally allotted to us to sleep; and then the air is always proportionably more cold and moist than in the day. When people tired with travelling, or hard labour, endeavour to recruit their languishing strength by noon-sleep, they lie down under the shade of the broad beech-tree, or the tremulous poplar; for thus they are both guarded from the sun's heat, and refreshed by the moist atmosphere exhaling from the leaves of the tree, while they enjoy a quiet sleep. For this reason Ovid * places the habitation of sleep in the cave of a mountain, which is never illuminated by the sun's rays; and he adds clouds or vapours exhaling from the ground. But in what manner, and by what means too great heat of the air may be corrected, and at the same time a moisture communicated to an air which is too dry, was declared at large in the comment to § 605, N^o. 2.

By insipid, emollient nourishment, and by mealy, soft, and emollient drinks.] All those aliments and drinks are here most convenient which may be prepared from barley, oats, rice, and the softest pot-herbs: for thus the acrimony of the humours, which is often increased by the fever, may be soothed or lessened, and the dryness of the body, which often hinders sleep, may be remedied; and at the same time too great violence of the fever is thus happily allayed (see § 610.), from which last alone, obstinate watchfulness often arises. For since every thing is to be avoided which may strongly affect the organs of the external senses, in order to induce sleep, it must be evidently necessary likewise to remove all those irritations within, which arise from acrimony of the humours,
dryness

* Ovid. Met. Lib. XI.

dryness of the body, and imperviousness or tenacity of the juices.

By a low, constant, and agreeable humming or whispering, or soft ringing, &c.] How serviceable such a soft but equable murmuring may be, was declared in the comment to § 702: and it there appeared that ravings might be thus quieted and sleep induced. Ovid * has very beautifully observed this; for though he places the habitation of sleep in silent stillness, yet he adds,

————— *Saxo tamen exit ab imo*

*Rivus aquæ Lethes : per quem cum murmure labens
Invitat somnos crepitantibus unda lapillis.*

By medicines farinaceous, oleaginous, moistening and soothing.] Such as conspire by their effects together with the ailments and drinks, before commended for such patients. Emulsions prepared from almonds, seeds of cucumbers, melons, gourds, &c. with water-gruel, or barley-water, are here more especially recommended. To these it is usual to add the seeds of the white poppy, which have the same efficacy with the former, but have no narcotic virtue, as I am well assured, and therefore they may be safely used in great plenty. But all these are of use here, inasmuch as they moisten and soothe by their mealy tenacity, and mitigate or sheathe all acrimony by the sweet oil with which they abound; and at the same time they afford the best nourishment. For all these seeds, being bruised and pressed, afford great plenty of oil, which yet for the most part soon turns rancid; and therefore the use of these oils seems to be less safe in fevers. But in emulsions prepared from the seeds, we have the same oily softness without any
danger

* Ovid. Met. Lib. XI.

danger of a rancid acrimony, since these rather turn sour. Here also are to be recommended decoctions of the lactescent plants, as of succory, hawk-weed, dandelion, viper-grass, goats-beard, lettuce, &c. all which, upon wounding them, pour out a milky juice, that is of the greatest efficacy for dissolving the febrile viscid (see §. 614); and in almost all these there is a mild paregoric or easing virtue, not so much stupifying as that we observe in the poppy or the like narcotic plants, but such as happily disposes to natural rest or sleep. Ovid ^h seems likewise to have pointed out the use of these, when he says,

*Ante fores antri sæcunda papavera florent,
Innumeræque herbæ, quarum de lacte soporem
Nox legit, & spargit per opacas humida terras.*

But out of all these a great variety of medicines may be chose, no less pleasant than efficacious.

By the exhalation or scent of soporiferous plants.] The heads of flowering poppies bruised, henbane, common night-shade of the shops, bean-blossoms, &c. exhale such a scent, which being a long time drawn through the nostrils, makes the head dull, and brings on a slight sleepiness. With these may be spread the floor of the chamber in which the patient lies, or, which is better, these flowering plants being pulled up by the roots may be placed in vessels full of water to stand within the patient's chamber; thus their soporiferous smell will be diffused through the air, with the watry vapours which they exhale, so as to induce sleep likewise by moderately cooling and moistening the air; in the winter months the want of these plants may be

^h Ovid. Met. Lib. XI.

be supplied by the officinal waters distilled from them in summer. For the same reasons likewise Aretæusⁱ would have the like whole plants, being fresh gathered, to be put about the patient's neck, *Crassant enim & malefaciunt spiritum aridum & tenuem, & caliginem quandam sensibus obducunt: grave autem & torpens est caligo: id vero est somni principium.* "For they thicken and moisten the
 " air which is too thin and dry, and draw a cloud
 " or mist as it were over the senses: there is like-
 " wise a heavy or dull mist before the sight; but
 " this is the beginning of a sleep."

By the use of medicines which are anodyne, pargoric, &c.] But since febrile watchings seem to arise generally from a beginning inflammation in the brain (as we declared at § 708.) it will not be so safe to have recourse immediately to narcoticks, and with them to stupify the patient. For as we cautioned before in the comment to § 229, N^o. 2. and in the cure of a delirium, § 702. the use of narcotics is to be suspected in acute inflammatory diseases, before their violence is abated; and Sydenham has observed that before the height was over, these medicines never were of service, but often did mischief. The cure of the inflammation must be therefore attempted by all the powers of art, and the increase of it prevented: for which purpose will conduce chiefly bathings of the feet, with frictions of them, an erect posture of the body, with blisters applied to the lower parts; by all which means the violence of the disease is drawn from the head. Aesclepiades^k placed so great hopes in frictions, that from them only he expected sleep, that was so necessary but difficult to be procured in phrenitic patients. For he would have, *Ut primo*

ⁱ Lib. I. Curatione morbor. acut. cap. 1. pag. 75.

^k Cels. Lib. III. cap. 18. pag. 152.

primo die a cibo, potione, somno abstineretur: vesperi daretur potui aqua: tum frictio admoveretur lenis, ita ut ne manum quidem, qui fricaret, vehementer imprimeret: postero deinde die, iisdem omnibus factis, vesperi daretur sorbitio & aqua, rursusque frictio adhiberetur. “ The patient to abstain

“ the first day from food, drink, and sleep; in

“ the evening water may be given for drink, then

“ gentle friction may be used, so as not to press

“ the hands forcibly which rub the parts; upon

“ the day following, all the same course being ta-

“ ken, in the evening may be given nourishing

“ suppers and water, and again the friction is to

“ be applied.” But he believed this remedy so

efficacious for procuring sleep, that he confesses too

much friction might be in danger of rendering the

patient lethargic. But although in the place cited

it is not determined what parts of the body are to

be subject to the friction; and Aretæus¹ equally

praises gentle stroking of the head as well as soft

rubbing the feet with oil: and even adds, they

will be especially useful if the temples and ears are

scratched, since the anger and fury of wild beasts

are more especially quieted by a gentle rubbing of

the head and ears; yet it seems preferable for mak-

ing a revulsion of the humours from the head, to

rub the feet; though likewise a soft stroking of the

head seems to be not without its use. *Longe enim*

sæpius aliud perfricandum est, cum aliud dolet; maxi-

meque cum a summis, aut a mediis partibus corporis

evocare materiam volumus, ideoque extremas partes

perfricamus. “ For it is much oftener necessary

“ to rub a remote part, when another is in pain;

“ and especially when we would call off the of-

“ fending matter from the upper or middle parts

“ of the body, we for that purpose rub the ex-

“ tremities

¹ Lib. de Curat. morb. acut. cap. 1. pag. 75.

“ tremities ^m.” It will be likewise one of the best remedies to apply at the same time linen cloths clipped in vinegar and water, to the forehead. Even Sydenham ⁿ observes, that if the watchfulness outlasts the fever, and the other symptoms are gone off, linen cloths wetted in rose-water, and applied cold to the forehead and temples, prove of more use than any kind of narcotics. But if the wakefulness still continues after all these means have been tried, and the disease is now in its declension, the signs teaching that there is no longer any reason to fear from an inflammation in the brain; then anodynes, paregorics, and narcotics, may be used, beginning with the mildest and gradually augmenting their dose, or changing them for stronger, until the disorder is relieved.

^m Cels. Lib. II. cap. 14. pag. 90.
pag. 83.

ⁿ Sect. I. cap. 4.

Of Convulsions in Fevers.

S E C T. DCCX.

Convulsions before described (§. 230 to 235.) do here always proceed from a disorder of the brain within, or from without, by things vellicating the brain by the nerves (as §. 627, 631, 632, 633, 642, 648, 649, 652, 653, 654); or else from an inordinate afflux, reflux, or a waste of the fluid of the brain, which may arise from all those causes that are able to produce a delirium, coma, or wakefulness (§. 701, 702, 703, 704, 708); and therefore there is here again a great variety observed, as well in the causes as in the methods of cure.

What a convulsion is, with its several kinds, and how it may be distinguished from a tremor, was declared before when we treated of this symptom in the history of wounds, namely, from §. 230 to 235. We then assigned the general cause of convulsions to be every thing that drives the nervous liquid with an alternate force into the muscles. But there we only considered this disorder as far as it might arise from causes seated in the wound itself, and which arose principally from some matter irritating the naked nerves in the wound; or from such a lacerating tension of the nerves as arose from a division of some of their fibres, whereby those remaining whole sustain all the force of those divided; or, lastly, so far as

this symptom might follow from too great a loss of blood preceding. But since convulsions sometimes attend in fevers, and then often arise from other particular causes, they therefore deserve a particular consideration among the other symptoms of fevers.

But since the actions of all the voluntary muscles depend on the brain, and it is almost in these muscles only that convulsions are observed (for febrile convulsions seem hardly to take place in injuries of the vital actions) and as these receive their action from the brain, it is evident a convulsion ought to be ascribed to a disorder of the brain, for that the cause producing contraction in the muscles is derived into them from the brain, by the nerves. The immediate cause therefore of convulsions always resides in the brain, though the remote causes may be placed in other very different parts of the body, as will immediately appear. Even in wounds the remote causes are always there seated, or at least they arise from the wound, as the productive cause: but febrile convulsions, though they may likewise arise from remote causes seated in other parts of the body, yet may they also proceed from a topical disorder of the brain. But since convulsions may take place in all muscles, and it appears that there are muscular fibres in the lungs, stomach, intestines, bladder, &c. it is therefore evident, that these viscera may be affected with the like disorder: but, properly speaking, these last do not here concern us, since such disorders are discoverable almost only by the injured functions of those viscera, but are not always obvious to the outward senses of the Physician. For we have seen, before that dreadful anguish arises from a convulsive contraction of the fibres in the lungs, a nausea and vomiting from a like disorder of the muscular fibres in the fauces, oesophagus,

œsophagus, stomach, intestines, &c. and the same likewise appeared when we treated of belchings and flatus. Moreover, the actions of these muscular fibres are performed without any determination from the will, and continue while all the actions of the brain are silent, in a profound sleep, or in an apoplexy. Therefore febrile convulsions, of which we are here treating, take place only in those muscles destined to move the body which are under the influence of the will; and consequently they always depend on a disorder of the brain. But it is evident, from what was said in the comment to §. 701, that the common sensory may be affected by other parts of the body disordered, in the same manner as if the physical or productive cause had pre-existed in the brain itself; when at the same time the cause of the disorder is lodged in very distant parts, and it thence appears, that this alteration of the brain is induced by means of the nerves. Hence we distinguish two sorts of causes of convulsions in fevers; namely, such as act upon the brain by first affecting the nerves in another part; and those causes which act immediately upon the brain itself, without first affecting the nerves in other parts of the body. But it appears from what was said in the history of wounds (see §. 163, 164, 165.), that the brain may be so affected as to occasion the most violent convulsions, only by an injury of the nerves, or nervous parts, placed very remote from the head. It was likewise proved from the observations of Wepfer (see the comment to §. 229, N^o. 2) that poisons lodged in the stomach produce the most dreadful convulsions, which cease immediately when these poisons are expelled by vomit. Hence it appears that febrile convulsions, as well as a delirium and coma, may arise from foul humours lodged about the præcordia.

Thus Galen ° has observed some people suddenly seized with convulsions, without any previous sign that might presage them; but a bilious vomiting supervening immediately relieved them.

But all these causes which disturb the actions of the brain by exciting an inordinate afflux, reflux, or waste of the spirits, may likewise produce convulsions; as is evident from what was said concerning a delirium and coma, arising from the like causes. Thus we very frequently observe convulsions in children when the humours are agitated with a violent fever, and even in a vernal tertian, the most salutary of all fevers, (except an ephemera) convulsions sometimes happen in the fits, only from the more violent motion of the humours through the brain; sometimes also a convulsion happens in the very first approach or coming on of such fit, when the quick, small, and often intermitting pulse sufficiently denotes the circulation to be disturbed (see §. 576.), and consequently that there is an inordinate impulse of the blood to the brain. Convulsions also are produced when the most tender vessels of the brain are compressed, either from a plethora or rarefaction, when the larger vessels are distended with too great a quantity of blood: Hence Hippocrates P gives us the following presage, *Caput dolentes, cum catocbe delirantes, intercepta alvo, torvi oculis, facie florida (ἀνθηροί) opisthotono corripuntur.* “Those who having a pain
“ in the head, are stupidly delirious, with costiveness of the bowels, a fierceness of the eyes, and
“ a redness of the face, will be soon taken with
“ (an opisthotonus) convulsions of the body backwards.” But almost every one of these signs demonstrate too great a fulness and distention of the
the

° De locis affectis Lib. V. pag. 6. Charter. Tom. VII. pag. 493.

P Prorrhet. Lib. I. Charter. Tom. VIII. pag. 756.

the blood-vessels in the head. But also too great emptiness of the vessels may produce convulsions, whether the inanition arises from an hæmorrhage (§. 232.), or from any other evacuation of the humours. For then the necessary pressure of the blood is wanting into the vessels of the brain. Hence Hippocrates lays it down as a general axiom, that convulsions arise either from repletion or inanition.

It is therefore evident that febrile convulsions arise from the same causes as a coma, delirium, and wakefulness: And it also appears at the same time, that there is a great variety of these causes; and yet that they ought to be accurately known and distinguished, in order to determine any thing certain as to the prognosis and curative indication, since the causes producing convulsions are often opposite, and require a contrary treatment or cure.

But convulsions we know are to be feared in fevers, if any of the fore-mentioned causes have gone before; and more especially if a delirium, coma, or wakefulness, among other signs, denote that the functions of the brain are disturbed. A *subfultus* or trembling of the tendons, when the Physician examines the patient's pulse, is deservedly esteemed a sign of convulsions at hand. But when convulsions are once present, they are easily known and perceived by every body.

S E C T. DCCXI.

IF convulsions continue long, they, by the consent or communication of the nerves, easily affect or spread into the whole nervous system, whence the most lamentable maladies ensue.

Altho' convulsions are always to be feared, yet when they cease immediately, they seldom leave much mischief behind. There are but few people in the world who have not at some time or other been troubled with convulsions, more especially in their infancy; in which stage of life convulsions usually arise from pain, a great noise, too strong a light, or other causes of the like kind, which violently affect the external senses. And even in adults, who by sad dreams are awaked out of their sleep, there is a sort of convulsion takes them thro' the whole body, in the instant, betwixt sleeping and awaking, especially when they imagine themselves thrown from a precipice, or have the like terrifying idea raised in the mind. It likewise appears from the observations of Galen, mentioned under the preceding section, that a bilious vomiting has instantly relieved people who were convulsed in fevers; and the like cases frequently occur in our daily visits to the sick. Hence we are told by the Coan prognostics^r: *Convulsio in febre nata, eodem die desinens, bonum.* "That a
"convulsion arising in a fever, and ceasing the
"same day, is a good sign." But on the other hand, *Convulsio in febre nata sedat febrim eodem die,*
aut

^r N^o. 157, 158. Charter. Tom. VIII. pag. 860.

aut postero, aut tertio. Si vero tempus, in quo incipit, transgrediatur, & non desinat, malum est.

“ That a convulsion arising in a fever, terminates the fever on the same day, or on the second or third. But if the convulsion continues longer than the first stage, in which is the beginning of the fever, and does not terminate the same, ’tis a bad sign.” For when a convulsion continues long, it may so disturb the common sensory, as wonderfully to change or pervert all its actions, and excite the most dreadful consequences. But altho’ the whole body is sometimes convulsed at one and the same time in fevers, yet it oftener happens that the convulsions shew themselves at first only in this or that single part of the body; as when there is a subsultus of the tendons in the hands, or the face is drawn out of its proper shape, and the eyes are wonderfully distorted, or else rendered fixed or rigid and immoveable from a tetanus of the muscles moving the eyes. After these appearances have continued some time, other parts are usually affected likewise, and at length the whole body is miserably convulsed; the whole nervous system being then affected by the consent of the nerves, as it is commonly called. For it appears from the most certain observations, that the nerves have such a communication or consent, that one being affected the rest are disturbed, as we said before in the comment to §. 701. But as far as we are acquainted with the nerves from anatomy, they seem all of them to run thro’ their course separate from each other from the beginning to the end of them, the smaller nerves not being derived from the larger, as branches from their trunks, as we see in the arteries and veins in which the cavities of the branches communicate with those of the trunks. For the larger

nerves, which resemble trunks, are made up of bundles of smaller nerves wrapped together in one common membrane; and these bundles are again made up of others still smaller, insomuch that the industry of the most minute anatomists has not yet been able to discover the end of their composition in this manner. But this fabric seemed to be necessary, that the most subtle fluid, secreted by the encephalon, and moved through the nerves, might pass through very distinct passages to every point of the whole body for the performance of sense and motion. Therefore this commerce or consent of the nerves seemed to be performed by means of the encephalon, from whence each derives its origin distinct from all others. But when one part therefore has been first convulsed, we see afterwards that another is affected in the like manner, as the cause which produced the first disorder is propagated into other parts of the common sensory; namely, if the topical cause in the brain exciting convulsions shall be an inordinate afflux, transflux, and efflux of the nervous fluid. Or if the nerves being first irritated in some certain part of the body, without any topical disorder lodged in the brain, produce the like convulsions, we then know the cause is so powerful as to disturb the whole common sensory, and its functions upon which all the voluntary motions depend.

But how great and deplorable disorders may follow convulsions, if they continue a long time, was said in the comment to §. 233. where we treated of the effects of convulsions. For so great is the severity sometimes of this lamentable disorder, as Aretæus observes^s, *Ut Medicus præsens atque aspiciens, nec ad vitam, nec ad doloris levamen, neque*
ad

^s Aretæi Cappad. de caus. & sign. morb. acut. Lib. I. cap. 6. in fine, pag. 4, 5.

ad figuræ emendationem quidquam opis adferre possit. Nam si membra dirigere velit, viventem sane hominem distraxerit discerpseritque : igitur victis a morbo nihil ultra subveniens contristatur duntaxat. Hac vero est Medici magna infelicitas. “ That the
 “ Physician who is present, and looks on, can do
 “ nothing that will afford any relief either to the
 “ patient’s life, to ease the pain, or to correct the
 “ figure of the parts. For if he would restore the
 “ limbs to their proper positions, he must in effect
 “ pull and tear the person to pieces while living ;
 “ and therefore the disorder being insuperable, he
 “ can do nothing more than lament the patient’s
 “ misfortune. But this is a great unhappiness to
 “ the Physician.”

S E C T. DCCXII.

BUT if convulsions follow after the signs of an inflammation in the brain have preceded, they are commonly fatal: if the urine becomes watery and pellucid, after it has been first discharged thick, convulsions then following, are a very bad sign: if convulsions arise in a fever after large evacuations, they are commonly fatal, as also when they happen with a perpetual delirium.

But although convulsions are always dangerous, on account of the very bad effects which may from thence follow, yet are they still more dangerous in fevers. For, as Hippocrates † tells us: *Febrem enim convulsioni succedere præstat, quam feбри convulsionem.*

† Hippocrat. Aphor. 26. Sect. II. Charter. Tom. IX. pag. 68.

vulsionem. “ It is better for a fever to follow after
 “ convulsions, than convulsions after a fever.”
 But the different degree of danger is judged of
 chiefly from the difference of the known cause,
 with the age of the patient, and violence or conti-
 nuance of the convulsions. For there are much
 greater hopes of a cure, when the brain is affected,
 for example, from corrupt bile lodged about the
præcordia, than if the convulsions proceeded from
 a topical cause in the brain itself. Convulsions
 arising from too great fulness, are much more easi-
 ly cured than those which follow after great inani-
 tion; since we may be sooner able to remove by
 art that which abounds, than restore that which is
 lost. But the different age of the patient likewise
 makes a considerable difference with respect to the
 prognosis. For convulsions in infants or children
 frequently arise from slight causes, but in adults
 they seldom happen but from violent causes. Hence
 Hippocrates ^u says: *Pueris vero convulsionem fiunt,*
si febris acuta fuerit, & venter non dejiciat, &
vigilent, & perterreantur, & ejulent, & colorem
immutent, & ex viridi pallidum, aut lividum, aut
rubrum induant. Hæc autem promptissime accidunt
pueris recens natis ad septem annos usque. Adul-
tiores autem pueri, & viri, in febribus jam non
prebenduntur convulsionibus, nisi vehementissimorum
& pessimorum signorum quid accesserit, qualia in
phrenitide fiunt. “ That children are convulsed
 “ if they have an acute fever, do not empty their
 “ bowels, but are wakeful, terrified, cross, and
 “ change their colour to a pale, green, livid, or
 “ red. But these accidents happen chiefly to
 “ children from the time of their birth ’till they
 “ are seven years of age. But more adult chil-
 “ dren

^u In Prognosticis, Charter. Tom. VIII. pag. 683. Et in
 Coac. Prænot. N°. 356, 357. ibid. pag. 871.

“dren and men are not invaded with convulsions
 “in fevers, unless the most violent and malignant
 “symptoms attend, such as happen in a phrenzy.”
 But children are thus more liable to convulsions,
 from their whole nervous system being more easily
 irritable; whence also in adults, especially women
 who have a like disposition of the nerves, convul-
 sions may arise from slight causes, as Aretæus * ob-
 serves. Perhaps for this reason Hippocrates, in
 the text lately cited, makes no mention of women,
 but only says, that more adult children and men
 are more rarely convulsed in fevers; but in ano-
 ther place he says^w, *Hystericis convulsiones faciles*
esse: verum & addidit, sine febre; “that hysteri-
 “cal women are easily subject to convulsions, but
 “without a fever:” for there is certainly more
 danger if such women are convulsed, if they are
 afflicted with a fever; but in the mean time it is
 evident, that in such women convulsions are to be
 expected even from slighter causes. But it is evi-
 dent enough, that as the convulsions are more vio-
 lent they must be more dangerous. But the con-
 tinuance of this disorder does not always afford the
 same prognosis; for although at first view it would
 seem that so much the worse of the event is to be
 expected, as the cause of the convulsion continues
 longer acting upon the brain; yet if the disorder
 runs to a great length, it is a sign that the strength
 of the body is capable of bearing such violent
 shocks; and there are some hopes left that nature
 may triumph over the disease, more especially if
 there are no signs denoting that the brain is daily
 more and more injured in its functions: which we
 know if a delirium, coma, watchfulness, insensibi-
 lity,

* De causis & signis morb. acut. Lib. I. cap. 6. pag. 3.

^w In Prorrhetic. Lib. I. text. 121. Charter. Tom. VIII.
 pag. 785.

lity, &c. often attending the convulsions are not increased, but rather diminished; and if at the same time the vital powers appear well conditioned, which we know more especially from the pulse and respiration. It may be asked, whether or no Sydenham did not conceive hopes of the patient's recovery in a symptomatic phrenzy attending in an acute continual fever, if after reducing the violence of the fever to its due moderation, this symptom continued any considerable time? for he plainly observes, that although this long continuance of so dreadful a symptom might terrify the by-standers, yet it did not infer speedy death, but that the patient has been either accustomed to the attacks of this symptom, or else able to support them, provided the violence of the fever is not kindled by the use of cordials and heating medicines*. It therefore seems very probable that in convulsions which arise from the like cause with a febrile delirium, such truces may sometimes take place; and I well remember to have met with several cases in my own practice, which confirm the same thing. In a noble youth, lying ill of an acute continual fever, there was a subsultus of the tendons appeared on the sixth day of the disease, followed with a trembling of the whole body; on the fourteenth day all the muscles of the body were convulsed, but the patient supported these dreadful symptoms to the twenty-first day, when the convulsions ceased, and the patient escaped from so dangerous a disease, though all his friends had given him over, and were very angry with me for entertaining as yet some hopes of his recovery, judging that I was troublesome to the patient by ordering medicines, when they were strongly persuaded that he must perish in a little time. For, unless a faithful ser-

vant

* Sydenham. Sect. I. cap. 4. pag. 81, 82.

vant had strictly executed what I ordered, the patient might have perished by the cruel commiseration of his friends. There are some passages in Hippocrates which confirm the same thing. For in describing the epidemical constitution of a fever he says^y: *Multis autem convulsiones, ac magis pueris ab initio: atque febricitabant, febribusque convulsiones succedebant; erantque hæc plurimis horum diuturniora quidem, sed innoxia, nisi his, qui ex omnibus aliis perniciose haberent.* “ Many were taken
 “ with convulsions, and more especially children,
 “ even at the beginning; but in some the con-
 “ vulsions followed after the fever; and these last
 “ were indeed of long continuance in many, but
 “ not fatal, except in those who had above all
 “ others the symptoms more especially malignant.”

Even in a tetanus there are still some hopes remaining, as appears from Hippocrates, where he says^z: *Qui tetano corripuntur, intra quatuor dies intereunt; hos vero si effugerint, sani fiunt.* “ Those
 “ who are taken with a tetanus expire within four
 “ days; but if they survive that space, they recover.” And in another place^a he ascribes still a longer duration to this dreadful disease, when he says: *Hic tertio, aut quinto, aut septimo, aut decimo quarto morbi die perit; hos si effugerit, convalescit.* “ In this case the patient expires on the
 “ third, fifth, seventh, or fourteenth-day of the
 “ disease; but if he escapes that time, he recovers.” Almost the same he affirms of an opisthotonus, the continuance of which he makes still much longer^b: *Hic vero morbus, ut longissimè, ad dies*

^y Epidem. I. text. 24. Charter. Tom. IX. pag. 46.

^z Aphor. 6. Sect. V. Charter. Tom. IX. pag. 197.

^a De Morbis, Lib. III. cap. 12. Charter. Tom. VII. pag.

587.

^b De Internis affect. cap. 55. Charter. Tom. VII. pag.

678.

dies quadraginta detinet ; quos si effugerit, convalescit. “ For this disease holds the patient the longest “ of all, even for forty days, which, if he escapes, “ he recovers.” But how dreadful these convulsions are, appears from the description which Hippocrates gives of them in the places before cited ; as also from what has been said of them by Aretæus ^c.

It is therefore evident, that there is always great danger in febrile convulsions, and yet that one ought not readily to despair. From what has been hitherto said, we may be able to understand the following prognostic rules.

If convulsions follow after the signs of an inflammation in the brain have preceded, they are commonly fatal.] For it then denotes that the inflammatory cause is so violent, and so deeply situated in the narrow extremities of the vessels of the brain, that the medulla itself is affected. For as it appeared when we treated of wounds in the head, the meninges of the brain, and often the cortical substance itself are injured without any convulsions following ; but when the medullary substance is injured, then convulsions immediately ensue. For all the hopes of cure in inflammations of the brain, consist in procuring a mild resolution of the inflammatory concrete, so as to restore it to a state of fluidity : but it was demonstrated among other things at §. 386, that the resolving an inflammation requires the obstructing matter to be not over compact, and the obstruction itself to be but small, especially in the arteries, or beginning of the lymphatic vessels. But when convulsions follow after inflammatory diseases of the brain, we know that the inflammatory concrete is impacted into the narrow extremities of the vessels in the cortex, and that therefore a resolution can hardly be expected : and the difficulty

^c De causis & sign. morb. acut. Lib. I. cap. 6. pag. 3. 4.

culty of procuring such a resolution will be here still greater, because here the arteries, being destitute of their elastic coats, are more easily distended; and if the impetus of the humours urging behind the obstructions is diminished, they will not be able to repel back the impervious particles from the narrower towards the larger capacity of the vessels, and from thence into the trunks; upon which repulsion of the obstructing matter however the resolution of an inflammation greatly depends. Hence Ætius^d, in treating of febrile convulsions, says: *Fit autem & convulsio ob excedentem siccitatem: sequitur autem maxime perniciosas phrenitides, tum propter febris vehementiam, tum ob intentos & agrestiores motus. Et ex his, qui sic convulsi sunt, neminem servatum ipse vidi, neque audiui, qui vidisset.* “But convulsions arise from too great dryness; but more especially they follow after very bad phrenzies, as well from the violence of the fever as the intense motion of the humours and their wandering passage through the vessels. And among those who are thus convulsed I have not seen nor heard of any who have escaped.” But the signs of an inflammation in the brain may be known from those of an inflammation in general, described at §. 382, as also from what we shall say hereafter (§. 772.) concerning a phrenzy.

If the urine becomes watery and pellucid after it has been first discharged thick, convulsions then following afford a very bad sign.] By the urine we know the salts and oils of the blood are evacuated from the body, which being rendered acrimonious would be injurious if they were any longer retained in the habit. But we observed before (§. 100.) that an increased velocity of the blood's circulation

^d Lib. Medicin. Lib. V. cap. 131. pag. 97. Vel tetrabibl. 2. ferm. prim. cap. 131. pag. 286.

culation dissolved and rendered its salts and oils more volatile and acrid. It is therefore evident, that in fevers there is still a greater necessity for evacuating these acrid parts by urine; and therefore we observe the urine more acrid in fevers, higher coloured, and often discharged thick and full of contents from the greater attrition of the fluids and vessels against each other, and from the increased acrimony of the humours. If therefore after a thick urine first evacuated, it is soon after discharged watery and pellucid, we know that the salts and oils of the blood rendered more acrid are retained in the body, and mixing with the circulating humours, they offer the greatest injury to those parts, where the vessels are the most tender, that is in the encephalon. When therefore convulsions follow after such urine, we know that the brain is irritated by the retained acrimony; and therefore that there is the greatest danger, lest these very tender and pulp-like vessels should be in a short time dissolved by the more acrid humours, drove through them with an increased force of the circulation by the fever. Hippocrates^e therefore justly condemns pale and thin urine as very bad, and assures us that the urine commonly has this appearance in phrenitic patients^f: And Galen adds in his commentaries to this aphorism^g, that he never knew a phrenitic patient cured, who discharged such urine. But in another place Galen^h says, that if the urine appears thin and pale in an ardent fever, it denotes a phrenzy; but if a phrenzy is already present, the urine having such an appearance presages death. Perhaps the urine is thus discharged

^e In Prognostic. Charter. Tom. VIII. pag. 633, 635.

^f Aphor. 72. Sect. IV. Charter. Tom. IX. pag. 182.

^g Ibidem. ^h In libro de urinis Galeno adscripto, cap. 4. Charter. Tom. VIII. pag. 338.

charged because the disease begins to injure the functions of the brain, whence the whole nervous system is disturbed: For we see in hysterical and hypochondriacal patients, when the fit is upon them, they discharge an incredible quantity of a thin pellucid urine; and therefore such urine seems to be a very bad sign, and of pernicious consequence, inasmuch as the offending acrimony is then retained in the habit.

If convulsions arise in a fever after large evacuations, they are commonly fatal.] For even death itself is at hand when convulsions proceed from this cause; as we see in the slaying of animals, which are violently convulsed a few minutes before death. Moreover, the cure of convulsions, arising from profuse evacuations, requires an immediate restitution of the lost humours, which is extremely difficult, if not impracticable in febrile patients. For although such exhausted patients take in the best nourishment of any kind; yet it is necessary for the action of the vessels and viscera to change the same into the nature of our healthy humours: But since in fevers all or most of the functions recede much from their healthy condition, the reason of this difficulty is evident. See also what has been said in the comment to §. 234, N^o. 4.

As also when they happen with a perpetual delirium.] Although the exercise of the voluntary motion of the muscles depends on the brain, and the ideas arising from objects acting upon the external senses, or from the imagination together with the combination of those ideas and the judgment thence rising, and the passions of the mind are all of them likewise seated in the brain; yet it appears from observations, that distinct actions are exercised in different parts of the brain. For sometimes in fevers the brain being affected there is a

delirium, though the exercise of the muscular motions remains uninjured : And sometimes again convulsions are observed in fevers without any delirium, though more rarely. For commonly a delirium attends at the same time, or at least precedes convulsions. If the delirium is slight and appears at intervals, the injury is less ; but when convulsions are accompanied with a perpetual delirium, we know that all the functions of the brain are disturbed, and consequently that there is the greatest danger.

Yet the antient Physicians seem to have observed the most violent convulsions without a delirium. For in the history of a tetanus, which is so exactly described by Aretæus ⁱ, there is no mention made of a delirium ; nor is it mentioned by Hippocrates ^k. But where he describes an opisthotonus, he adds, that sometimes these patients trifle. I have likewise myself had an opportunity of seeing a tetanus without any delirium through the whole course of the disease ; but as this kind of disorder rarely happens in these countries, unless it happens to proceed from an injury of the nerves or tendons, I judged it would be of use to add here what I had observed in this wonderful disorder. A healthy virgin of a good habit, about thirty years old, rising up in a morning, observed the left side of her face swell, the upper eye-lid of the left eye depressed, and the corner of the mouth of the same side drawn upward. But finding herself very well in other respects, and having been frequently troubled with a like swelling of the face with the tooth-ach from carious teeth, she suspected nothing
amiss,

ⁱ De causis & signis morbor. acut. Lib. I. cap. 6. pag. 3, & 4.

^k De morbis Lib. III. cap. 12. Charter. Tom. VII. pag. 587. De intern. affection. cap. 56. ibid. pag. 678.

amiss, but for three days followed her usual labour, walking daily through the streets. On the fourth day she consulted me, and by an accurate enquiry I was not able to discover any remote cause of the complaint, though I suspected something malignant lay concealed. After a considerable quantity of blood taken from a vein, I ordered a cooling purge, by which means the swelling of the face with a retraction of the lip began to abate, and the upper eye-lid was more elevated. But on the sixth day she was taken with a fever, and at the same time began to perceive an unusual stiffness in the neck, and it was with difficulty that her jaws could be opened. After another bleeding I ordered the jaws, neck, and throat to be covered with an emollient plaister, endeavouring at the same time to fill the body with softening decoctions. On the seventh day the jaws were very strictly closed together, and on the eighth day the whole back was stiff, together with the neck, even down to the os sacrum, and she perceived an approaching tetanus was threatened in her hands and feet; the face appeared turgid and inflated, and the fever continued the same. On the eleventh day the deltoide muscles in each arm were swelled and extremely rigid, and she complained of perceiving a wonderful motion in the abdomen, which upon the least speaking ascended to the stomach: In this she perceived some relief from a moderate compressure of the abdomen; when she slept, her hands were convulsed, and her eyes rolled about in a wonderful manner. On the twelfth day of the disease all the limbs were stiff: On the thirteenth day the tension in the nape of her neck began to diminish, and, upon beginning to sleep she would wake suddenly in a fright, perceiving a sort of an impediment or uneasiness in her throat, with a difficulty of swal-

lowing. On the fourteenth day she began to move her arms and neck, her swallowing became easier, and when she slept her jaws opened from each other, but were contracted again as soon as she waked. On the sixteenth day she perceived a wonderful sort of motion in the abdomen with great anguish, but without pain: but in each groin she felt a most troublesome tearing pain; the whole trunk of the body was rigid with the tetanus, but she was better able to move her legs, and could a little open her jaws, so that I could perceive her tongue beset with painful white spots. Almost in the same condition she continued, till the nineteenth day, and then the fever began to increase, the pulse became fuller, and the skin was all over moistened with a moderate sweat: She was now better able to move her limbs, and could open her mouth wider; but the trunk of her body continued so stiff, that when she would sit upright in bed, she was obliged to be raised by the repeated efforts of two women, so as to bend her body forward with a considerable force, which yet was affected with pain, notwithstanding the great force used; her appetite increased, but she could as yet only take liquid food, because mastication was uneasy. But her eyes rolled about, and her face was distorted during sleep. On the twentieth day there was an itching attended all over the body, and a kind of lacerating pain was felt in each of the groins. On the twenty-first day the fever abated, and every thing seemed to be upon the improving hand. On the twenty-second day there was a troublesome pain about the upper orifice in the stomach, as also in the back at about the same height. On the twenty-third day there was again a difficulty of opening the jaws, she perceived a stiffness only on the right side of the spine, and the pain about the
upper

upper orifice of the stomach disappeared. On the twenty-fourth day there was a pain extended from the loins to the right shoulder, which was relieved by compressing the abdomen. The fever in the mean time gradually decreased; as did also the stiffness on the right side of the spine, but a disagreeable numbness was perceived in the same place, which also lessened by degrees. On the twenty-ninth day the fever was quite off, the patient had a good appetite, could open her jaws, and put out her tongue, which last appeared swelled, and in a manner ulcerated upon one side. At the same time she had also a sensation, as if a great number of strings were broke asunder in her back, but without any pain: about the fortieth day from the beginning of the disease, she was able to go up and down stairs, and was afterwards perfectly restored from so difficult a disease, and has now lived three years since in perfect health.

But through the whole course of the disease she continued perfectly in her right mind, and the urine every day deposited a quantity of a pretty uniform sediment. But after two bleedings, when I found the fever so moderate that there was no danger from its too great violence, I supported the patient's strength by a mild diet, diverting the impetus of the humours from the head by the application of epispastics to the feet: I two or three times excited stools by emollient clysters, when the bowels were constipated; I fomented the rigid and cramped parts with the most emollient liniments, giving internally at the same time the most emollient decoctions and emulsions, with the addition sometimes of gentle nervous medicines; and towards the end of the disease, when the watchings proved troublesome. I procured sleep by gentle anodynes. One great advantage was, that du-

ring the whole time in which the jaws were obstinately contracted, we had an opportunity of conveying drink and liquid food through several interstices here and there made by decay'd teeth.

S E C T. DCCXIII.

IN the cure of febrile convulsions their particular cause is first to be discovered (§. 710.) with the part originally affected, from whence the convulsion arises (§. 710.) and then, without delay, such medicines are to be applied, as are capable of obtunding acrimony, or resolving impacted matter, and of relaxing contracted parts. Therefore these convulsions are usually cured by diluting, relaxing, and softening medicines with revulsions; nor ought any confidence to be placed in such medicines as are endowed with the pompous title of nervous or antispastic, for the cure of convulsions.

Since it is evident from what was said at §. 710, that febrile convulsions have been observed from very different, and even opposite causes, it will be necessary to discover them by a careful enquiry, in order to make a successful cure. For convulsions may arise from too great fulness, as well as from too great emptiness of the vessels; and therefore what may be proper for the cure in one place, may often destroy the patient in the other case. At the same time also it is necessary for the Physician to be acquainted with the part originally affected; namely, whether the topical cause is lodged in the brain itself, or whether such things are present in

in other parts of the body as affect the brain by irritating the nerves; for in such a case it would be in vain to apply medicines to the head. When, for example, a great quantity of bile fluctuates about the præcordia, and disturbs the actions of the brain, a vomit given soon removes that cause of convulsions in fevers: but when the same symptom arises from impervious blood urged into the cortical substance of the brain, a vomit given in that case would increase the disorder, since we plainly see, that in vomiting, the blood is urged with a greater impetus to the head. But the signs have been already given, by which the various causes of convulsions may be distinguished, and the part discovered in which the origin of the disorder is seated. This being known, and not before, the medicines are next to be thought of, in which therefore there is a great diversity required, according to the variety of the causes and the parts affected. But in general we may conclude that such things may be useful as are capable of obtunding acrimony, of resolving impacted matter, and of relaxing contracted parts. For except in that kind of convulsions which arises from a sudden and great emptiness of the vessels, and which can only be relieved by such things as replenish the vessels, these remedies always take place; yet having a regard to the particular kind of acrimony, and the nature of the obstructing matter impacted into the narrow extremities of the vessels. For thus in young children living almost entirely upon milk, the cheese-like coagulum lodged in the stomach and intestines, and degenerating into an acid acrimony, may produce convulsions by irritating the nervous fabric of the stomach and intestines. For this purpose will be useful Venice-soap to dissolve the coagulum, earthy absorbents to obtund the

acid acrimony, gentle purgatives, and sometimes emetics to evacuate the morbid humours may be of the greatest service. But when putrid humours are lodged about the præcordia, whether they pre-existed before the fever, or are formed by and collected together during the fever, purges and vomits will indeed be useful; but the putrid acrimony may be most happily corrected by acids, which in the former cause would be prejudicial. Thus other remedies are required when the impervious blood is impacted into the vessels of the brain from an inflammatory tenacity, than if the like obstruction arose from a cold, mucous tenacity of the humours put into motion by a fever, as sometimes happens in leucophlegmatic and old people. But relaxing medicines are more especially useful for parts contracted by a spasm or cramp, concerning the particular usefulness of which, see what has been said in the commentaries to §. 164, and 234, N^o. 3.

By diluting, relaxing, and softening medicines, with revulsions, &c.] For diluents dispose the humours to an easy motion, weaken almost every kind of acrimony, and so relax the vessels, that they more easily transmit their fluids; at the same time they afford a proper vehicle to the urine and sweat, that the acrimonious particles may be most commodiously expelled by those ways from the body. At the same time all lenient decoctions, prepared from emollient herbs, mealy emulsions, sweet expressed oils, food of barley, oats, and emollient pot-herbs, are here likewise useful; inasmuch as by these the body is filled with mild humours, all acrimony is obtunded and weakened, and all the vessels are at the same time relaxed. But those things which derive the impetus and quantity of the humours from the head towards other parts, are called revulsives, and they act either by diminishing the resistance of the vessels in those parts, or by increas-

ing

ing the celerity of the motion of the humours through them. Hence bathing of the feet, the application of epispasticks, frictions, and emollient clysters often repeated are of the greatest use.

It appears from the writings of the antient Physicians, that they used the same remedies for the cure of convulsions (as may be collected from what was said upon these subjects in the comment to §. 164 and 234, N^o. 3.) But there is one passage or two in Hippocrates¹, where he recommends pouring on of cold water for the cure of convulsions, though a little before^m he had pronounced cold to be productive of convulsions and cramps, and to be an enemy to the brain, nerves, and spinal medulla. But it is well known that by plentifully pouring on cold water, the vessels are contracted, and the blood condensed; and therefore this method seems to be directly repugnant to those remedies lately recommended. But then it is evident from the place before citedⁿ, that he observes the pouring on of cold water is only useful on some occasions, and particularly in a tetanus without an ulcer, in a youth of a fleshy habit and middle age; nor does he seem to ascribe this effect upon the convulsed parts to the greater cold, but only says, *Frigidæ copiosæ profusio caloris revocationem efficit.* “A plentiful effusion of cold water takes off the heat;” but that he rather ascribes this cure to heat is evident, because he afterwards subjoins, *Calor autem hæc solvit.* “But heat removes these.” But in another aphorism^o he seems to ascribe this effect to a stupidity produced by the pouring

¹ Aphor. 21 & 25. Sect. V. Charter. Tom. IX. pag. 206, 210.

^m Aphor. 17 & 18. Sect. V. *ibid* pag. 204.

ⁿ Aphor. 21. Sect. V. *ibid*. 206.

^o Aphor. 25. Sect. V. *ibid*. 210.

pouring on of cold water, which supposes a weakened action of the nerves. But since the spirits flow impetuously through the nerves into the convulsed parts, it is evident in what manner this method will be sometimes useful, namely, in those cases where convulsions arise from an inordinate motion of the spirits; as for example, in hysterical patients: for then by that sudden shaking of the body which is produced by the pouring on of cold water, that direction of the spirits may be changed which occasions the convulsions; for we see that these disorders are often suddenly removed only by irritating the olfactory nerves by volatile spirits of sal-armoniac, castor, &c. For in these hysterical convulsions (which Hippocrates therefore terms slight or easy, as we observed before under the preceding aphorism) frequently almost any change introduced in the nerves will remove them, only by altering the present condition of the common sensory. Hence therefore the sprinkling of cold water often immediately removes such spasms: but for the cure of febrile convulsions this method does not seem to be safe.

Nor ought any confidence to be placed in such medicines as are endowed with the pompous title of nervous or antispasmodic for the cure of convulsions.] From all that has been here said under the title of convulsions, it is evidently apparent that there can be no universal antispasmodic remedy; but that such, however cried up, are either perfectly useless, or else are serviceable at one time, and mischievous at another, according to the variety of the causes from whence the convulsions arise. A plethoric youth afflicted with convulsions in an acute fever is cured by evacuations; but one exhausted by profuse evacuations is cured by repletion. When a topical inflammation of the
brain

brain attends an acute fever, and excites convulsions, bleeding, and other remedies which allay the too great violence of the fever are the best: but on the contrary, Hippocrates ^p observes, *Quod convulsionem solvat febris superveniens acuta, quæ prius non fuit; si vero fuerit prius, jam exacerbata.* “ That an acute fever, coming after convulsions, “ when it did not attend before, removes them; “ but that if the fever attended before the convulsions, they rage worse.” And thus also in another place ^q he says, *Convulsione aut tetano laboranti febris succedens morbum solvit.* “ A fever “ succeeding after a convulsion or tetanus, terminates that disease.” Namely, when the stimulus or obstructing matter producing the convulsion is dissolved or weakened by the fever (see §. 587.) for thus in the history of the tetanus, given under the preceding aphorism, the fever increased on the nineteenth day; but at the same time every thing was changed for the better. Sydenham has observed ^r that infants are often convulsed in the first stage of the small-pox or measles, namely, before the morbid matter is thrown out on the surface of the body by the fever; and he remarks, that thousands perished when the Physicians attempted the cure by repeated clysters and other evacuations: for by that means the fever was depressed, by which the eruption of the small-pox and means ought to have been promoted; and upon the appearance of which eruption those convulsions immediately ceased. It is therefore evident that no confidence ought to be placed in those medicines which are endowed with the title of specifically nervous;

^p Coac. Prænot. N^o. 354, 358. Charter. Tom. VIII. pag. 871.

^q Aphor. 57. Sect. IV. Charter. Tom. IX. pag. 171.

^r In Dissertatione Epistolari pag. 459.

nervous, or antispasmodic. For if we examine into the confused heap of such remedies recommended by Hippocrates, it will appear that most of them possess the property of absorbing acidity, whence they are useful for children convulsed by an acid, of which kind are the powders of the countess of Kent, of pearl, and mother of pearl, &c. Some again seem to be altogether inactive, as the raspings of ivory, elk's-hoof, harts-horn, &c. supposing they are taken crude; for if they are burnt into a calx, they acquire the property of absorbing acids. Others again, which are extremely useful in hysteric convulsions, are often prejudicial by their stimulating and heating power in febrile convulsions, more especially where there is an inflammatory thickness of the blood, or too great a force of the fever attending, as, for example, the spirits of harts-horn, ivory, blood, volatile and oily salts of castor, &c. The absorbent powders and specifics of elk's hoof, ivory, &c. may, and often ought to be used with safety, that the Physician may satisfy the expectations of the patient and their friends, that he may not seem to have neglected any thing, because others very often extol them with great encomiums when they are called into consultations, more especially at the courts of the great; but at the same time care must be taken not to trust so far to these as to neglect other more efficacious remedies; and still greater care must be taken not to make use of those things which we know from the particular cause of the febrile convulsion will be mischievous.

S E C T. DCCXIV.

BUT if the head is found to be the part originally affected, the cure ought to be conducted agreeable to what was before directed for a coma, §. 706.

But if the cause of the febrile convulsion shall appear to reside in the head, as the part originally affected, those things will be useful which we recommended for the cure of a febrile delirium: And as at the same time a violent inflammation generally attends, the cure will be the same with that of a phrenzy, concerning which we shall treat hereafter at §. 781.

Of

Of FEBRILE SWEATS.

S E C T. DCCXV.

SWEATS in the beginning of an acute fever, the cause of which fever is more than usually obstinate, acknowledge for their cause a relaxation and weakness of the extremities of the vessels, a violent circulation of the blood through them, and an easy separation of the watery from the other parts of the blood.

We have seen already at §. 594, that sometimes the material cause of the fever is subdued, dissolved, and rendered moveable by the fever itself; yet so that it still retains some conditions which are repugnant to the healthy or equable circulation; whence it is expelled from the body by some sensible evacuation. Among these evacuations are also ranked sweats. But such a sweat is always good, and is said to be critical. But the sweat concerning which we are here speaking is symptomatical, and almost constantly of an ill presage, because it removes little or nothing of the morbid matter, but only exhales the thinnest parts of the blood. But that critical sweat very rarely happens in the beginning of the disease, since it is the effect of nature overcoming the disease, and therefore can be only expected when the violence of the disease declines.

But by the beginning of an acute fever in this place we are not to understand that point of time wherein health degenerates to sickness, but a considerable portion or stage of the course of the disease;

ease; namely, that whole time of the disease wherein no sign of concoction as yet appears, as we observed before from Galen in the comment to §. 590; and therefore in this sense the beginning often comprehends a great part of that time of the disease which is usually called its increase or ascent, as we observed in the place last cited. But during this whole time the disease increases, and health is diminished; and therefore any thing of good can seldom be hoped for from a sweat breaking forth in this stage of the disease, since it commonly proceeds at that time from the superiority or prevailing force of the disease. It is therefore evident that this beginning of an acute fever will admit of various latitude, according as the fever runs thro' its course more swiftly or slowly, and as the material cause itself of the fever can be more easily or difficultly subdued by the force of the fever itself. For very acute diseases^s immediately bring on the most severe symptoms, and very speedily finish their course: And for this reason is added in the text "the cause of which fever is more
 " than usually obstinate," and consequently will require more time to be subdued and rendered moveable; provided in the mean time it is not such as may suddenly destroy the body by a raging force, or to make itself a way outwards. For, as we made it evident before (at §. 594, N^o. 2. from Hippocrates), critical sweats appear on the third, fifth, seventh, ninth, eleventh, fourteenth, seventeenth, twenty-first, thirty-first, and thirty-fourth day of the disease. See what is said concerning this aphorism of Hippocrates in the comment to §. 741, following, where we treat of critical days. Therefore in some acute fevers a sweat appearing on the third day may be critical and salutary; while again in other acute fevers still proceeding
 from

^s Hippocr, Aphor. 7. Sect. I. pag. 12.

from an obstinate cause, a sweat breaking forth on the third day may be symptomatic and prejudicial: A symptomatic sweat may be therefore best of all distinguished by its appearing without any previous signs of concoction, in the first days of the disease, while the morbid matter still continues crude; but a critical sweat appears later, and after the signs of concoction have gone before: Having yet at the same time a due regard to the greater or less velocity with which the disease runs through its course.

But the cause of such a sweat is threefold, for either the extremities of the vessels discharging the sweat upon the surface of the skin are more relaxed, and by that means yield more easily to the fluids: Or else a greater quantity of the fluid is applied in a given time to these secretory and excretory organs by the greater violence of the circulation: Or lastly, the watery and thinnest parts of the blood cohere less powerfully to the rest, so as to be more easily separated. But these causes may either exist separately, or else concurring together they may produce the greater effect.

That a greater laxity only of the cutaneous vessels will occasion sweats, we are directly assured from experience. For when a strong and healthy person has the surface of his body exposed to the vapours of hot water, he soon runs down with sweat, as frequently happens in the cure of the venereal disease by sweating. When the whole surface of the skin is retained as it were in a vaporous bath of its own, by being covered up in bed with many cloaths, a sweat is very easily excited. But on the contrary, when the cutaneous vessels are constricted by the greater cold of the air, a sweat can be either not at all raised, or with much greater difficulty, even though the person exercises him-
self

self with violent motion of body. Hence the reason is evident, why a sweat being once raised often disposes the body so, that it afterwards melts with too profuse sweats, even from slight causes; namely, because the cutaneous vessels are too much relaxed and weakened by the warm sweat. Tulpius^c has a wonderful instance of this kind in a virgin, who from her infancy, on account of the sweats frequently raised in her mother when with child, had these perspiracles of the skin so large and open that they were almost continually running, and discharged so great a quantity of sweat, that she was obliged to shift herself three or four times every day. The cutaneous vessels being still more weakened by these sweats, the disorder continued obstinate for seven years after the cure was undertaken, even though the most convenient remedies were used.

But that a more violent circulation of the blood excites sweat we are assured, since by muscular motion only the velocity of the circulation being violently increased, a profuse sweat may be forced out even in the midst of the severest winter.

But a more easy separation of the watery from the other parts of the blood, is justly ranked among the causes of febrile sweats. Chemistry demonstrates that the greatest part of the blood is water, which may be separated from it by a very gentle degree of heat; insomuch that Hoffman^d observes, this watery part of the blood will evaporate much sooner than any other kind of water in a like quantity, in the same place, and in a like vessel. But after the blood has been thus dried by a gentle heat, if then it be urged with a stronger fire, it yields various substances, from which still

^c Observat. Medic. Lib. III: cap. 42. pag. 257.

^d Frid. Hofman. Observ. Med. Chymic. pag. 208.

more water may be separated. But in every person there is not the same degree of cohesion of the watery with the other parts of the blood, and therefore the separation of them is not equally easy. When a man exercised with daily labour has blood taken from a vein, it congeals into a solid mass, and the thinner parts do not separate from the grosser 'till it has stood for some hours, and even then the watery part is but small in quantity. If the blood is examined which is taken from a delicate girl leading an inactive life, immediately a large quantity of a thin fluid separates and floats on the surface of the thick cake. At the same time also it appears, that the exercised and laborious people do not sweat but by very hard labour; whereas weak girls often melt in sweats even with the slightest exercise of body. For by the violent action of the strong vessels and viscera, the water seems to be intimately united to the other constituent principles of the blood, and coheres much more powerfully.

S E C T. DCCXVI.

IF such a sweat continues for a considerable time, it deprives the blood of its diluent liquid, inspissates what remains, and occasions fatal obstructions, the blood afterwards hardly admitting of an intimate mixture with diluent or resolvent liquors; hence it may produce almost all kinds of acute diseases.

A certain quantity of water was necessary in the blood, that by the interposition of its parts among the rest of the grosser principles, the blood may be
prevented

prevented from concreting into a solid mass, and by that means continue disposed to flow through the smallest extremities of the arteries. For we see that the particles of the blood concreate together by dryness, §. 117, and, on the other hand, we demonstrated that the cohering particles of the blood may be resolved by diluting with an attenuating fluid intermixed. (§. 132.) If therefore a sweat continues in the beginning of an acute fever, it dissipates the diluent liquids, and renders the remaining mass of the blood impervious; whence in a little time it hesitates in the ultimate extremities of the arteries, and from thence obstructions, inflammations, and their worst consequences may follow. Many Physicians have been of opinion, that the morbid matter might be expelled by sweats in acute diseases, at least in part, if not entirely; and therefore they inferred, that this discharge always abated the violence of the disease, more especially as in the plague and a few other diseases there is sometimes a volatile miasm this way expelled; and as the slighter febrile diseases arising only from an obstructed perspiration are often happily cured upon the appearance of a sweat. But they despise the danger which ought justly to be feared from a dissipation of the thinner parts of the blood, by thinking that this vehicle of the blood which was destroyed, might be easily restored again by diluent watery drinks. We can indeed procure the watery drinks taken in and mixed with the blood in the veins to flow together with it through the vessels, but it is very difficult to dissolve those parts of the blood which have been once united by the violence of the disease, and a want of that thin fluid, by the interposition of which its concretion was prevented; and even sometimes it is altogether impossible to dilute these parts. For

the blood, thus rendered impervious, hesitates in the smallest extremities of the arteries, and by that means a passage is denied to the diluent liquors; and moreover, the cohesion of the conjoined particles is often so great, that water cannot insinuate itself betwixt them, when they are concreted with a tenacity almost like that of a polypus, which being once formed is extremely difficult to resolve. Thus we see that the blood lately taken from a vein may be very easily diluted with warm water, but when it has once concreted, an entire dissolution of the concreted mass is impracticable. Hence appears the reason why sometimes great quantities of diluent liquors are drank without any relief in the most acute diseases; while at the same time the great quantity of thin and watery urine discharged, denotes that the ingested water cannot be intimately mixed with the blood, but is immediately separated from it again, and discharged by the urinary passages; and therefore the salts and oils rendered more acrid by the increased velocity of the circulation are retained (see §. 100), and the blood itself more and more inspissated with an inflammatory tenacity, so as absolutely to refuse all mixture with watery liquors; hence in a little time follow a delirium, coma, convulsions, and a fatal peripneumony, which may be expected from the destruction of the very tender small vessels by the retained acrimony, or else from such an obstruction of them by the impervious blood, that the functions thereon depending are destroyed. But it is very evident, that all the same disorders are to be feared when the diluent liquors taken in are immediately dissipated by sweat. But what increased all these maladies was, the forcing of sweats in acute diseases by hot and acrid remedies, as theriaca, saffron, volatile oily salts, &c. and in the mean time the pa-
tient

tient was often prohibited from all drink, lest the efficacy of such medicines given should be weakened. Upon this subject the passages, which Sydenham has interspersed throughout his works, deserve to be consulted; for he was the first, and at that time almost the only, Physician who opposed the torrent of so bad a practice, and fought against this pernicious method of cure by very weighty arguments, establishing the contrary method of cure by the happy event even in the most dangerous fevers.

S E C T. DCCXVII.

SUCH a sweat is therefore always to be suppressed in the beginning of a fever, unless the matter of the disease appears to be so subtle, that it may be dissipated together with the first sweat.

From what has been said, therefore, it appears, that a sweat is prejudicial in the beginning of acute fevers, and that it ought for that reason to be suppressed: for the febrile matter which ought to be attenuated, subdued, and rendered moveable by a due moderation of the fever itself, is not yet disposed to be that way evacuated. But this is also confirmed by the testimony of the antient Physicians. For, *Sudor, una cum febre ortus, in acuto morbo malus est.* “A sweat arising together with the fever, “in an acute disease, is bad,” says Hippocrates^w; and Celsus, where he treats of provoking sweats, observes, that it may be raised two ways, either by a dry heat, or a bath. But he adds, that we ought to be careful of provoking sweats by a dry heat,

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^w Coac. Prænot. N^o. 574. Charter. Tom. VIII. pag. 885.

ne quid horum vel in febre, vel in cruditate tentetur.
 “ Nor to attempt any thing of this kind in a fever,
 “ or in the stage of crudity^x.” And in another
 place he orders, that if the fever is decreasing or ending,
 and the signs denote a sweat is about to appear;
Tum demum dare potui calidam aquam, cujus salubris
effectus est, si sudorem per omnia membra diffundit.
Hujus autem rei causa, continere æger sub veste satis
multa manus debet; eademque crura, pedesque con-
tegere: qua mole plerique ægros in ipso impetu fe-
bris, potissimeque ubi ardens ea est, male habent y.
 “ That then indeed we may give warm water for
 “ drink, whose effects are salutary, if it diffuses a
 “ sweat through all the limbs. For this reason
 “ the patient’s arms and hands are kept under a
 “ sufficient quantity of cloathing; and in the same
 “ manner the legs and feet are covered; but such
 “ a weight of cloathing is very bad for the pa-
 “ tient in the violence or height of the fever, more
 “ especially when it is of the ardent kind.” See also
 what has been said upon this subject in the com-
 ment to §. 594.

But we must except those diseases, the matter of
 which is so thin and moveable, that it may be dis-
 sipated by the first sweat, for then sudorifics are
 useful given in the beginning of the disease. But
 this has been observed to take place chiefly in the
 plague and in pestilential fevers. Hence Syden-
 ham, who always condemns sweats in other disea-
 ses, yet admonishes that they are very useful in
 pestilential fevers. For he then gave a sudorific
 bolus of theriaca, electuarium de ovo, with saffron,
 &c. with some spoonfuls of an aromatic mixture;
 and afterwards loading the patient with cloaths, he
 by these means provoked a sweat. Or even if a
 vomiting

^x Cels. Medic. Lib. II. cap. 17. pag. 93.

^y Idem, Lib. III. cap. 6. pag. 130.

vomiting prevented the taking of these sudorific medicines, or occasioned them to be rejected again as soon as taken, he excited a sweat only by the weight of bed-cloaths; and when once the sweat began to appear, the vomiting was immediately quieted. But the sweat being once begun, he continued it for twenty-four hours with thin aromatic liquors drank; and if the patient's strength failed he recruited them with broths. But he observed that towards the latter hours the sweat flowed more naturally, copiously, and in a manner critically, to the great relief of the patient. Upon this subject see what has been said in the commentaries to §. 598, 634, 659. In that wonderful disorder which has been commonly termed *Ephemera Britannica*, or *Sudor Anglicus*, even at the very first invasion of the disease, the patients perceived, as it were, a kind of hot air diffused through their limbs, and immediately after a sudden and profuse sweat began to flow^z, which, if suppressed, proved fatal to the patient; nor did any fairly escape, unless they had suffered such a profuse sweat for twenty-four hours. If the sweat terminated sooner, they soon after relapsed, or else fell into obstinate diseases^a. Even when such as were the moment before perfectly in health, began to be invaded by this most dangerous disease, it was not safe for them even to put off their cloaths, but they were obliged that very instant to take to their bed. Or if the disease invaded those who were well and in bed, they were obliged to keep themselves there, and to expose nothing but their face, nor even to move about their limbs. Even if two people were taken together by the disease in one bed, it was not sufferable for them to change their apartment, but

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they

^z Joh. Caji de Ephem. Britan. pag. 23.

^a Ibidem, pag. 128.

They were obliged with great inconveniency to endure these troublesome sweats under the same bed-cloaths^b. But as in the height of the disease the patient was often delirious, servants were obliged to watch carefully, lest the patient should expose some part of the body to the immediate hazard of his life. But even the urine or intestinal fæces, the most necessary discharges, did not permit the patient to rise up in the bed, but they were taken away from under them by linen cloths^c. So great was the care necessary to avoid suppressing the sweat, which, when it happened, was followed soon after with a livid swelling of the body, and a sensation like the pricking of needles under the skin, attended with immediate danger of death.

In such diseases therefore alone can we expect any good from the immediate appearance of sweats, which in other acute diseases are always prejudicial. But it is by a careful attention only to such diseases as spread epidemically, that the Physician can learn how he ought to conduct his practice, as will be hereafter declared more at large when we come to treat of epidemical diseases.

^b Ibidem, pag. 108.

^c Ibidem, pag. 128.

S E C T. DCCXVIII.

SUCH sweats are prevented by leaving the bed, or by sitting up in it, by freeing the body from too much covering, by admitting a moderately cool air, by abstaining from such things as are heating, or are made hot by fire, by often using much thin mild drink moderately cool, speedily to restore the loss of what was exhausted; and, lastly, by restraining the too great velocity of the circulation; see §. 102 to 106.

We come now to consider how this sweat, arising in the beginning of fevers, may be safely removed.

By leaving the bed, or by sitting up, &c.] For when the patient lies sweating in bed, the whole body is surrounded with warm and moist vapours, than which nothing more relaxes and weakens; but, as we reckoned (§ 715.) too great weakness and relaxation of the vessels among the causes of febrile sweat, it is evident that continual lying in bed increases the cause of sweat. Hence Sydenham^d, fearing those profuse sweats in the beginning of the small-pox, will have the patients to sit up, and not keep to their bed in the day-time. But no prudent person will advise the taking up of a sweating patient suddenly out of bed, and to expose the body hardly covered to the cold air; since we have demonstrated before, §. 118, that so many and great disorders may arise from the sudden application of cold to a body hot, and in a sweat. But the
sweat

^d In Dissertatione Epistolari, pag. 446, & alibi sæpius.

sweat is first to be lessened by gradually removing the bed-cloaths, and then, when it has almost ceased, the patient may put on his cloaths and sit in a chair; or if the weakness is so great as to forbid sitting up, he may lie in this manner clothed upon the bed only: but after this has been done, it will never hurt the patient to admit the moderately cool air, which will temperate the too great and troublesome heat. But how prejudicial continual lying a-bed is, together with the confined air in fevers, has been said before upon another occasion §. 698. At the same time also the too great violence of the circulation may be lessened, which is another cause of sweat in fevers (§. 715.), since by this means a due moderation may be obtained with respect to the exorbitant force of the fever, as we demonstrated in the comment to §. 610. Nor is this a new invention of restraining sweats in fevers; for Ægineta^e recommends the same, when he says, *Cum vero sudores largius eruperint, tunc abstergendo, & levando integumenta recreare oportet. Etenim lassant supra modum prodeuntes, ut in syn-copen frequentur deduxerint. Tenue ergo sit velamen & madidum, & aër frigidiusculus, & somnus adjungatur & eventilatio.* “ But when sweats break
 “ forth too copiously, the patient ought to be re-
 “ freshed by wiping them off, and by lightening
 “ the bed-cloaths; for excessive sweats so much
 “ weaken the patient, that they frequently bring
 “ on a fainting. The covering ought therefore
 “ to be thin, and the air cold and moist, and to
 “ these should be added sleep, and a changing or
 “ renewal of the air.”

By abstaining from such things as are heating, or are made hot by fire.] For every thing which is either actually hot, or is endowed with a power of increasing

^e Lib. II. cap. 46. pag. 22. versa.

increasing the causes of our heat, excites sweats. For in a hot air all people sweat from the slightest causes; and almost all aromatic and stimulating medicines are sudorifics; more especially if a method is taken to determine their action towards the surface of the body: which is more especially effected, when after taking these things the person lies in bed covered with cloaths, and retained in a bath of his own vapours.

[By often using much thin and mild drink, &c.] For thus may be well restored those parts which have been exhausted by too profuse sweats in fevers. But it is necessary for the drink to be thin and mild, lest it should increase the violence of the circulation, as a stimulus. But drink moderately cool is preferable to that made warm, because by warm drinks sweats are increased, or at least maintained. Hence Sydenham, when he found it necessary to promote sweats for the space of twenty-four hours in the cure of pestilential fevers, maintained the sweats once raised by warm drinks. But for very cold drink to be taken into a body much heated, more especially in large quantities at a time, would be dangerous, since the blood is so easily coagulated by intense cold, and is in the present case still more inclined to concretion, by the dissipation of its thinnest parts into sweats. It will be also best to give the drink in small quantities, and often repeated, because if much thin liquor is suddenly mixed with the blood, it is immediately expelled by the relaxed and open perspiracles of the skin.

[By restraining the too great velocity of the circulation.] For every thing else being alike, the secretion and excretion is increased, in proportion as a greater quantity of the fluid is applied in the same space of time to the secretory and excretory

cretory organs: and therefore the reason is evident why sweat is excited by too great a velocity of the circulation. But every thing hitherto recommended is likewise of use to diminish the too great violence of the circulation, as will appear evident to one who considers what was said before at §. 610. But how, and by what means this excess of the circulation may be lessened, has been explained in the aphorisms here cited in the text.

But since a weakness and relaxation of the cutaneous vessels has been ranked among the causes of sweat (§. 715.), and as the remedies here recommended, do not seem to be so directly adapted to correct this weakness and laxity, therefore a peculiar treatment may seem necessary for this purpose. But a moderately cool air constricts these too much relaxed vessels; and as they are less urged by the diminished violence of the circulation, these dilated vessels usually contract to their former dimensions by their natural elasticity. But in the mean time, we find in the writings of the ancient Physicians, that they likewise applied externally to the skin such things as were capable of corroborating by their astringent virtue the too much relaxed cutaneous pores; and of this nature many things are recommended by Ægineta ^f. He even directs to anoint the body with oily or fat substances, which by obstructing the latent passages of the skin, might prevent the moisture from escaping. Thus it is known that the Romans used to anoint with oil the bodies of the *athletæ*, lest by too violent exercise of body they should melt in sweats. Thus Celsus ^g also tells us, *Si vero sudor exercet, duranda cutis est, vel nitro, vel sale; quæ cum oleo miscentur. At, si levius id vitium est, oleo corpus unguendum est:*

^f Lib. II. cap. 46. pag. 22, versa.

^g Lib. III. cap. 6. pag. 133;

si vehementius, rosa, vel melino, vel myrteo, cui vinum austerum sit adjectum. “ That if a sweat fatigues the patient, the skin is to be hardened with nitre or salt, mixed with oil. But that if the disorder is slight, the body is to be anointed with simple oil; but if more violent, with oil wherein roses, millet, or myrtles have been infused, to which some rough wine is to be added.”

But as many people cannot bear the application of fat substances without being immediately afflicted with an erysipelas; and as sprinkling the body with astringent powders, or to cover it all over with fomentations prepared with astringent medicines, gives great trouble; and as it is always unsafe to suppress a sweat by obstructing or constringing the pores, while at the same time the violence of the circulation continues to agitate the humours, and the same remedies seem to impede the sensible perspiration; for these reasons such remedies are seldom put in practice, more especially since by the other methods which we before proposed, which are more safe and less troublesome, the febrile sweat may for the most part be happily restrained. Yet the observations with which we are furnished in medical history, teach us that such things have sometimes been useful. Thus, in a certain disease, familiar to the inhabitants of Bengal, the patients melted with most profuse sweats, to suppress which they sprinkle the beds with linseed; for that being moistened by the sweat, forms a very tough mucilage, which, adhering to the skin, stops up its pores, and by that means restrains the sweat^h.

There is still another kind of sweat which is usually observed towards the end of long continual fevers; as also in those who, having recovered

from

^h Lettres curieuses & edificantes des missions etrangeres, &c. Tom. XV. pag. 414.

from lingering fevers, are as yet weak and languid; and more especially as Sydenhamⁱ well observes, if the patient escapes from those diseases after frequent and profuse evacuations, and particularly if they had originally an infirm constitution of body before they were taken with the disease. For these are no sooner laid in bed, though but moderately covered with cloaths, but they begin to grow hot, and soon after run down with sweat; whence great weakness usually follows, and there is danger of a consumption. To those thus affected Sydenham usually gave five or six spoonfuls of old Malaga wine, by the use and virtue of which long continued, they gradually recovered strength, and the sweats disappeared. I have often seen many good effects from an infusion of sage made in wine, and taken in a like quantity night and morning: or if the troublesome sweat does not yield to this, the same infusion made with spirit of wine, and taken in the quantity of two spoonfuls twice a day, never fails; namely, when these night sweats arise from this cause. It is well known that porters, when they are in a sweat and thirsty with hard labour, take first a dram, and afterwards allay their thirst with small-beer, having experienced that without this precaution, what they drink would soon be expelled in sweats without refreshing the body. From hence it is evident, that spirituous liquors may be of great use to allay sweats from too thin a state of the humours, and a relaxation of the cutaneous vessels.

ⁱ Sect. V. cap. 2. in fine, pag. 291.

Of a Febrile Diarrhœa.

S E C T. DCCXIX.

A Diarrhœa, or flux, has for its matter, mucus, lymph, glue, pus or matter, sanies, blood, and other juices derived from the nose, mouth, fauces, œsophagus, stomach, liver, gall-bladder, pancreas, intestines, and mesentery; for its cause it acknowledges a violent expulsive force of the intestines, a weakness of the contractile powers of the intestines, or an impediment in the absorbing vessels of the intestines preventing their admittance of the juices.

A frequent discharge of liquid excrements by stool is called a diarrhœa (*ἀπὸ τῆς διαρρέειν*) which signifies a perfluvium, *i. e.* a flux through the bowels; and in a strict sense the word is only thus used by Physicians to denote the same thing. For although the excrements are discharged figured, but soft, for the most part in people who enjoy a sound state of health; yet in many it is a common thing for the bowels to be loose without any detriment to their health; which has been also remarked by Hippocrates, who observes, that this alters by age; *Quibus per juventutem humidæ sunt alvi, illis senescentibus exsiccantur. Quibus vero in juventute siccæ sunt, illis senioribus humectantur.* “ For in
 “ those who have a looseness of their bowels in
 “ their youth, they become dry when they grow
 “ old. But those who are costive in their youth,
 “ have

“ have a looseness when they are old ^k.” But he does not in the least judge a looseness of the bowels to be morbid in youth, since in another place ^l he has pronounced, that young people who have a looseness of their bowels have their health better than those who are constipated. A humidity therefore of the bowels is not sufficient to term it a diarrhœa, but there ought likewise to attend a frequent discharge by stool, having always a regard to the natural habit of the patient, which is so very different in various people, with respect to this evacuation: For there are many who go to stool several times in a day, though at the same time they otherwise enjoy a sound state of health; others again go but once a day, or not so often. A person is therefore said to be afflicted with a diarrhœa, when there is a more than usually frequent and fluid discharge of the fæces; but when this more frequent and liquid discharge of the excrements is accompanied with a considerable pain, it is usually called a dysentery; or an ill disposition and difficulty of the intestines. From whence the same disease is also by Celsus ^m called *Tormina*; the gripes; though other authors would have it called a dysentery only when there is an ulceration of the intestines, and a discharge of blood by stool; as we shall see more at large hereafter §. 721. But when the ingested food is expelled by stool hardly altered, it is commonly called *λεῖνίεργία*, *sive lævitas intestinorum, qua continere nihil possunt, & quidquid assumptum est, inconfectum protinus reddunt.* “ A lientery or smoothness of the intestines, in
“ which they can retain nothing, but imme-
“ diately discharge whatever is taken in undi-
“ gested;

^k Aphor. 20. Sect. II. Charter. Tom. I. pag. 60.

^l Aphor. 53. Sect. II. *ibid.* pag. 89.

^m Lib. IV. cap. 15. pag. 224.

“gestedⁿ;” from a laxity and as it were a palsy in the fibres of the stomach and intestines. But this disease may be included under the general definition of a diarrhœa, as a species under the genus, as may also another disorder a-kin to this, which is usually called by authors the *affectio cœliaca*; in which the aliments are expelled, not perfectly crude and unaltered under a liquid form, but the chyle is discharged together with the fæces^o, which naturally used to be absorbed by the lacteal vessels, before the fæces remaining after the food is discharged by stool. But the term cœliac passion is not found used by authors in such a restrained sense. Indeed in Aretæus^p we have such a description, which teaches that the cœliac passion differs only in degree from a lientery, since in a lientery the aliements are soon expelled by stool crude and unaltered; but in the cœliac passion, *Liquescit a calore alimentum, sed non concoquit calor, neque in succum proprium vertit semicoctum & imperfectum relinquens.* “The aliment is liquified, but not concocted by the heat, nor changed into its proper juice, but is left imperfect, and only half concocted.” But in another place, where he treats of the cure of this disease^q he has the following passage; *Si ventriculus ciborum impotens sit, perfluat autem alimentum, non coctum, non mutatum, crudum, nihilque ad corporis molem transeat, cœliacos hos appellamus:* “If the stomach is not capable of digesting the food, but the aliment flows through it not concocted, nor changed, but crude, without any of it passing into the body, we call these patients cœliacal;” which definition certainly agrees very well with a

Vol. VI. B b lientery.

ⁿ Lib. IV. cap. 16. pag. 226.

^o H. Boërh. Institut. Med. Sect. DCCCXIII.

^p Lib. II. De causis & signis morbor. diuturnor. cap. 7. pag. 58.

^q De curat. morbor. diuturnor. Lib. II. cap. 7. pag. 132.

lienterly. But in Celsus the cœliacal disease of the stomach, as it is called, is very different: For thus he expresses himself; *In ipsius vero ventriculi porta consistit is, qui & longus esse consuevit, & Κοιλιακός a Græcis nominatur. Sub hoc venter indurefcit, dolorque ejus est: alvus nihil reddit, ac ne spiritum quidem transmittit: extremæ partes frigescent: difficulter spiritus redditur.* “ But in the gate of the
 “ stomach itself is lodged that which is usually a
 “ disorder of long continuance, and called Κοιλια-
 “ κός by the Greeks: In this disorder the belly
 “ seems hard, and is painful; nothing is discharged
 “ by stool, and the bowels do not even transmit
 “ air; the extreme parts grow cold, and the
 “ breathing is difficult.” Yet it has obtained from custom with us to call it the cœliac passion, when the aliments are in some degree concocted, and retained a longer time in the stomach, and not so soon expelled by stool as in a lienterly, in which the food is discharged by stool perfectly crude, as it was at first taken in, with so great and manifest a degree of crudity, that one plainly perceives the kind of the food taken in^s. And therefore in this sense the cœliac passion may be ranked among the kinds of a diarrhœa.

But in considering a diarrhœa three things are more especially to be regarded, namely, the difference of the matter evacuated; the different parts of the body from whence that matter is derived; and, lastly, the causes which occasion that matter to be deposited in the cavity of the intestines, and afterwards to be expelled by stool; all which ought to be well known, in order to form a prognosis and indications for the cure. We shall first see what
 medical

^r Cels. Lib. IV. cap. 12. pag. 220.
 Medic. pag. 322.

^s Gorræi desin.

medical observations have taught us concerning the matter discharged by a diarrhœa.

Mucus.] By this name we call a ropy thick humour hardening into scales, and drying up to a tophaceous matter, resolvable again in water only by maceration. All these properties we find in the mucus of the nostrils, which serves to lubricate and defend the internal membranes of the nose. But as we said before at §. 75, a mucus of the same kind lines the fauces, internal parts of the mouth, œsophagus, stomach, and anoints the whole internal surface of the intestines, whence it will not seem at all wonderful if mucus is sometimes expelled by stool in a diarrhœa. Such mucous stools therefore are discharged, when the natural mucus lining these parts is first accumulated in a large quantity. Sometimes also in diseases the organs, which separate this mucus, are so disposed, that they form a much greater quantity than is natural. This is evident in catarrhs, when men who are in health, having their noses commonly dry, discharge daily an incredible quantity of mucus; and as the like mucous follicles are dispersed throughout the internal surface of the stomach and intestines, it is sufficiently evident that these being affected in the like manner, may collect and discharge a very great quantity of mucus by stool. Hence Hippocrates^c observes, *Hominibus, capita humida & pituitosa habentibus, ventres crebro exturbari, pituita à capite defluente.* “That people who have their heads
“moist and phlegmatic, have frequently their
“bowels disturbed by the phlegm flowing from
“the head.” And in another place^u, *Quibus in diarrhœis spumose fiunt dejectiones, illis à capite pituita defluit.* “That in those who have frothy

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“de-

^c De aëre locis & aquis cap. 2. Charter. Tom. VI. pag. 189.

^u Aphor. 30. Sect. VII. Charter. Tom. IX. pag. 306.

“ dejections in a diarrhœa, there is in them a de-
 “ fluxion of phlegm from the head.” For the
 Antients, ignorant of the circulation, when they saw
 a sudden collection of phlegm in any part, and did
 not understand by what force or by what passages
 it was derived thither, they believed it to be col-
 lected in the brain, which they pronounced to be
 the coldest and the least abounding with blood,
 from whence they supposed it to flow to the other
 parts of the body; and from hence they gave the
 name of catarrh from its flowing downwards.

Lymph.] The saliva of the mouth swallowed,
 the liquor secreted by the exhaling arteries of the
 stomach and intestines, the pancreatic juice, and
 the hepatic bile which is so dilute and thin, may
 all conduce to form the matter of a lymphatic or
 serous diarrhœa. For if we consider the quantity
 of saliva swallowed, the great number of the arte-
 rial ducts opening into the cavity of the stomach
 and intestines, with the great bulk of the liver and
 pancreas, it will be sufficiently evident, that a very
 large quantity of lymph continually distils into the
 cavity of the intestines, which is again absorbed
 in health; but which in diseases is sometimes dis-
 charged by stool, to the great damage of the body,
 since by this means a great quantity of the healthy
 humours is exhausted, and the due preparation of
 the chyle from the ingested food is hindered, in-
 asmuch as that depends in a great measure on the
 mixture of the healthy humours with the crude
 juices of the aliments. Hence if such a diarrhœa
 continues for a long time, there usually follows
 great weakness and very bad obstructions of the
 abdominal viscera. But sometimes also the lymph
 stagnating in other parts of the body is absorbed by
 the veins, and mixing with the circulating hu-
 mours is afterwards this way evacuated from the
 body,

body, as we sometimes observe with salutary effects in a dropsy. Hence Hippocrates ^w says; *Ab Hydrope detento, aqua secundum venas in ventrem fluente, (morbi) solutio. In hydrope incipiente, diarrhœa aquosa facta, citra cruditatem, morbum solvit* *.

“ That the water retained in the abdomen, in a
 “ dropsy, flowing a second time into the veins,
 “ terminates the disease. And that a watery di-
 “ arrhœa in an incipient dropsy without crudity
 “ removes the disease.”

Glue.] More tenacious than the natural mucus, and sometimes produced of that accumulated, and thickened by long standing; but sometimes the glue arises from what is taken into the body (see what has been said before under the title of diseases arising from a spontaneous glue). There are wonderful instances of such glutinous concretions in the intestines, given us in medical history. The embassador of the emperor Charles V. was tormented with a pain, together with a tumour in the right hypochondrium, continued along the bottom of the stomach to the left side. He had for the space of six years made use of emollient remedies proper to remove the schirrhus, as the Physicians imagined this tumour to be of that kind, at length a pretty sharp clyster being applied, there was discharged a hard body perforated in the middle of about a foot in length, which the patient was afraid was part of his intestines. But as he was thereby immediately relieved, he again permitted a second and a third clyster; and after the discharge of more of the like matter he lived well in health ^y. In another there was a disease something

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like

^w Aphor. 14. Sect. VI. Charter. Tom. IX. pag. 255. & Coac. Prænot. N^o. 461. Charter. Tom. VIII. pag. 879.

* Ibid. N^o. 457. pag. 878.

^y Fernel. Pathol. Lib. VI. cap. 9. pag. 157.

like this, but more violent, which totally intercepted the passage of the intestines; and after death the intestinum colon was found so much stuffed up with concremented phlegm, that it perfectly resembled a solid, and none of the fæces could be discharged by stool. Hitherto may be also referred that kind of phlegm which is called vitreous, being pellucid like glass, and trembling like a jelly, or the white of an egg, as we sometimes see discharged by stool. See what has been said in the comment to §. 71.

Pus or matter, and sanies.] Namely, when a vomica breaking in the stomach, intestines, or adjacent viscera, discharges matter into these parts where they used to convey their healthy humours. But even in other parts of the body which do not directly evacuate themselves into the stomach and intestines, matter lodged may be evacuated or deposited into the intestines by metastasis; which we demonstrated by several observations in the comment to §. 406. The same is also true of laudable matter which has been so long confined in a close abscess, as to change into sanies, or corrupt matter.

Blood.] When the fæces are discharged bloody from an erosion or ulceration of the intestines by acrid humours, there is pain and griping attend at the same time; and then the disorder ought rather to be called a bleeding dysentery than a diarrhœa. But it sometimes happens that blood is discharged by the anus, without any considerable pain by the dilated mouths of the hepatic or mesenteric vessels, or from the hæmorrhoidal vessels without a rupture of them; but that a like hæmorrhage must ensue from a rupture of those vessels is evident to all. Thus I remember myself to have sometimes seen, after the most troublesome and long continued pains of the

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the upper orifice of the stomach, that a considerable quantity of blood has been discharged by the anus without any pain, but soon after has followed great weakness with faintings and death. But when this happens from a dilatation of the mouths of the vessels only, the danger is not so great; for frequently such a discharge of blood is salutary, as it lessens the too great quantity, and often supplies the deficiency of the other natural discharges of blood. Thus I have known several men feeding plentifully, and living an idle life, with whom it is a common thing to discharge pure blood three or four times in a year by the anus, without any detriment to their health, but rather they found themselves much better after such an evacuation. Galen observes^z that blood is discharged in some people by a kind of circuition, either from the loss of limbs (see the comment to §. 174), or from a neglect of exercise. And in another place^a, after having said the like, he adds as follows, *At visa est quoque mulieribus, suppressis mensibus, hujusmodi per sedem sanguinis vacuatio fieri; ut & nonnullis per vomitum ob eandem causam. Verum & his quidem sincerus sanguis excernitur, similis ei, qui mactata victima profunditur; modo per alvum inferiorem, modo per superiorem.* “But we also observe, that such an evacuation of blood by stool happens in women who have a suppression of the menses: and in some a like discharge of blood by vomiting has proceeded from the same cause. But then in these cases the blood is discharged pure, like that which is poured forth upon slaying an animal; and this is sometimes evacuated downward by stool, and sometimes upward.”

B b 4

These

^z De Symptom. causis, Lib. III. cap. 7. Charter. Tom. VII. pag. 97.

^a De locis affectis, Lib. V. cap. ultimo, ibid. pag. 503.

These are principally the humours which compose the matter of a diarrhœa ; but then to these the bile is to be added, as is evident enough, tho' it has not been considered among the former. But immediately hereafter, where we treat of the parts from whence the matter of a diarrhœa flows to be evacuated, the gall-bladder is mentioned. Now, according to the various mixture of all these humours among themselves there arises a great difference. But besides these there are sometimes more extraordinary cases happen, wherein another kind of matter may be discharged by stool, which cannot be referred to any of those before-mentioned. Thus in Tulpius we read ^b of a comely and tender woman, who being frequently afflicted with a tertian fever, or an obstruction of the spleen, at length discharged daily a great quantity of yellow fat floating upon the fæces for the space of fourteen months, or longer, so that it resembled melted butter ; and this she discharged in so great a quantity that it filled several cups. But that it was really fat appeared from its yielding a clear flame when it was thrown upon burning coals, and when it was once cold it hardened like solid fat. But this fat was always discharged by stool without gripings, and without any colliquative fever, which most Physicians suspected, and without any wasting or falling away of the body ; insomuch, that the woman then continued in a good state of health, being the sixteenth year after this discharge. Another case of the like nature is related by the same author ^c.

Of the nostrils, mouth, fauces, &c.] We come now to the enumeration of those parts from whence the matter of a diarrhœa may be derived into

^b Lib. III. cap. 18. pag. 208.

^c Ibid. cap. 19. pag. 210.

to the cavity of the intestines, so that it may be afterwards expelled from thence by stool. But from all the forementioned places there is a direct passage into the intestines. For, from the nostrils the humours may slip down into the fauces, and from thence into the stomach and intestines; and from hence sometimes both the patient and the Physician have been alarmed without just cause, when blood flowing from the nose and swallowed in the sleep, has been afterwards discharged by stool. Hence also a great quantity of mucus is often discharged by stool in young children, when they swallow the mucus, which slips down from the nostrils into the fauces when they have taken cold, or when the like mucus is coughed up from the lungs. From the liver there is a passage open into the intestinum duodenum by the porus biliaris, and from the gall-bladder by the cystic duct; and from thence may follow bilious, hepatic, atrabiliary, and other diarrhœas. The same is also true of the pancreas. But the intestines are also furnished with innumerable arterial ducts exhaling humours into their cavity, separated from the blood, and these are also accompanied with absorbing veins, as we are taught from anatomical injections, made as well by the branches of the vena portarum, as by the mesenteric arteries; and therefore humours may be also derived from these vessels into the intestines; and that the quantity of these humours may be very considerable, will appear from considering the number of these vessels, and that their extremities opening into the cavity of the intestines, seem to be very easily dilatable, since they even transmit the ceraceous matter of an injection, as Ruysch observes in several places, and as I have myself sometimes seen, even though the injection is not urged into the vessels with a great force, nor
any

any signs appear afterwards of the matter being extravasated by a rupture of the vessels, when the intestines thus filled have been inflated and dried. But although the small venous ducts naturally absorb the humours contained in the cavity of the intestines, yet as all those veins discharge themselves into the trunk of the vena portarum, and as that vein distributed through the liver performs the office of an artery, an impediment being formed against the free course of the humours, through the ultimate extremities of the vena portarum, in the liver, the humours may then be obliged to return with a retrograde motion from the veins into the cavity of the intestines, when, after exciting extreme anguish, they are urged by the force of vomiting and an increased respiration. See what has been said concerning this retrograde motion of the humours in the comment to §. 631.

But if the resistance be diminished in the vessels, or if the impulse of the fluids moving thro' them be increased from any cause, there may then be a quantity of humours derived from other parts towards the cavity of the intestines; whence it is evident, that the humours derived from other and most distant parts of the body, may be discharged by stool. Thus we know that by the repeated use of purgative medicines the whole body may be exhausted; and that the same may happen from a long continued diarrhœa, we shall declare hereafter. But this appears in nothing so evident as in the disease termed the cholera morbus, where of a sudden, in a few hours time there is so great a discharge of the humours both by vomiting and stool, that the whole body is exhausted, the face looks pale and collapsed, all the strength is destroyed, and even sometimes convulsions are observed from so profuse and sudden inanition, even though not so much as a drop of blood is discharged

discharged either upward or downward: and this I have often observed with great admiration, and particularly in a strong girl, who in the space of three hours had her face so much altered and collapsed by this disease, that her most intimate acquaintance could not know her; all the humours being dissolved as it were by a poisonous force, and violently expelled by vomiting and stool.

For its cause it acknowledges a violent expulsive force of the intestines, &c.] We have already seen the nature and several kinds of the matter of a diarrhœa; and from what parts this matter may be derived into the cavity of the intestines. Whatever therefore occasions the humours to be derived in a greater quantity towards the cavity of the intestines, may in that respect be the cause of a diarrhœa; and therefore a diarrhœa supposes a violent expulsive force in the intestines. But this cause alone is not sufficient; for if the absorbing veins, which are found opening throughout every point of the internal surface of the stomach and intestines, imbibe again the humours forced upon those parts, there will be no diarrhœa. For when a healthy person drinks twelve pints of Spa water, there is often not so much as a drop discharged by stool; for though so great a quantity of liquor is conveyed into the intestines, yet it is all absorbed by the bibulous veins, and discharged from the body by the passages either of the urine or sweat. There is therefore required so great a contractile force in the intestines, as to enable them to confine so great a quantity of liquor, and prevent it from escaping by stool. But when these contractile powers are weakened, the liquor taken in by the mouth, or deposited into the cavity of the intestines from their own or the mesenteric vessels, or those of the adjacent viscera, then escapes by stool,

at least a part of it, or else all of it, if the intestines are perfectly relaxed, or in a manner rendered paralytic. In the first case, the evacuation by stool is liquid and frequent, and in the latter case, there will be a lientery when the ingested food or the humours expelled into the cavity of the intestines, are by their own weight and the force of the respiration expelled by stool, little or nothing altered; and often even against the patient's will, which is then always a very bad sign, inasmuch as it denotes a perfect palsy or relaxation of the intestines. Hence Hippocrates^d has pronounced those evacuations by stool to be fatal which are made without the knowledge of the patient. But as this sometimes happens to delirious and phrenetic patients, rather from an injury of the brain than from a palsy of the intestines, therefore in another place he has made a greater restriction to this prognosis, when he says^e, *Ab alvo tenuia non sentienti transire, ei qui apud se sit, malum: ut hepatico.* "Thin stools coming away without the patient knowing what happens to him is bad; as when the liver is disordered." Hence also astringents are of service by corroborating the too lax fibres of the intestines, as will be said hereafter in the cure of this disorder, and likewise stimulating aromatics are often of much use, as they irritate the inactive fibres into more violent contractions. Hence the reason is evident why Hippocrates says^f, *In diuturnis lienteriiis ructus acidus abortus, qui prius non aderat, bonum signum* "That acid belchings arising in lienteries of a long standing, which they did not attend before, are a good sign." For it denotes that the contractile force of the stomach and intestines

^d In Coacis Prænotionibus N^o. 631. Charter. Tom. VIII. pag. 890.

^e Prorrhēt. Lib. I. ibid. pag. 750.

^f Aphor. I. Sect. VI. Charter. Tom. IX. pag. 245.

intestines is in some measure returned, whereby the ingested aliments may be retained at least so long that they begin to degenerate into a spontaneous corruption; whereas, in a lientery, properly so called, every thing taken in is speedily evacuated unaltered by stool.

But besides this weakness of the contractile powers of the intestines, there seems to be another cause of a diarrhœa. For we know that the intestines are naturally agitated with a kind of vermicular motion, as appears even to the naked eye in the dissection of living animals, and when the intestines of mankind have been exposed to view by wounds or other causes (see the comment to §. 648): and this is called the peristaltic motion by which the fibres of the intestines, contracting themselves successively in different parts, apply the absorbing venal ducts to those things which are contained in the cavity of the intestines; and by this means the contents are gradually propelled throughout the whole length of the intestinal tube, even to the anus. But these internal contents suffer a great remora or retention before they reach the anus, because of the many folds or eminencies contracting the cavity of the intestines, and from the retrograde peristaltic motion repelling the contents back again. For if any one carefully examines by the eye the intestines of a living animal after the abdomen has been cut open, it will plainly appear that the intestinal contents are propelled by the peristaltic motion; and that soon after the same motion becoming retrograde, repels back again the contents, which are again propelled forward the next instant, and by that means very slowly conveyed towards the anus. But this done, that the food, drink, and humours conveyed thro' so great a length of the intestines, might be every moment applied to the mouths of the absorbing veins,

veins, and be drained almost entirely of their juices, and that the remaining fæces deprived of all their useful moisture being figured, but as yet soft for the most part in healthy people, may be excluded by stool. But in people who are perfectly in health, there seems to be a determinate space of time necessary for the performance of this whole motion from the mouth to the anus, but varying in different people: and this may be experienced by any one by swallowing whole currants, which are always discharged entire in the fæces, which being afterwards inspected, will shew the interval of time betwixt their taking in and exclusion. Hence also it is common with most people to go to stool at an usual time. Hence Hippocrates ^s says, *Alvi dejectio optima est mollis, compacta, subfulva, non valde graveolens, prodiens hora consueta, copia pro ratione ingestorum. Tali enim dejectione existente, inferior venter sanus est.* “ That the best stools are
 “ soft, close, of a dark yellowish colour, not very
 “ foetid, and discharged at an usual time or hour,
 “ in a quantity proportionable to the food taken in.
 “ For when the stools are thus conditioned, the
 “ abdomen or lower venter is in a healthy state.”

If therefore from any cause the intestines are so irritated, that their contents arrive sooner at the anus by the more quick and violent peristaltic motion, there will not be time enough allowed for the venal ducts to absorb all the juices of the aliments; and therefore the stools will be more frequent and liquid, that is to say, a diarrhœa will attend. Moreover, by such a swift propulsion the ingested food may be discharged by stool little altered; and thus a lientery will attend, which is
 commonly

^s Coac. Prænot. N^o. 601. Charter, Tom. VIII. pag. 888. & in Prognosticis ibidem, pag. 626.

commonly ascribed only to a palsey of the intestines. Hence Galen^h observes, that the name given to a lientery is of bad import, denoting a smoothness of the intestines, and supposing that the disease may be produced when sharp corroding humours irritate the stomach and intestines. He also adds, that the intestines being ulcerated by such crude and acrid humours, are so stimulated by the food passing on, that they very soon urge forward their contents; more especially when this happens throughout the whole tract of the intestines, the quickness of the passage will be such that there will be no signs of concoction. But although he would ascribe such a lientery to a weakness of the stomach and intestines, yet it is sufficiently evident from what follows in the same place, that he only understands a weakness of the digestion, and not a weakness of that power by which the stomach and intestines contract themselves, and protrude their contents towards the anus. But in order to distinguish these two kinds of the lientery, he says; that which arises from acrid humours irritating the stomach and intestines, is accompanied with a sense of the heart-burn, or gnawing pain; but, on the contrary, that which arises only from a weakness of the stomach and intestines, is destitute of all sense of pain.

But that this motion of the intestines, protruding their contents towards the anus is accelerated by every thing that stimulates, appears from the action of purgative medicines, which by their irritation seem to draw the humours towards this part, and at the same time to increase this motion. For although there is often occasion for the greatest straining of the abdominal muscles and diaphragm
to

^h Commentar. in Aphor. 1. Sect. VI. Charter. Tom. IX. pag. 246.

to expel the hard fæces, yet it is certain that they may be discharged by the action of the intestines only, since sometimes the stools are deposited suddenly, and against the strongest endeavours of the will. This is confirmed by a fair experiment of Wepferⁱ: For, to a puppy he gave a scruple of glass of antimony with milk, and three hours afterwards cut open the abdomen, and from whence the intestines hung out naked, but the animal discharged yellow fæces by stool, nearly of their natural consistence, only by the force of the intestines, as evidently appears. Hence the reason is also evident, why, after taking of purges, and in a spontaneous diarrhœa, there is a considerable murmuring noise heard in the intestines, and frequently gripes go before the bowels are evacuated, though they are not so troublesome and frequent as in a dysentery, but proceed merely from the peristaltic motion of the intestines accelerated. It is likewise evident, from what has been said, why Hippocrates pronounces: *Prædicere autem oportet, excretionem subitus erumpentem desituram esse, quum ventrem manu tangenti nullus motus occurrerit, & in fine dejectionis flatus exiverit.* “ That we ought to predict
 “ the excretion of the humours breaking forth will
 “ suddenly desist, when no motion can be per-
 “ ceived in the belly felt by the hand, and when
 “ in the end of the evacuation no flatus is dis-
 “ charged^k.”

When therefore a weakeness of the contractile powers of the intestines is in the text placed as the cause of a diarrhœa, it is to be understood, not only as if the intestines let slip their contents, in every diarrhœa where they are relaxed and paralytic,

ⁱ Cicut. Aquat. Histor. cap. 20. pag. 253.

^k Prorrheticor. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

tic, but also inasmuch as the natural effect of their contraction, namely the absorption of the juices by the bibulous veins is diminished; even though the contractile force of the intestines remains strong enough, and their contents only are expelled by a quicker peristaltic motion. In the same manner also Galen seems to have proposed the cause of a lientery to consist in a weakness of the stomach and intestines, as we observed a little before, even tho' it may be produced by acrid humours irritating these parts. Hence also it is recommended to correct or obtund what is acrid and irritating in the cure of a diarrhœa (§. 722). Whence it is evident that the words of the text are to be understood in this sense.

Or obstructions in the absorbing vessels of the intestines preventing their admittance of the juices] If we consider that the saliva swallowed, with the pancreatic juice and hepatic bile, are continually conveyed into the intestines, and that in every point of the internal surface of the stomach and intestines, there are small arterial ducts which exhale thin humours, it will appear that a great quantity of liquids must be collected in the cavity of the intestines; to which again are to be added the food and drink taken in. But naturally almost all these juices are absorbed by the lacteal veins, or by the mesenteric veins are conveyed to the great trunk of the vena portarum, the solid fæces only being expelled by stool. If therefore there should be any impediment preventing the absorption of the liquids contained in the intestines, the stools must consequently become more fluid and copious, as the intestines are irritated into more frequent contractions either from the mass of their contents only, or from the intestines being perfectly relaxed or paralytic, so as to let their contained fluids escape only by the pressure of respiration. But although

an impediment being formed in the branches of the vena portarum distributed through the substance of the liver, may hinder the mesenteric veins from freely discharging themselves, whence they cannot conveniently receive the humours to be absorbed from the cavity of the intestines; yet this cause of a diarrhœa is less frequent, because the veins may easily be distended in such a case, 'till at length after the greatest anguish and vomiting, the humours are pressed back from the veins into the arteries, and by that means the larger veins are again emptied. (see §. 631, 632.) But the mouths of the smallest veins opened into the cavity of the intestines may be so stopped up by ropy mucous humours there collected, or by apthous incrustations, (see §. 998.) that they can admit of nothing, while in the mean time the exhaling small arteries being not so easily obstructed, often continue to pour forth their humours, being urged by the impulse of the arterial blood, though the venal orifices can at the same time admit nothing. In the worst kind of apthæ there is almost constantly such a fatal diarrhœa, and sometimes it happens in children, whose turgid abdomen sticks out with indigested food; and then the diarrhœa is continual, though the bulk of the abdomen does not in the mean time lessen. Such a disease seems to have been described by Hippocrates^l, whose very words almost are to be found likewise in Celsus^m, who says: *At intestinorum levitas periculosior est, si frequens dejectio est, si venter omnibus horis & cum sono, & sine hoc, profluit; si similiter noctu & interdium; si, quod excernitur, aut crudum est, aut nigrum, &, præter id, etiam læve, & mali odoris; si sitis urget; si post potionem urina non redditur (quod evenit, quia tunc liquor omnis non in vesicam,*
sed

^l Prorrhæ. Lib. II. cap. 13. ^m Lib. II. cap. 8. pag. 74.

sed in intestina descendit); si os exulceratur, &c.
 “ But a lientery or smoothness of the intestines is
 “ more dangerous, if the stools are frequent, and
 “ if there is a flux of the belly or discharge by
 “ stool every hour, with or without a noise or
 “ flatulencies; if the like, which is discharged by
 “ day and night, be crude, black, or shining, and of
 “ an ill smell; if the thirst is urgent, or if after
 “ drinking the urine is not discharged, which hap-
 “ pens because then all the liquor descends not in-
 “ to the bladder, but into the intestines; if the
 “ mouth be ulcerated, &c.” Perhaps the same
 takes place when the intestines have been ulcerated
 after a long continued dysentery, and then these
 parts being cicatrized with a scar become imper-
 spirable, as we see in scars of the external parts
 of the body, when the fabrick of the parts has
 been destroyed. But this cause of a lientery
 seems to have been acknowledged by Galenⁿ,
 when he says: *Ex dysenteria oritur lenteria,*
quando ex magna ulceratione multæ cicatrices intes-
tinis oboriuntur, propter quas cibos non continent in-
testina; unde ex intestinorum lævitate vocata est
lenteria. Quamobrem talis est insanabilis lenteria,
cicatrices namque non sanescunt. “ From a dysen-
 “ tery arises a lientery, when the intestines are
 “ beset with many cicatrices from a large ulcera-
 “ tion, for which reason they do not properly re-
 “ tain the food; and hence it is called a lientery
 “ from the smoothness of the intestines; therefore
 “ such a lientery is incurable, for scars are not to
 “ be remedied.” That a diarrhœa arising from
 an obstruction of the absorbing vessels is dange-
 rous, appears plainly enough, whence Celsus, late-
 ly cited, subjoins °: *Inter quæ cum evidens mors sit,*
 C c 2 *multo*

ⁿ Galeno adscript. Introductio seu Medicus, cap. 13. Char-
 ter. Tom. II. pag. 385.

^o Lib. II. cap. 8. pag. 74.

multo evidentior, si jam in longinquam quoque id vitium est, maximè etiam si in corpore senili est.

“ Among which lenteries, as death is apparently
 “ the consequence, it will be so, much more evi-
 “ dently if the disorder is already of long stand-
 “ ing, and more especially if it happens in the
 “ body of an old person.” But when the disorder arises from a ropy mucus and fæces accumulated in young patients, there are more hopes of a cure; for that mass of foul matter being dissolved by saponaceous medicines, but afterwards evacuated by purgatives, a cure is often performed. Hence perhaps Hippocrates, treating of this disease, says P: *Est autem hic morbus gravissimus senioribus; vehemens est etiam viris. Reliquis autem ætatibus multo minor.* “ But this disorder is most obstinate
 “ and fatal in old people; but it is also violent in
 “ men. But in the other lower ages it is much
 “ less violent.”

S E C T. DCCXX.

IT is therefore evident that a flux of the bowels in fevers is manifold with respect to their matter, cause, and their effects and event; and therefore that it is often altogether incurable; that it is sometimes colliquative, and is then hardly ever curable.

From all that has been said under the preceding aphorism it is evident, that a very great variety may take place in this disease; even though all these different species may be comprehended under

der the general name of a diarrhœa. First, as to their

Matter.] For we have seen that the healthy and diseased humours of all those parts which directly empty their fluids into the cavity of the stomach and intestines, may afford the matter of a diarrhœa: and moreover, that morbid matter of humours may be derived to the intestines by a metastasis or translation, even from the most remote parts of the body. Hence only from the matter evacuated in a diarrhœa, Hippocrates determines many and various particulars with respect to the prognosis; namely, *Valde aquosum, aut album, aut ex viridi flavescens, aut vehementer rubrum, aut spumosum dejicere, mala hæc omnia. Malum quoque est & exiguum, & glutinosum, & album, & subpallidum, & læve. His autem magis lethalia fuerint nigra, aut pingua, aut livida, aut æruginosa, aut mali odoris* ^q. “That all those in which the stools
“ are either very watery, white, of a greenish
“ yellow, intensely red or frothy, are of bad im-
“ port. The flux is also bad wherein the matter
“ discharged is small in quantity, glutinous, white,
“ or palish, and smooth or shifting. But those
“ which are black, fat or oily, livid, or of a dark
“ green, and of a malignant smell, are still more
“ fatal.” The like observations he gives us also in several other places. But among others he condemns evacuations of the simple humours

ἀκρῆτα διαχωρήματα; as when a bilious, melancholic, porraceous, or an eruginous humour flows through the intestines without being mixed with a watery humidity, or any thing else; as Galen ^r explains this word. For it denotes that such a humour flows impetuously through the intestines; and that the

C c 3

force

^q In Prognostic. Charter. Tom. VIII. pag. 629, 630.

^r In Commentar. Aphorism. 6, & 23. Sect. VII. Charter. Tom. IX. pag. 294. & 303, & aliis pluribus in locis.

force by which the intestines contract and retain their contents, hardly any longer subsists. For if that force was strong, it would have mixed the affluent humour with the others contained in the cavity of the intestines, and therefore would not have permitted them to have been discharged by stool without mixture.

Cause.] We reckoned up three general classes of the causes of diarrhœas under the preceding aphorism ; each of which classes again comprehend within themselves a great number of different causes. Thus for example, the causes expelling the humours into the intestines are found very various. When a person arises warm out of bed and exposes his body to the cold air, there often follow soon after slight gripings, and sometimes a flux, or several liquid stools ; because the perspirable matter being suddenly obstructed, run the humours towards the intestines. Acrid or corrupt bile in acute diseases, and acid acrimony in young children, and in the weaker adult persons, are frequently the real cause of a diarrhœa. An inflammation of the intestines, and the general ways in which that inflammation may terminate, may also be the cause of a diarrhœa, as will be hereafter made evident. Hence it is sufficiently apparent how manifold are the causes of a diarrhœa.

Effects and event.] For if by a diarrhœa the over abounding quantity of the humours is removed from the body, even though they are healthy, or if offensive matter is evacuated without weakening the patient's strength, the effects will be good, and the event salutary. But the event will be contrary, from a loss of the healthy and necessary juices, or if the patient's strength cannot support a great evacuation. Thus even a discharge
of

of blood by stool is sometimes salutary in people who are plethoric; for instance, when from having lost some limb, or from a suppression of the menses in women, the redundant quantity of the blood makes its escape this way by a dilatation of the anastomoses or mouths of the vessels. But when the same happens from an erosion of the vessels, it is often attended with the greatest danger. Thus it was observed in the commentaries to §. 594, that sometimes a critical diarrhœa carried off such parts of the humours in diseases as deviated from the laws of health, or which were not capable of flowing through the vessels with the rest of the healthy humours without injuring the functions. But that in the beginning of acute diseases, the matter being not yet concocted, nor disposed for evacuation, a diarrhœa often proves fatal. But in order to determine the different event of a diarrhœa, the patient's strength and habit are to be first considered, with the nature and time or stages of the disease. For strong bodies of a full habit easily support large evacuations, whereas moveable and tender women are greatly disordered, even by slight evacuations. Thus Hippocrates^s pronounces, *Pleuritide aut Peripneumonia affecto diarrhœam succedere, malum pronunciauit Hippocrates.* "A diarrhœa is bad when it happens after a person was afflicted with a pleurisy, or a peripneumony." But, in the aphorism next following, he says; *Ophthalmia laborantem diarrhœa corripit, bonum.* "That for one afflicted with an ophthalmia to be taken with a diarrhœa is a good sign." And in another place^t; *Si alba pituita detento vehemens diarrhœa succedat, morbum solvit; contra vero in Phthisicis lethalem esse diarrhœam monuit.* "That if a

C c 4

" violent

^s Aphor. 16, & 17. Sect. VI. Charter. Tom. IX. pag. 256, 257.

^t Aphor. 29. Sect. VII. *ibid.* pag. 305.

“ violent diarrhœa succeeds in a person afflicted
 “ with white phlegm, it terminates the disease;
 “ but that on the contrary a diarrhœa is fatal
 “ in consumptive people.” The truth of this
 might be confirmed, if it was necessary, by many
 observations of Hippocrates and others. But that
 Physicians may safely judge whether or no a diar-
 rhœa will be salutary or not, a particular regard
 ought to be had to that excellent aphorism which
 is of the greatest use in practice. *In alvi pertur-*
bationibus & vomitionibus sponte abortis, si quidem,
qualia oportet purgari, purgentur, confert & facile
ferunt. Sin minus contra. Sic & vasorum eva-
cuatio si, qualem fieri oportet, fiat, confert & fa-
cile ferunt; sin minus, contra. Inspecere ergo opor-
tet & regionem, & anni tempestatem, & ætatem,
& morbos, in quibus oportet (evacuari) vel non.
 “ In vomitings and purgings arising spontaneously,
 “ if they carry off such humours as ought to be
 “ evacuated, they are useful and easily tolerable
 “ to the patient. But otherwise they are detri-
 “ mental. So likewise an evacuation of the ves-
 “ sels rightly performed is beneficial, and easily
 “ supportable, otherwise the reverse; a regard
 “ ought therefore to be had to the country, sea-
 “ son of the year, with the nature and age of the
 “ patient and the disease, in which evacuation is
 “ convenient or not.”

And therefore that it is often incurable.] For
 sometimes such is the malignity of the matter, and
 with such great violence does it discharge itself, that
 it eludes all the endeavours of art. Hence Hip-
 pocrates ^x says; *Quibuscunque morbis incipientibus,*
si bilis atra sursum vel deorsum eruperit, lethale.

“ In

^u Aphor. 14. Sect. V. *ibid.* pag. 202.

^w Aphor. 2. Sect. I. *Chartæ.* Tom. IX. pag. 5.

^x Aphor. 22. Sect. IV. *ibid.* pag. 146.

“ In any diseases where atra bilis or black choler is powerfully evacuated either upward or downward in the beginning, it is a fatal sign.” And in another place; *In febre ardente alvus affatim erumpens, lethale.* “ That a copious flux in an ardent fever is fatal ^y.” The fatal event of which signs is confirmed by many histories, which he gives us in his books of epidemics. Sometimes also a purulent vomica, a malignant schirrus, or even a cancerous tumour, is observed in those viscera which directly evacuate their humours into the intestines, as we are taught by medical history: From whence a corrupt sanies, or very sharp and corroding ichor flowing into the intestines, excites diarrhœas or dysenteries incurable by any art: Hence Hippocrates ^z observes; *Ex diuturno morbo alvi deductio, malum.* “ That a flux of the bowels from a disease of long continuance is bad.” If now the intestines, being perfectly paralytic, let every thing escape thro’ their cavity, it is evident enough that there are but small hopes of a cure; as also when after a long continued dysentery the intestines are ulcerated, and leaving scars behind there follows a smoothness of the intestines. For as Hippocrates observes, *Post longam enim dysenteriam desinentem, si hydropes, aut lienterix fiant, lethale est.* “ If a dropfy or a lientery follow after the end of a long continued dysentery, it is fatal ^a.”

That it is sometimes colliquative, and is then hardly ever curable.] Although in every profuse or long continued diarrhœa, the body is wasted by the great quantity of the fluids exhausted, yet it is not every flux of the bowels that deserves to be termed colliquative, though the word is often abused

^y Coac. Prænot. No. 130. Charter Tom. VIII. pag. 858.

^z Aphor. 5. Sect. VIII. Charter. Tom. IX. pag. 343.

^a In Coac. Prænot. N^o. 466. Charter. Tom. VIII. pag. 879.

fed by the ignorant and the boaster, for the term *συντήκεσθαι*, which properly denotes to melt down or waste away, is sometimes used in a less proper sense as Galen ^b observes, when the body falls away in diseases. But a colliquative flux of the bowels is properly intended, when after long continued diseases, and especially after a suppuration of the viscera, or a dropsy of long standing, the humours are dissolved into a putrid liquor, and evacuated by stool. This is that kind of diarrhœa which usually puts a period to the life of a patient wasted by a pulmonary consumption, as Hippocrates ^c observes in several places. The like flux also happens towards the latter part of the life of a dropical patient, when the waters being corrupted by a long stagnation putrefy the viscera to which they flow; and then the unhappy patient often conceives hopes of a cure from the discharge, when even death is at hand. Hippocrates therefore very prudently observes, that a watery diarrhœa is serviceable in dropsies, but then it must be only in the beginning of the disease, as we observed before at §. 719. Since therefore a colliquative flux is rarely observed but in such desperate cases, it is evidently enough not frequent, and hardly ever curable.

^b In Comment. Aphor. 28. Sect. II. Charter. Tom. IX. pag. 70.

^c Aphor. 12, & 14. Sect. V. Charter. Tom. IX. pag. 201, 202. Coac. Prænot. N^o. 634. Charter. Tom. VIII. pag. 890.

S E C T. DCCXXI.

IF the diarrhœa continues a long time, it disposes the abdominal viscera more and more to the same disease, weakens, excoriates, or inflames them, drains and forces out the humours from the other vessels and viscera; hence an atrophy, leanness, and weakness of the body, an inspissation of the fluids throughout the whole habit, a laxity of the solids, a loss of the fluids, a leucophlegmacy, dropſy, and tabes or consumption of the whole habit.

We come now to treat of the effects of a diarrhœa, and from thence to determine the prognosis, or what disorders are to be thence feared. From what we said before it appears, that by a diarrhœa offensive humours are often evacuated from the body; and that sometimes the too great abundance of healthy humours is thus lessened; whence in such cases a diarrhœa may be useful. But when the offensive abounding humours have been thus evacuated from the body, if the diarrhœa continues any longer it will be mischievous, and hence Hippocrates ^d absolutely condemns long continued diarrhœas, whether of the crude aliments, bilious, or phlegmatic; nor would he have a diarrhœa continue longer than seven days, but advises to restrain them by a suitable diet and convenient medicines, varied according to the several kinds of the disease. All which has been fairly collected together from Hippocrates by Celsus ^e, when he says,

Sed

^d Prorrhēt. Lib. II. cap. 4. Charter, Tom. VIII. pag. 813.

^e Lib. IV. cap. 19. pag. 222.

Sed uno die fluere alvum sæpe pro valetudine est; atque etiam pluribus, dum febris absit, & intra septimum diem id conquiescat. Purgatur enim corpus, & quod intus læsurum erat, utiliter effunditur. Verum spatium periculosum est, interdum enim tormina & febriculas excitat.

“ But for a flux of the bowels
 “ to continue for a day is often salutary; as it also
 “ is when it continues several days when the fe-
 “ ver is off, and if it stops within seven days, for
 “ the body is thus purged or cleansed, and the
 “ injurious matter lodged therein is thus happily
 “ evacuated. But long continuance of the disease
 “ is dangerous, for it sometimes occasions gripes
 “ and slight or hectic fevers.”

Therefore if the flux continues long, it inclines the abdominal viscera more and more to the same disorder, and weakens them.] For by the continual afflux of great quantities of the humours the internal surface of the intestines is macerated, the mouths also of the arteries and excretory ducts of the viscera are likewise relaxed, and therefore they will less resist the impulse of the humours, and more easily transmit them; and thus by degrees the body will be habituated to send a great quantity of juices to these parts, and at the same time the other excretions by the bladder and insensible perspiration will be lessened; from thence will arise the greatest difficulty of the cure, since it is often found so hard a task to restore the weakened vessels and viscera to their former strength. Thus I have seen diarrhœas arising from an ill diet in poor people, which being neglected in the beginning, have continued for years incurable by all the methods undertaken, and this even though there were no signs of a corruption in the viscera, or of a latent vomica in any part of the body, but the obstinacy of the disease seemed to proceed only from the lax
 and

and weak state of the intestines and abdominal viscera.

Excoriates and inflames them.] It appears from anatomy, that the internal surface of the intestines is covered with a nap or pile, consisting of the prominent extremities of the small arteries and veins, whence their internal membrane is said to be villous or downy. But these tender and pulp-like extremities of the small vessels, as also the prominent nervous papillæ, are anointed with a soft mucus discharged from the adjacent follicles or cells, and by that means they are defended from the acrimony or roughness of the ingested food passing over them. If therefore these tender parts are deprived of their defending mucus by a long continued diarrhœa, it is evident enough that pain and inflammation must frequently ensue. But also the pulpy substance of the intestines themselves, being macerated in a great quantity of humours flowing hither, or being corroded by their acrimony, is sometimes dissolved, and appears in the stools like lacerated membranes. For although the mucus only of these parts being abraded, may deceive one under this appearance, yet observations teach us, that even sometimes the substance itself of the intestines is thus abraded. These are the ξύσματα, ramenta or shavings, as they are called by Hippocrates †, the appearance of which in the stools he justly condemns, when he says; *Et quibus dejectiones si residere permiseris, neque moveris, veluti ramenta subsident: Et si pauca sunt, parvus est morbus, si multa, magnus.* “ And in those li-
 “ quid stools which being permitted to stand
 “ without shaking, deposit a kind of fleecy shav-
 “ ings; if these are little in quantity the disease is
 “ small; if much, the disease is great.” Galen ‡
 testifies

† Aphor. 67. Sect. VII. Charter. Tom. IX. pag. 331.

‡ De usu partium, Lib. IV. cap. 17. Chart. Tom. IV. p. 390.

testifies that he has seen many, who being afflicted with violent and long continued diseases have thus had a great part of the intestines corrupted, and in many places their internal coat entirely destroyed, more especially in dysenteries. And when once smooth cicatrices are formed from such a cause destroying the absorbing veins, it seems sometimes to produce an incurable lientery. Nor is the internal coat of the intestines separated and discharged only under the appearance of fleecy threads and shavings, but sometimes a great part of it is expelled under the form of a membrane, as we are assured from medical observations; in confirmation of which it may be sufficient for us to alledge only one instance of a person afflicted with excruciating pain of the bowels, with such an ulceration of the intestines, that he entirely discharged the whole membrane which lines the rectum. Nor did he immediately discharge this membrane all at once, for by its firmly adhering to the orifice of the anus, it afforded an extraordinary spectacle, and could not be perfectly separated from thence in less than two days time ^h.

Drains and forces out the humours from the other vessels and viscera.] For although sometimes by a diarrhœa in the beginning of the disease, superfluous or offending humours are expelled, yet if that expulsion continues, the good and necessary fluids will be exhausted from the body; and at the same time the ingested aliments will be discharged by stool, before chyle can be prepared and absorbed from them, to supply the deficiency of those juices which are daily destroyed by the actions of life and health. Thus the quantity of the juices will be lessened and drained, or forced from the other vessels and viscera of the body.

For

^h Tulpii Observ. Medic. Lib. II. cap. 17. pag. 207.

For this reason Hippocratesⁱ says; *Mulieri uterum gerenti, si alvus multoties profluat, abortus periculum est*^k. “There is danger of a miscarriage from a frequent diarrhœa in a woman with child.” Because the vessels being thus exhausted, there are not juices enough in the mother to support two bodies.

Hence an atrophy, weakness and leanness of the body.] For then those juices are drained from the body, which ought to repair what is consumed, whence the nutrition will be defective. And as the rest of the humours become more acrid for want of new chyle, the fat will be dissolved, and mixing with the circulating humours will allay their acrimony for a time, but will afterwards be evacuated together with them by stool, whence leanness will follow; for it is well known that people are emaciated by frequent evacuations by stool. Hence also Galen^l recommends continual purging of the bowels for the cure of over-fatness. But that weakness will arise from an emptiness of the vessels exhausted of their fluids, we demonstrated before in the comment to §. 661. But weakness in a diarrhœa is by Hippocrates derived not only from inanition, but from the fatigue which the patient is obliged to undergo in the frequent discharges, nor is he able to sleep, though he discharges but little at a time: for his words^m are the following: *Verum si alvi excrementum liquidum est, expedit nec stridere, nec crebro & pauculum quid excerni: Fessus enim homo ex continua exsurrectione insomnis*

ⁱ Hippocr. Aphor. 34. Sect. V. Charter. Tom. IX. p. 214.

^k Cels. Lib. II. cap. 10. pag 72.

^l De sanitate tuenda, Lib. VI. cap. 8. Charter. Tom. VI.

pag. 175.

^m In Prognosticis, Charter. Tom. VIII. pag. 627.

inſomnis fit, ſi vero affatim sæpe dejiciat, periculum eſt ne in animi deliquium incidat. “ But if the inteſtinal
 “ fæces are liquid, ’tis beſt if a very ſmall quantity
 “ is diſcharged at a time, neither frequently nor
 “ with a noiſe; for the patient, being fatigued, is
 “ robbed of his ſleep by a continual riſing up;
 “ but if he diſcharges a great quantity at once,
 “ there is danger of his falling into fainting fits.”

Dyſentery.] Which properly denotes no more than a diſorder of the inteſtines; whence ſometimes follow a troubleſome diarrhœa and gripes, and a frequent tenefmus or fruitleſs endeavour to go to ſtool, with a ſharp pain, which is then uſually called a dyſentery. But becauſe a diarrhœa uſually follows a dyſentery, when the inteſtines, being excoriated or inflamed, are in ſevere pain, by the long continued flux; or elſe are corroded and ulcerated by the ſharp preying humours; and as then for the moſt part the mucus of the inteſtines is abraded, and is uſually diſcharged together with ſome ſtreaks of blood (from the veſſels, being now naked, and in a manner rubbed off, commonly diſcharged by ſtool with a frequent and troubleſome tenefmus); hence a bloody flux of the bowels is by ſome Phyſicians judged only to be intended properly by the term dyſentery. This opinion is favoured by the deſcription of Cæſus; for, what the Greeks call a dyſentery he terms the gripesⁿ, and deſcribes it as follows: *Intus inteſtina exulcerantur: ex his cruor manat, iſque modo cum ſtercore aliquo ſemper liquido, modo cum quibusdam quaſi mucoſis excernitur; interdum ſimul quædam carnoſa deſcendunt. Frequens dejiciendi cupiditas, dolorque in ano eſt. Cum eodem dolore exiguum aliquid emittitur: atque eo quoque tormentum intenditur, &c.*

“ Internally the inteſtines are ulcerated,
 “ whence

ⁿ Cæſus Lib. IV. cap. 15. pag. 224.

“ whence blood issues, and is discharged in some
 “ manner with liquid excrements always, and
 “ sometimes there is discharged a sort of mucus,
 “ sometimes likewise a sort of fleshy substance
 “ descends from the bowels. There is a frequent
 “ desire to go to stool, and a pain in the anus, with
 “ the same pain there is very little of any thing
 “ discharged, and then the torture is proportion-
 “ ably more increased, &c.” For although Galen^o
 terms an ulceration of the intestines a dysentery,
 and denies that it is present, when sharp corroding
 humours are discharged by stool, before the intes-
 tines are ulcerated; yet he calls a flux of blood
 from the intestines without an ulceration by the
 name of a bloody dysentery^p: and by the same
 name he also calls that flux of blood by stool,
 which happens in those who have suffered an am-
 putation of any of the limbs, or are become ple-
 thoric from neglecting wonted exercises^q. But it
 would seem that such a discharge of blood may be
 better referred to a diarrhœa, as we observed be-
 fore at §. 719, since it is often observed without
 any tenesmus or gripings. A discharge therefore
 of blood is with less propriety esteemed a pathog-
 nomonic sign of a dysentery, since therein we ob-
 serve bilious, mucous, and atrabiliary matter dis-
 charged by stool, with a troublesome tenesmus and
 violent gripings; and therefore the troublesome
 pain and frequent tenesmus, is much better used as
 a sign to distinguish a dysentery from a diarrhœa,
 whether from an ulceration of the intestines, or
 from their being excoriated and inflamed from an
 abrasion of their mucus; which opinion is also fa-

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voured

^o Commentar. 2. in Lib. II. Epidem. Charter. Tom. IX.
 pag. 138. & pluribus aliis in locis.

^p In Comment. Aphor. 65. Sect. V. Charter. Tom. IX.
 pa. 240.

^q Comment. 4. in Hippocrat. de articulis, Charter. Tom.
 XII. pag. 450.

voured by the strict sense of this term, as it literally signifies an ill state of the intestines. But from what has been said the reason is sufficiently evident, why after a long continued diarrhœa follows a dysentery, according to the observation of Hippocrates †.

An inspissation of the fluids throughout the whole habit.] For by a long continued flux of the bowels the most liquid parts of the blood are exhausted, and therefore what remains, however small in quantity, will yet be rendered thick and impervious. Nor is it any objection to this that we before recommended a flux of the bowels, or the procuring an artificial diarrhœa in the cure of an inflammation, which is performed by a resolution of the thick inflammatory matter. For in that case purges were used to diminish the impetus of the blood, and lessen the quantity of the humours, §. 396. N^o. 2, 3. or to make a revulsion of the impetus from the inflamed towards some other parts (§. 396. N^o. 4); and thus at the same time the elastic vibrations of the vessels were restored, by lessening the quantity of the distending liquid, §. 398. N^o. 1. Add to this, that at that time such purges were chosen as had a considerable power in dissolving the blood, as well as in evacuating the humours by stool. It is indeed true, that the humours are dissolved and fused when a diarrhœa attends, but then all that is dissolved escapes by stool; and therefore what remains being deprived of its diluent vehicle, must be very much inclined to produce obstructions and inflammations. Hence the reason is evident why Hippocrates ‡ (though he observes in one place that a diarrhœa is useful to one afflicted with an inflammation of the eyes, yet he) observes † in another place,

† Aphor. 75. Sect. VII. Charter. Tom. IX. pag. 336.

‡ Aphor. 17. Sect. VI. Charter. Tom. IX. pag. 257.

† In Coacis Prænot. N^o. 220. Charter. Tom. VIII. p. 864.

place, *Oculorum rubedinem in febre* (ἐν πυρεσίνῳ, alii legerunt ἀπυρεσίῳ sine febre) *ortam diuturnam alvi malignitatem significare*; “That a redness of the eyes in a fever, denotes the malignity of a long continued diarrhœa;” as also, *Rubores circa nasum alvi humescentis signa esse*. “That redness about the nose is a sign of a moist state of the bowels.” For the same reason in a long continued lientery, *Rubet facies, & quasi maculis quibusdam omnium colorum distinguitur*. “The face looks red, and is as it were marked with spots almost of every colour.” It is therefore no wonder in desperate consumptions, if after a colliquative diarrhœa, there are inflammatory pustules arise in the face, and a quinsy affects the fauces, &c. The same is likewise frequently observed in inveterate dropsies, when all the water escapes from the vessels, and is collected in the cavities of the body, and only the red parts of the blood are left in a small quantity, but thick and impervious, hesitating about the extremities of the arteries.

[A laxity of the solids, and a loss of the fluids.] Since a diarrhœa is a frequent discharge of stools more than usually liquid, it must evidently occasion a waste of the fluids. But a laxity of the solid parts also follows from a long continued diarrhœa, not only in the intestines, but likewise throughout the whole body. For it was demonstrated at §. 25, that the solid fibres of our bodies became too lax, when the assimilation of the ingested aliments into the nature of our healthy fluids is impeded; because from these thus altered, those parts ought to be restored which have been wasted both from the solids and fluids by the actions of life. Also from what was said in that place it ap-

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peared,

^u Coac. Prænot. N^o. 216. *ibid*.

^w Cels. Lib. II. cap. 8. pag. 74. Hippocr. Prorrhetic. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

peared, that too great a loss of the healthy humours impeded the assimilation of the ingested aliments. Since therefore by a long continued diarrhœa there is a great loss of the fluids, and the ingested aliments are also expelled by stool, before a due quantity of chyle has been prepared and absorbed from them; it is therefore very apparent, that a laxity of the solids is justly ranked among the effects of a long continued diarrhœa.

Leucophlegmacy, dropsy, tabes or consumption of the whole habit.] All these disorders may follow from too great a laxity of the solid parts produced from a long continued diarrhœa, as is evident from what has been said in the comment to §. 44. N^o. 2. For although it may seem wonderful at the first view, that the body should swell with accumulated water, when at the same time the most fluid parts are continually exhausted by a diarrhœa, yet this is nevertheless true. For generally intense thirst is used to accompany a profuse diarrhœa; and tho' the ingested drink escapes for the most part by stool, yet some part of it is absorbed, and from the weakened cohesion of the solids is deposited in the cavity of the thorax or abdomen, so as to produce a dropsy: or if it is collected throughout the whole habit in the panniculus adiposus, it produces a leucophlegmacy. Hence says Hippocrates*: *A Dysenteria Lienteria, a Lienteria Hydrops.* "From a dysentery follows a lientery, and from a lientery a dropsy." Moreover, when the diarrhœa ceases after it has continued a long time, the body relaxed and weakened soon swells and becomes dropical from the watery liquors taken in. But since in a diarrhœa for the most part those juices are evacuated which ought to nourish the body, and as the

* De Morbis, cap. 2. Charter. Tom. VII. pag. 533.

the assimilating powers are deficient from the loss of the fluids, and the laxity of the solids, therefore the nutrition will be likewise defective, and the body will waste away. For the same is true in this case, which Celsus ^y has observed concerning the abuse of purges: *Assuescit enim non alii corpus; & ob hoc infirmum erit: cum omnibus morbis obnoxia maximè infirmitas sit.* “That the body falls into
 “ a habit of being not nourished, and from thence
 “ will be infirm, since weakness is the most obnox-
 “ ious to all manner of diseases.” This effect of a long continued diarrhœa is also confirmed in the Coan Prognostics of Hippocrates ^z where he says; *Lienteriæ cum spirandi difficultate & lateris morsu, in tabem desinunt.* “That lenteries, attended with
 “ a difficulty of breathing and a pain in the side,
 “ end in a consumption.”

Having thus premised every thing that belongs to the matter, causes, diagnosis, and prognosis of a diarrhœa, it remains for us to treat of its cure as a febrile symptom.

^y Lib. I. cap. 3. pag. 31.

^z N^o. 469. Charter. Tom. VIII. pag. 879.

S E C T. DCCXXII.

THE cure is performed by mitigating the irritating acrimony; by an expulsion of it with vomits, purges, and clysters; by corroborating the relaxed vessels, by quieting the impetus of the humours with narcotics, and by directing them another way by sweat or urine; by evacuating the morbid matter, and by correcting its first source or spring.

It must first of all be enquired, whether a diarrhœa is to be removed or not. For, as we said before, sometimes foul diseased humours are evacuated by a flux from the intestines, and sometimes the too great redundancy of healthy humours is thus removed; but, by what signs this may be distinguished, we likewise remarked before. Therefore as Trallianus^a well observes: *Quare initio ea, quæ corporis commodo atque utiliter excernuntur, reprimere minime convenit, &c. Ubi vero diuturnior alvi fluxus fuerit, non tantum superflua evacuans, sed etiam habitum colliquans, & vires consumens, tunc sane & medicamentis resistere convenit.* “That it is not in the least convenient to
 “ suppress those matters, the discharge of which is
 “ commodious and useful to the body, &c. but
 “ when the flux has been of long standing, so as
 “ not only to evacuate the superfluities, but like-
 “ wise to exhaust the habit, and waste the strength,
 “ then indeed it will be proper to oppose it by me-
 “ dicines” He also testifies, that he had observed an unseasonable suppression of a diarrhœa in fevers to have thrown the patient into great danger, so
 as

^a Lib. VIII. cap. 7. pag. 423, 424.

as to affect them either with a phrenzy or lethargy, or else with pains of the head, attended with troublesome parotides or swellings under the ears. It is only by a careful observation of diseases, and an attention to these particulars, that a Physician can discover whether a flux of the bowels will be serviceable or not, as we said more at large in the history of fevers in general, and concerning which we shall speak more particularly when we come to treat of the epidemical diseases.

But since the general causes of a diarrhœa enumerated at §. 719, are different one from another, and depend on very different circumstances; it is therefore sufficiently evident, that no universal method can be delivered for the cure of a diarrhœa, whose treatment ought to be varied according to the different causes. But all these various methods may be commodiously reduced to those enumerated in the present aphorism.

By mitigating the irritating acrimony.] But this may be obtained either by such remedies as dilute, involve, sheath and entangle all acrimony, so as to render it unactive: or by such things as, by their opposite nature to the known acrimony, can obtund or weaken it. To the former indication serve chiefly diluents; for by them the most acrid matter of any kind may be rendered unactive. (See § 605. N^o. 6.) It is indeed true that a diarrhœa is often increased during the time that the intestines are overflowed by the plentiful drinking of diluent liquors; but at the same time the acrid irritating matter is mitigated and washed out, and this being performed the disorder will cease in a short time, or else may be easily removed by the use of opiate and corroborating medicines. In the cholera morbus, where there is a profuse evacuation both upward and downward, Syden-

ham^f gave a broth made of the tender flesh of chickens, but so thin and dilute, that it had hardly any taste of the flesh; or in defect of that he gave any other soft diluent liquor: of the same liquors he ordered frequent clysters to be injected by the anus, with the view of wasting out from the body so sharp a stimulus by a large quantity of diluent liquors, or at least that thus its acrimony might be greatly weakened. Hippocrates^g seems to have pointed out this method in treating of a flux of the bowels: for thus he expresses himself; *At vero alia alvi profluvia, quæ sine febre sunt, & brevi tempore durant, & boni moris sunt: aut enim eluta sedabuntur, aut sua sponte.* “ But in other
 “ fluxes of the bowels, which are without a fever,
 “ of short duration and good condition, they will
 “ be either quieted by diluting, or else cease spon-
 “ taneously.” But in this case water is the only diluent, to which various things are usually added, according to the different nature of the irritating acrimony. Thus if a too viscid or acrid bile, or a rancid oily matter adhering to the intestines is the cause of the diarrhœa, saponaceous substances are added to the watery liquors, such as honey, jelly of elderberries, currants, &c. because we know that in such a case a dilution cannot be easily obtained by water only. Such things as sheathe, entangle, or inviscate, are serviceable two ways; for they not only mitigate and render the acrid humours unactive, with which they mix themselves, but at the same time they line and defend the internal surface of the intestines, so that they are less liable to be injured and irritated by the acrimony. For this reason the emollients are added to the diluent water, such as comfrey, mallows, marsh-

^f Sect. IV. cap. 2. pag. 217, &c.

^g Prorrhetic. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

marshmallows, mullen, &c. both leaves, flowers, and roots, with oats, barley, millet, and the like; the sweetest and softest expressed oils drank, and injected by way of clyster, are serviceable in the same manner: but as these very easily turn rancid by the increased heat in fevers, therefore emulsions prepared from the oily seeds and fruits themselves are sometimes justly preferred. For this reason Hippocrates^h says in the cure of a dysentery; *Et siquidem febris expers fuerit, unguinosi, pinguibus, dulcibus & liquidis alvo contenta semper educere oportet.* “ That if it is without a fever, the intestinal contents ought always to be washed out by unctuous, fat, or oily, and sweet liquors.” In very painful dysenteric excretions Galenⁱ recommends goats fat or cerate of roses. White wax melted and taken in warm milk, we are told, was of great use in a camp-dysentery^k. The like effects are also usually expected from the medicinal earths of the shops, as terra sigillata, bole armoniac, and the like, if taken in a sufficient large quantity; for by their mild softness they allay all sorts of acrimony, and at the same time corroborate and obtund any latent acid, or at least so cover and sheathe it as to prevent any further irritation, while they resist all putrefaction: hence also they have a great name in the cure of diarrhœas and dysenteries, concerning which see what has been said in the comment to §. 88. N^o. 5. But since all diluent, emollient, and oily substances relax and weaken, it is evident that they must be prejudicial, where a diarrhœa arises from too great a laxity in the fibres of the intestines, and that they only are of use where the irritating acrid can be mitigated by them.

All

^h De affectionibus, cap. 7. Charter. Tom. VII. pag. 627.

ⁱ Comment. 2. in Lib. II. Epidemic. Charter. Tom. IX.

pag. 138.

^k Degnerus de Dysenteria, &c. cap. 3. §. 88. pag. 149.

All these are capable of mitigating acrimony almost of any kind : But when the particular kind or nature of the irritating acrimony appears, such things will be also serviceable as have an opposite force. Thus when a diarrhœa attends in young children with acid belchings, and green stools smelling sour, it is plain that the irritating acrimony is an acid ; and the earthy absorbents, as crabs-eyes, coral, calcined hartshorn, or the burnt bones of animals, &c. are so happily of use, that many have believed them universal remedies in all diarrhœas, but without foundation ; since they have no action at all where a putrid alkaline acrimony occasions the disease, which however is fairly cured by acids. But, in what manner the different known kinds of acrimony are to be cured, we said before in the comment to §. 605. But it is evident that great caution is necessary, first rightly to discover the nature of the irritating acrid, since an error of fatal consequence may be committed in this respect. But when such cases occur, wherein the nature of the stimulus does not evidently appear, diluents and emollients only can be used with safety to weaken the stimulus.

By an expulsion of it with vomits, purges, and clysters.] The most speedy cure of a diarrhœa will be obtained, when that, which by its stimulus produced the disease, can be evacuated upward and downward : For it is a work of much longer time to mitigate the irritating acrimony than to expel it, when that can be safely performed. This method is confirmed by a careful attendance to nature in the cure of diseases. For by the diarrhœa itself when it arises from an acrid irritating stimulus, nature endeavours to evacuate that which is the cause of the disease ; and hence so often the matter of the disease being discharged by stool, the diarrhœa

diarrhœa ceases spontaneously. But when this matter is either too copious or tough, art assists nature by attempting to evacuate that upward or downward, which being longer retained would make the disease of long continuance. But altho' in a diarrhœa all the humours flow almost spontaneously towards the intestines, so that there seems to be an open way to assist this endeavour of nature by the use of purges; yet practical observations teach us, that frequently a diarrhœa and dysentery are the most happily cured by vomits; whether this is brought about by an evacuation of the matter upward, which lodged about the stomach and superior intestines, producing an irritation by the continual stimulus in the intestines, yet without being readily propelled towards the anus; or whether the irritating matter hitherto lying fixed, is rendered moveable by the violent concussions of the abdominal viscera in vomiting; or, lastly, the motion of the intestines may be inverted by vomiting, by which hitherto all the intestinal contents were swiftly hurried towards the anus. The first effect of vomiting seems to be proved by what Degnerus^l observed in a very bad kind of epidemical dysentery: namely, that it was a good sign if the patient discharged yellow bile, and still better if green bile was expelled at any time of the disease; but more especially in the beginning, by vomiting or stools, either spontaneously, or by the use of medicines; the whole malignity of the disease being thus evacuated at one and the same time: But the patients recovered so much the more certainly as this evacuation happened sooner. The second effect of vomiting is fairly proved by what Sydenham^m has observed in the cure of fevers; namely, that in a
continual

^l Degnerus de Dysenteria, &c. pag. 21.

^m Sect. I. cap. 4. pag. 63, &c.

continual epidemic fever that spread, among other symptoms there was a vomiting, or sometimes a fruitless endeavour to vomit; but yet the morbid matter could not be thus expelled, but required a vomit to be given, that being rendered moveable by the violent concussions in straining to vomit, it might be afterwards evacuated; for unless it could be thus discharged a profuse diarrhœa ensued in the progress of the fever, often very dangerous, when the patient's strength was exhausted, or infringed by the disease; and yet to cure this disorder in whatever time of the disease it appeared, he found nothing more efficacious than a vomit, provided the patient's strength was yet firm enough to bear it. But Sydenham testifies, that he has often wondered to find the matter discharged by vomiting, neither considerable in quantity, nor possessed of any remarkable bad qualities. But, as Hippocrates observesⁿ, *Quæ prodeunt, haud multitudine æstimanda sunt, sed quamdiu prodeant, qualia oportet, & æger facile ferat.* "We are not to estimate the usefulness of evacuations from their quantity, but from their continuing a long time in their due condition, and being easily tolerable to the patient." The third and last effect of vomiting, where the motion of the intestines accelerated downward is diminished or inverted upward, seems also to be confirmed by practical observations. Hippocrates^o remarks, *Quod, longa diarrhœa detento spontaneus succedens vomitus diarrhœam solvit.* "That a spontaneous vomiting succeeding in a patient who has been long afflicted by a diarrhœa, terminates the flux." Nor yet does it seem that this effect ought always to be ascribed to the evacuation of the irritating matter; for in another place

ⁿ De Humoribus Charter. Tom. VIII. pag. 546.

^o Aphor. 15. Sect. VI. Charter. Tom. IX. pag. 225.

place he has the following passage^p: *Alvum autem coactam vomitio solvit, & plus æquo fluentem sistit: illam quidem humectando; hanc vero siccando. Quum igitur quis alvum celerrimè sistere volet, devoratum cibum, priusquam humescat, & deorsum detrabatur, evomere oportet, &c.* “But a vomiting removes
 “ a costiveness of the bowels, and likewise restrains
 “ too great a flux of them, by moistening in the
 “ first place, and by drying in the latter. When
 “ therefore any one would speedily stop a flux, he
 “ ought to vomit up the food swallowed, before it
 “ is moistened, or carried downward, &c.” The
 like is also to be found in Celsus^q. I remember
 myself to have several times used astringents and
 other remedies without success for the cure of long
 continued diarrhœas, whereas a vomit being given
 in the morning for three days together has removed
 the disorder, though there were no signs teaching
 that any thing was lodged about the first passages,
 which by its stimulus might cause a flux. Even
 it happens, though rarely, that the disease is so
 obstinate that thus also it will not give way, but I
 have been obliged to give a vomit every day three
 or four times more, and with happy success; but
 observing to give an opiate in the evening after the
 operation of the vomit was over.

From these effects the root ipecacuanha seems to
 have gained such reputation as a specific remedy
 in all diarrhœas and dysenteries, though any kind
 of vomit would produce the like effects. But ipe-
 cacuanha is justly the most in use, because it does
 not excite such disturbances in the body as anti-
 monial vomits, and may be safely given, even to
 infants.

But

^p De victus ratione sanorum, Lib. II. cap. 10. Charter. Tom.
 VI. pag. 473.

^q Lib. I. cap. 3. pag. 32. *

But purgatives are likewise often used with success to expel the stimulus, namely, when the irritating matter lies rather in the intestines, or about the stomach; and if there is neither sickness or inclination to vomit attending the fever. But then it is usual to chuse such as have a manifest astringency joined with their purgative force, so as to leave the bowels strict or constipated after their purgative operation is finished in healthy people. Hence the several kinds of rhubarb, &c. have justly merited so much praise in the cure of a diarrhœa. But clysters take place here, inasmuch as they wash out the irritating matter from the large intestines, where this matter may likewise hesitate; or inasmuch as the purgative remedies injected with a clyster may produce their proper effects. For it is well known by daily observation in practice, that purgatives injected in a quadruple dose by the anus, and retained a long time, operate in the same manner as if a single dose had been taken by the mouth. These are more especially of use in young people, and in others who have an aversion to these nauseous purgatives, or immediately vomit them up again as soon as taken. But when clysters are used for this purpose in adults, they ought not to exceed the quantity of three or four ounces; and so proportionably less in those who are younger, lest, irritating the intestines by their weight, they should be suddenly expelled again by stool. It is also preferable, first to wash out the large intestines by injecting a clyster made of honey and water, that afterwards the purging clyster may be better retained and absorbed by the bibulous veins of the intestines.

But all these only take place when there are hopes of this way expelling the irritating matter, the
viscera

viscera being found and healthy, that they may be capable of bearing the action of these medicines. For if, for example, the liver is wasted in chronic diseases, or eat up by a purulent vomica, the shocks of the abdomen in vomiting may rend or break this friable viscus, whence a very bad over-purging, faintings, and death itself may be feared. Hence also this method proves so often fatal in the event, when purges or vomits are repeated while there is an inflammation of the intestines; for we have before observed that a diarrhœa and dysentery are sometimes produced from such an inflammation. For Sydenham † observes in a sort of continual fever (which spread at the same time when the small-pox was epidemical) of the inflammatory kind, that there was a diarrhœa attending; and moreover at the same time there was a diarrhœa which spread epidemically without any manifest signs of a fever ‡. But that Physician being most acute in distinguishing the nature of diseases, found, *Ille diarrhœa ortum suum deberet radiis inflammatoriis in intestina versis, atque eadem ad hanc expulsionem sollicitantibus; cum interim sanguinis massa, ope hujus diverticuli a malis, quos aliter radii isti attulissent, effectibus integra maneret atque illæsa, nullo febris visibili signo exterius se prodente.* “That the
 “ diarrhœa owed its origin to the inflammatory
 “ rays directed towards the intestines, and sollici-
 “ ting an expulsion that way; when in the mean
 “ time the mass of blood, by means of this
 “ drain, continued sound and uninjured from the
 “ effects which those rays would otherwise have
 “ brought, while no visible sign of a fever shewed
 “ itself externally.” This kind of diarrhœa he readily cured by bleeding, with a cooling regimen of diet and medicines. But if the cure was at-
 tempted

† Sect. III. cap. 3. pag. 207.

‡ Ibid. pag. 209.

tempted with rhubarb, or other mild and astringent cathartics, the disorder slight in its own nature often became destructive. It is therefore evident how much caution is necessary to obtain the knowledge of the cause of a diarrhœa, before one sets about the cure.

It is moreover to be remarked, that one dose of a purge or vomit is not sufficient to expel the irritating matter, but sometimes it is necessary to repeat the same oftner. Thus Sydenham in the cure of a dysentery gave a purge every other day to the third time ^t.

By corroborating the relaxed vessels or ducts.] Namely, when a diarrhœa derives its origin from a weakness and laxity of the intestines, or when the irritating stimulus being expelled, too great a laxity of the intestines remains. But in what manner, and by what remedies, too great a laxity of the parts of the body may be strengthened, has been said in the comment to §. 28, and more especially here are convenient those things which we recommended under the fourth number of the same aphorism. To this purpose conduce a drying diet, little drink, and strong at the same time; hence in such a diarrhœa Hippocrates ^u gave bread thoroughly toasted for food, and he recommends very little drink, and of the strongest kind. But the corroborating medicines are then best given in a solid form, that they may lie a longer time in the first passages, and descending slowly through the intestines may be successively applied to every part of them. For this purpose is likewise recommended water wherein a red hot iron has been often extinguished, and afterwards given as a drink, either alone, or mixed with an equal quantity of milk; others

^t Ibidem Sect. IV. cap. 3. pag. 227.

^u De salub. victus ratione, Charter. Tom. VI. pag. 234.

others dip ignited plates of iron into milk for the same purpose; but thus the cheefy and creamy part of the milk is burnt, and gives it a disagreeable taste of burning. How great a force iron has in corroborating too lax and weak fibres was said at §. 28. But of how great use these corroborants often are in the cure of the most obstinate diarrhœas, appears from the observations of Physicians. A man who had been a long time afflicted with a continual flux, and had spent all his substance in vain for a cure, was advised by Forestus^w to eat a large quantity of unripe medlars, by which means his flux was cured in a few day's time. He likewise observed the same effect from this medicine in a certain merchant, who see'd Johannes Sprinchius Physician at Louvain with three hundred pieces of gold; but was at length cured of his diarrhœa, with which he had been afflicted many months, only by the use of medlars. The like remedies may be likewise injected by way of clyster^x. And sometimes mild spices may be mixed with the astringents to irritate the flaccid intestines with a gentle stimulus. Fomentations of wine boiled or infused with astringents, or aromatics, may be also applied to the abdomen, or else aromatic emplasters may be used in their stead.

But before these medicines are made use of, we ought to be certain that the irritating matter is expelled, and that the only remaining disorder is a weakness and flaccidity of the stomach and intestines; for if a flux of the bowels is suppressed by astringents, before the noxious humours have been expelled, the most desperate maladies often ensue. For Hippocrates^y observes, *Dysenteria*

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sedata

^w Lib. XXII. cap. 1. Tom. III. pag. 47.

^x Sydenham. Sect. I. cap. 4. pag. 87.

^y De victu in morbis acutis Charter. Tom. XI. pag. 162.

sedata abscessum aut tumorem quemdam faciet, nisi (desierit) aut in febres, vel sudores, aut urinas crassas & albas, & valde perspicuas, aut in tertianas, aut in varicem, aut in testiculum, aut in crura, aut in coxam dolor decubuerit. “ That a
 “ dysentery being stopped, occasions an abscess or
 “ swelling in some part, unless it terminates either
 “ in fevers, sweats, or thick and white urines,
 “ which become very clear; or unless it turns to
 “ a tertain or varix, or unless a pain invades the
 “ testicle, leg, or hip.” But it is sufficiently evident, that he does not here treat of the radical cure of a dysentery, by an expulsion of the morbid matter, but only of allaying the pain of the distemper, while in the mean time the material cause of the disease is expelled by other passages; or else being translated to other parts of the body, it produces various other diseases. Thus Hollerius^z observes, that a dysentery untimely suppressed sometimes occasions an epilepsy, and sometimes a pleurisy; and that even it had produced in a certain person an itch almost like a leprosy. Sydenham^{*} remarks, that from the impeded discharge of the offending matter of the disease by astringents, when it has not been first evacuated by cathartics, apthæ have ensued, which for the most part denote imminent death. But we know that irritating matter is expelled, if the disease has already continued a long time, if vomiting and purging medicines have been used, if the pain and gripings are abated, and the intestinal discharge is changed for the better. For as Hippocrates^a says, *In alvi enim fluxionibus dejectionum mutationes, juvant, nisi in pravas mutantur;* “ In a flux of the bowels an alteration in
 “ the

^z Comment. in Coac. Hippocr. pag. 876.

^{*} Sect. IV. cap. 3. pag. 222.

^a Hippocrat. Aphor. 14. Sect. II. Charter. Tom. IX. p. 52.

“ the stools is of service, unless they are changed
 “ for the worse.” So long therefore as the stools
 are very foetid, black, livid, eruginous, purulent,
 ichorous, bilious, and yellow, &c. astringents are
 prejudicial; but when they begin to come nearer to
 the natural condition of the intestinal fæces, and
 more especially if the ingested aliments pass through
 little altered, then there will be occasion for corro-
 borants and astringents.

By quieting the impetus of the humours with nar-
 cotics.] What great use these are of in moderat-
 ing the violence of a fever, has been in several
 places taught by Sydenham throughout his works; and concerning this we treated more particularly in
 the comment to §. 610. Moreover it appears from
 daily observation, that the use of narcotics often
 binds up the bowels very obstinately. Hence it was
 customary with Sydenham^b to give his liquid lau-
 danum after the operation of purges was over in
 the cure of diarrhœas and dysenteries; and as he
 gave purges every day, so on the intermediate days,
 in the morning and at night, he gave narcotics.
*Ut scilicet symptomatum ferociam debellaret, atque
 inducias impetraret, dum cum humore peccante ex-
 terminando ipsi res esset.* “ Namely, to subdue
 “ the fierceness of the symptoms, and to command
 “ a truce, since the engagement here lay in exter-
 “ minating the peccant humours.” Moreover, if
 the disorder being more than usually obstinate did
 not yield to the third purge, he gave a paregoric
 night and morning every day, ’till the patient
 was perfectly recovered; and even sometimes he
 repeated them every eight hours, and in a pretty
 large dose, if the disease did not yield. When
 Bontius^c practised physic in the East-Indies, where

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the

^b Sect. IV. cap. 3. pag. 226, &c.

^c Histor. natur. & medic. Indiæ orient. Lib. II. cap. 3 p. 19.

the most dreadful dysenteries are very frequent, he found that they were irritated even by the mildest laxatives with incredible torture to the patient, and were often sure to be followed with the most pernicious consequences; and these he was able to cure with nothing so safe and speedy as by the extract of saffron^d, which contained a large quantity of the most choice opium, so highly did he esteem this remedy, that he believed it to be truly an antidote to this frequently even venomous disease; for which reason he had always recourse to this as his safest refuge, as well in dysenteries as in that kind of flux which he calls hepatic; in which, without very severe gripings, pure blood was discharged by stool. Sydenham^e likewise observes, that in those years when dysenteries were epidemical, evacuations were first necessary before laudanum could be given; and yet in a less favourable constitution of this disease, that those evacuations might be safely omitted, and the cure effected a shorter way, namely, by the use of laudanum only.

But opium, or the great compositions of the shops in which it is an ingredient, being dissolved in milk, and injected in the form of a clyster, suppress almost every kind of flux^f, since by that means a sort of topical rest was introduced in the intestines, and the most severe gripes often immediately removed. When an ounce of theriaca diluted in three or four ounces of sweet milk is injected by the anus, it will even as yet stop for some hours that fatal diarrhœa which attends consumptive people, and which yields to no remedies, and by the repeated use of it the fatal exit of this disease may be retarded.

By

^d Hist. natur. & medic. Indiæ orient. Lib. II. cap. 4. p. 20.

^e Sect. IV. cap. 3. in fine, pag. 235. ^f Ibidem, pag. 229.

By directing them other ways by sweats.] Hippocrates affirms (as we said before upon another occasion at §. 586, N^o. 2.) *cutis raritas ventris densitas*. “That a laxity of the skin makes a dryness of the bowels.” For in those people who perspire largely, as those who are robust and healthy usually do, the bowels are generally constipated; since a great part of the humours is exhaled from the surface of the body, which when the perspiration is deficient tends inward, and usually escapes either by urine or stool. When therefore the quantity and impulse of the humours in fevers tends towards the intestines, as Sydenham^s expresses it, the inflammatory rays are turned upon the bowels, and they are sollicitated to an expulsion; in that case it is often useful to determine the humours towards other parts of the body, and especially towards the skin. The same thing also takes place, when after a long continued diarrhoea the intestines being relaxed, a greater quantity of humours is derived to them beyond what was usual or natural; for then the humours being turned another way, urge less upon the weakened vessels of the intestines; and thus there is an opportunity given them to contract themselves more, or become stronger. It was said before upon another occasion in the comment to §. 659, that when those who were taken with the plague were put into a sweat only by the weight of bed-cloaths, immediately the vomiting and purging ceased; the rays of the morbid matter which were before reflected inward to the stomach and intestines, now taking their course towards the surface of the body, as Sydenham^h observes. Moreover, he has likewise remarked, that the epidemical dysenteries which spread

^s Sect. II. cap. 3. in fine, pag. 209.

^h Sect. II. cap. 2. pag. 153.

in the first year, were more of a subtle and spirituous disposition, nor did they yield so readily to cathartics. But in these after bleeding premised, when the patient was in the flower of his age, he only gave a large quantity of whey for drink, and took care to have it often injected by the way of clyster; thus he diluted the acrid irritating stimulus, and observed the gripings and bloody stools to disappear after the fourth time of discharging the clyster: afterwards he confined the patient to his bed, where in a short time he spontaneously fell into a sweat, which he ordered to be continued for the space of twenty four hours, but yet not to have the sweat provoked. By this mild sweat was discharged that humour which before rushing upon the intestines produced the disease. For if the patient left his bed sooner than the time specified, he observes that they were sure to have a relapse; and then they were obliged to repeat the same method of cure againⁱ. But we here treat of such sweats as arise from the strength of the vital powers, and from nature prevailing over the disease; and by which sweats the irritating matter is expelled from the body, or the impulse of the humours diverted from the intestines. For when the sweats arise from the strength being overpowered by the disease, they rather afford a fatal sign, according to the observation of Hippocrates, who says^k; *Ex alvo diu affecta (κοιλίη μακρῇ) vomitibus, biliosis, cibum fastidientibus, sudor multus cum impotentia repentina, occidit.* “That in those, who have
 “ been a long time afflicted with a flux or bilious
 “ vomitings, and an aversion to food, a profuse
 “ sweat with sudden weakness kills.” And again^l,
Ex

ⁱ Ibid. Sect. IV. cap. 3. pag. 231, 232.

^k Coac. Prænot. N^o. 638. Charter. Tom. VIII. pag. 890.

^l Ibid. N^o. 647.

Ex alvis liquidis perfrictio cum sudore, mala. “ That
 “ a violent rubbing or scratching of the body,
 “ with sweats following from liquid stools, are bad
 “ signs.”

Or by urine.] It is evident that profuse and long continued fluxes lessen the other excretions. Thus in a lientery Hippocrates observes (as we remarked before at §. 719.) that the drink does not penetrate to the bladder, and therefore is not expelled by urine. Degnerus ^m observes in an epidemical dysentery, that the urine was generally so suppressed, that the patient hardly discharged a drop for the space of six, eight, ten, or fourteen days. Hence Hippocrates places a due discharge of the urine among the signs of a lientery being cured, when he says ⁿ; *Indiget autem curatione hic morbus, donec & urina pro ratione ejus, quod in potu acceptum est, procedat, & corpus ab ingestis cibis augmentum capiat, & a malis coloribus liberatum fuerit.* “ But the cure of this disease is necessary to be continued, until the urine is discharged in proportion to the drink taken in, and ’till the body receives nourishment or increase from the ingested food, and is freed from its ill colour.” A due excretion of the urine therefore affords a good sign, since it denotes that the intestines do not deposit all that is taken in, but that the juices being absorbed by the venal orifices mix with the blood, and are afterwards discharged through the kidneys. But since naturally by the urine those particles are expelled from the body which are become acrid and offensive, it therefore seems very probable, that by the same passages such other acrid particles might be expelled, which being conveyed to the intestines would cause an irritating

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tating

^m Histor. Dysenter. cap. 1. §. 29. pag. 17.

ⁿ Prorrhet. Lib. II. cap. 13. Charter. Tom. VIII. pag. 822.

tating stimulus. Perhaps the same thing is pointed at by Hippocrates °, when he says, *In dolore hypochondriorum submurmurante, lumborum dolor superaccedens in febris, ventres ut plurimum humectat, nisi flatus deorsum eruperit, vel urinae copia prodierit.* “ In the murmuring colics of hypochondriac people, a pain of the loins supervening in fevers, generally produces a liquid state of the bowels, unless the flatus makes itself a way downward, or unless a large quantity of urine is discharged.” And in another place P: *Quibus alvus ab initio turbatur, urinae vero paucae sunt, & progressu temporis alvus quidem siccatur, urina vero tenuis redundat, his abscessus ad articulos fiunt.* “ In those who have a dysentery or disturbance of the bowels from the beginning of the disease, and have the urine very small in quantity, but in process of time the stools become drier, and a great quantity of thin urine is made, abscesses happen in such about the joints.” For in the former case, the quantity of urine diverts the matter which would otherwise have rendered the bowels moist; but in the latter case the stools being dry, the quantity of the urine is increased; but at the same time it is thin, and therefore does not evacuate the offending matter from the body, but deposits the same by metastasis upon the joints.

But this determination of the humours otherways made by sweats or urine is salutary, since by those passages at the same time the offending matter may pass out. But it sometimes happens in diarrhœas and dysenteries, that they are suppressed either spontaneously or by the untimely use of astringents, whence the offending humours, being transmitted

° In Coacis Prænot. N°. 291. Charter. Tom. VIII. p. 868.

P Ibid. N°. 619. pag. 889.

transmitted to other parts of the body, produce new diseases. Thus Sydenham has observed, the worst kind of apthæ proceed from this cause, as we said a little before under the present aphorism; and others have observed, that epilepsies and the worst kind of diseases have proceeded from the same cause. Hitherto relates the following observation of Hippocrates⁹; *Quibus biliosæ sunt dejectiones, surditate nata cessant, & quibus surditas, hæc, ortis biliosis dejectionibus, cessat.* “That a deafness
“ arising in those who have a bilious flux termi-
“ nates the diarrhœa, and that sometimes people
“ are cured of deafness upon the appearance of a
“ bilious diarrhœa.”

By evacuating the morbific matter.] Namely, if this is lodged in the intestines, it is discharged by vomits, purges, or clysters. But if the morbific matter is derived into the intestines from other parts, a more copious discharge by sweat or urine may often serve for the same purpose, concerning all which we have already treated. But sometimes it requires a very large space of time to evacuate all the matter of the disease. Thus Sydenham observes^r, that a dysentery, if it continues long, affects all the intestines successively downward, till at length the whole force of the disease lies upon the rectum with a continual desire of going to stool, though nothing more is discharged than a sort of bloody mucus. But in this case he observes, that none of the common methods proposed will suffice; and that topical remedies applied to the rectum under whatever form always prove mischievous. But he judged this troublesome tenesmus not to proceed from an ulceration of the rectum,
but

⁹ In Coacis Prænot. N^o. 627. Aphor. 28. Sect. IV. Charter. Tom. IX. pag. 150.

^r Sect. IV. cap. 3. pag. 234.

but rather because the intestines, which by degrees resume their former strength, deposite the reliques of the morbid matter upon the rectum. Hence he observes, that this disorder is to be bore with, 'till the patient's strength is recovered by a restorative diet, with agreeable cordials; by which means the strength being increased, this troublesome symptom gradually goes off in proportion of its own accord.

By correcting its first source or spring.] Namely, if we know that the intestines are supplied with acrid humours from an universal cacochymy of the blood; or if the like humours are collected in any particular part of the body, and from thence conveyed to the intestines. Thus in the worst degree of the scurvy, (see §. 1151. N^o. 4.) diarrhœas and dysenteries ensue, which are not to be cured, unless the malignant cacochymy of the humours making the first spring or cause of these maladies can be removed or corrected. Sydenham^s has sometimes observed, though very rarely, that a dysentery not rightly cured at first has continued for some years, when the entire mass of the blood having acquired a dysenteric cacochymy, continually supplies acrid or heating humours to the intestines; yet the patient is well enough with respect to the other functions.

In a woman thus affected who had tried many remedies without success, bleeding often repeated, but at long intervals subdued the obstinate disorder. Thus he removed the inflammatory cacochymy of the blood; which appeared from the blood extravasated resembling that in a pleurisy, and from the considerable relief which she perceived after each bleeding. But when, for example, in an abscess of the liver, a diarrhœa or dysentery

^s Sect. IV. cap. 3. pag. 235.

tery arises from a continual flux of the matter or sanies into the intestines, it is sufficiently evident how difficult it must be to correct or remove the first spring or source of the disorder. If now a schirrhus formed in the liver degenerates into a cancer, and continually erodes the intestines by its acrid virus, who will be bold enough to hope for any thing of a cure in such a case? If the Physician inspecting the very foetid stools of a dysenteric patient about to expire, should be immediately thrown himself into the like disorder from the malignant exhalations, which I remember to have happened to a certain eminent gentleman: or if the disease should be contracted by those people who wash the linnen that has been souled with the dysenteric stools of the patient^t, what good can be done as long as the putrid fumes lodged internally, disperses its malignant virus every moment to the intestines? It is evident, no cure can be expected if this malignant source of the disorder cannot be corrected. For the art of healing has its bounds, and the Physician, who knows how to discover an incurable disease, merits as much reputation as he that removes a curable disease.

^t Degnerus de Dysenteria, &c. cap. 1. §. 41. pag. 32.

Of Febrile Eruptions.

S E C T. DCCXXIII.

INflammatory pustules or exanthemata have generally for their matter something which cannot pass through the smallest vessels of the skin, but hesitates, or stops there; but for their cause they acknowledge the circulatory, secretory, and excretory powers of life; hence these eruptions are manifold, according to the variety of these causes, so that fevers are afterwards denominated from thence erysipelatous, scarlet, red and purple petechials, morbillous and variolous.

Efflorescencies or exanthemata are derived from ἀπὸ τῆ ἔξανθεῖν, which signifies to flower or blow out, arise or break forth; and it is usually applied to those humours which break out in the skin from the internal parts, so as to create some kind of pustules or roughness^u. Celsus calls them pustules^w, and tells us, they are of several kinds: *Nam modo circa totum corpus partemve aspredo quædam fit, similis his pustulis, quæ ex urtica vel sudore nascuntur: ἔξανθήματα Græci vocant, eaque modo rubent, modo colorem cutis non excedunt, &c.* “ For they arise
 “ with a sort of roughness, either throughout the
 “ whole body, or some particular part, like those
 “ pustules which are produced by nettles, or from
 “ sweating. The Greeks call them exanthemata, and
 “ they

^u Fœsli Oeconomia Hippocrat. pag 131.

^w Lib. V. cap. 28. pag. 326.

“ they sometimes look red, and sometimes not
 “ exceed the colour of the skin, &c.” But
 these are all called by the same name of efflores-
 cencies, whether they project beyond the skin
 (when perhaps they are properly to be called pus-
 tules or pimples) or do not rise above the skin,
 but only appear rough. Both these kinds are called
 exanthemata by Hippocrates. For in describing
 the disease of Silenus, he says^x, *Octava die frigidum*
exsudavit per totum corpus, exanthemata cum sudore
rubra, rotunda, parva, varis similia permanebant,
non abscedebant. “ On the eighth day he had a
 “ cold sweat all over his body, and with the sweat
 “ he had small round exanthemata of a red colour,
 “ which continued like warts without scaling off.”
 But in another patient^y he observes, *Lata exanthe-*
mata non admodum pruriginosa. “ Broad exanthe-
 “ mata without much itching:” and Galen^z, in
 his commentary to this aphorism, likewise acknow-
 ledges this distinction of the exanthemata.

Since therefore the exanthemata appear in the
 external skin, it is evident the seat of them is in the
 cutaneous vessels, and therefore for the most part
 that they acknowledge for their matter something
 that cannot pass through, but obstructs those ves-
 sels. Thus in consumptive patients, when the most
 liquid parts of the blood are expelled in night-
 sweats, such itching pustules frequently arise in the
 cutaneous vessels from the inspissated blood hesita-
 ting there. But when these vessels are constricted,
 either by more than usually acrid humours sent
 towards the skin, or from external stimuli irritating
 those vessels, we observe that the same efflorescen-
 cies are produced. Thus in healthy people, exer-
 cised

^x Epidem. 1. Ægrot. 2. Charter. Tom. IX. pag. 101.

^y Epidem. 6. *ibid.* pag. 415. & Aphor. 9. Sect. VI. Charter.
 Tom. IX. pag. 253.

^z *Ibidem.*

cised with hard labour in the summer heats, when a salt and strong smelling sweat is expressed, such exanthemata frequently appear with a very troublesome itching. The same is also frequently observed, from the more acrid substances applied externally to the skin, more especially if they were mixed with any thing fat or oily. Hence it appears, that sometimes exanthemata may be produced from a cause existing without the body, and applied only to its external surface, though for the most part they acknowledge for their matter something which cannot pass through the smallest vessels; and thus in such case, where the small vessels are irritated or contracted by external stimuli, the humours cannot pass freely through them. Whether or no such stimuli may not be lodged in the air with which we are invested, as are capable of producing this disorder? Reaumur ^a, to whom we owe many fair discoveries, upon handling the nests of some caterpillars, was surprized to find a troublesome itching in his hands, and especially betwixt the fingers; but afterwards his face and eye-lids began to swell, and a troublesome tumor of the eye-lids continued for four whole days; in vain he washed his hands with water, oil, and spirits of wine, for the troublesome inflammation still continued. But upon enquiry he found, that many small hairs in the cast-off skins of the caterpillars, when they were changed from the state of a chrysalis or worm into that of a butterfly, fixed themselves into the skin, and there continued to prick and irritate like small rigid thorns. Nor did the small hair of the exuvixæ or cast-off skins offend only by touching them, but if they were agitated by a stick, they produced nearly the same effect; and in the sun-shine was able to
perceive

^a Memoirs pour l'Histoire des Insectes, Tom. II. Mem. 4. pag. 191, &c.

perceive upon stirring these caterpillars nests, that thousands of small corpuscles floated in the air, which seemed to be nothing else than such small hairs shook out of the old cast-off skins of the caterpillars; and therefore the reason appeared why these disorders may be produced without immediate contact. But as this is observed throughout the large tribe of the common caterpillars, which may be thus of mischievous consequence; it therefore seems very probable, that these hairs may be carried by the wind to divers places, and produce the like disorders, But the same author observes, that the troublesome itching and inflammation produced from this cause by rubbing the parts affected with the leaves of parsley. Perhaps there are many like things floating in the air in particular times and places, which may produce the same effects. Thus Hippocrates ^b remarks, that great showers with intense heats and southerly winds occasion itchings, and little watery blisters, like those from burns, under which the skin seemed to be burnt. But in this case will not the greater tenderness of the skin in some people render them more liable to be affected from the same cause than others? Four women, who were present with Reaumur, when he handled these nests of the caterpillars, were afflicted with exanthemata on the neck. In delicate girls, and men of a tender constitution, I have sometimes observed, that if upon getting out of bed in the morning they do but expose their face and hands to the common air, by opening the window, the skin of those parts is immediately corrugated into pimples or little blisters, with great itching; whether this arises from an obstructed perspiration excited by the morning cold, and irritating the skin, or else from acrid particles floating

^b Epidem. 2. in initio. Charter. Tom. IX. pag. 118.

floating in the air, and dispersed through it by the diurnal heat.

Moreover, observations teach us, that sometimes the cause which excites itching and efflorescencies is lodged in the stomach, and about the præcordia, from whence being expelled those effects are immediately removed. When by misfortune a poisonous muscle is swallowed by any one, there follows sooner or later great anguish, and soon after the skin almost of the whole body is beset with exanthemata, attended with a violent itching; but if the contents of the stomach are immediately expelled by white vitriol, or any other vomit which operates immediately as soon as it is swallowed, those efflorescencies with the anguish soon disappear; nor does it seem probable that this poisonous acrimony mixes with the blood, and passes together with it to the skin, since after vomiting all the disorders immediately cease. I know a person who is immediately troubled with the same symptom from the taking of crabs-eyes; which symptoms are also removed when he has ejected them by a vomit. It may be therefore asked, whether exanthemata may not in the like manner be produced in fevers, when such malignant sordes are collected about the præcordia? at least what I have observed in my own practice, in the cure of these disorders, seems greatly to confirm this opinion; namely, that when these sordes or foul humours are evacuated either upward or downward, or spontaneously by art, these exanthemata vanish. In the case of Silenus^c mentioned by Hippocrates, from the first day of the acute fever were discharged sincere bilious stools, frothy, and afterwards thin and black. On the sixth day the stools were suppressed. On the eighth day small round exanthemata broke out.

Possibly

^c Epidem. 1. Ægrot. 2. Charter. Tom. IX. pag. 101.

Possibly because the matter was collected about the præcordia, which before escaped by stool, but there rendered much more malignant by the disease. For Hippocrates remarks from the beginning to the end of the disease, that there was a continual palpitation of the hypochondria. In another place he also says; *Anxiis alvi turbatæ suppressio, brevis velut culicum puncturæ efflorescunt, &c.* "That in those who have a suppression of the flux with anxiety, there are soon after eruptions break out like the bitings of gnats^d, &c." And again, *Pruriginosæ affectiones omnibus nigrorum dejectionem significant, & vomitum grumosum.* "That itching eruptions of the skin denote a discharge of black stools, and grumous vomiting^e." From all which we may conclude, that a proper regard ought to be had to these causes.

But from whatever cause the exanthemata arise, it is certain, that during the time they are present, such particles hesitate in the cutaneous vessels, as cannot pass freely through them, whether the disorder proceeds from a fault in the fluids to be transmitted, or in the transmitting vessels, or in both together. But as febrile eruptions most frequently arise from a critical deposition of the morbid matter in some of the vessels obstructed, dilated, or broken (see §. 593); that is, when the fever terminates neither in perfect health, nor death, but in another disease; from thence it is evident, that their efficient cause is the vis vitæ, which conducts the humours through the vessels in a circulatory motion, separates some from others and frequently discharges them from the body by various passages. Thus we see in the small-pox and measles, after a fever preceding, the morbid matter is separated

^d Coac. Prænot. N^o. 564. Charter. Tom. VIII. pag. 885;

^e Ibid. N^o. 636. pag. 890.

and deposited on the skin. Thus also in infants, after a slight fever preceding, the skin appears in several places beset with spots, and sometimes with large red pustules; and soon after a glutinous humour is expressed through the dilated vessels of the skin, where it often concretes into thick scales; and if the secretion or excretion of this humour is disturbed by repellent and drying medicines, convulsions, fevers, and the worst consequences frequently follow. These exanthemata are therefore of various kinds, according as they arise either from an increased velocity of the circulation only, or from a secretion of the morbid matter, or from an excretion of it at the same time. There is moreover a difference also to be observed in these from a diversity of their matter: for sometimes the cutaneous vessels being filled with thick inflammatory blood they look red; and sometimes the like disorder taking place in the thinner humours, they look yellow, or of the same colour with the skin, as Celsus observes in the place a little before cited. But since from these exanthemata in different fevers, which either accompany or follow after, a name is derived to them, therefore the most obvious kinds of these fevers are here enumerated.

[Erysipelatous.] What an erysipelas is has been said before in the comment to §. 380. and it was also remarked in the comment to §. 593, that a fever often arises in people before perfectly in health, without any previous known cause, which fever ceases after one, two, or more days, depositing a certain matter towards the external surface of the body, occasioning red spots in various parts, but most frequently in the face, where in a very short time they spread themselves to a considerable

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size;

fize; and then such a fever is termed erysipelalous. This fever most frequently happens towards the end of the summer^f, and sometimes occasions a redness with an incipient pain about each ear or the parts adjacent, and in the skin of the affected part there appears a numerous assemblage of small pustules, which, as the disease increases, generally arise into blisters full of ichor: afterwards the erysipelas spreads, and occupies successively other parts of the face, which it often swells in a surprising manner; and the eyelids are generally so inflated in a violent erysipelas, that the patient cannot open them. After this the disorder is frequently propagated successively through the rest of the scalp, the violence of the disease for the most part then lessening in that part where it was first seated, while it still continues in its greatest vigour in other parts. The most known and frequent kind of erysipelas is usually observed to be thus; and the signs of this disease beginning seem to have been known to Hippocrates^g, when he says; *Rubores circa aurem, ex prægresso dolore in febris orti, signum quidem Erysipelatis in facie futuri: sed & convulsiones ex talibus fiunt, cum vocis interceptione & exsolutione*; “Rednesses about the ear, “ arising from a preceding pain in fevers, denote “ the sign of an erysipelas about to follow in the “ face; but from such follow convulsions, with “ stammering and loss of speech;” namely, when an erysipelas does not throw itself outward, but invades the internal parts of the head, for then all these disorders are to be feared. For, as we said before in the comment to §. 593, the good or bad event of this disorder depends chiefly upon the part towards which the erysipelas is determined by the

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preceding

^f Syden. Sect. VI. cap. 6. pag. 352.

^g Coac. Prænot. N^o. 201. Charter. Tom. VIII. pag. 863.

preceding fever: for there is seldom any great danger if it occupies the external surface of the body, unless it be repelled by ill treatment. But that this disorder is most dangerous when it invades the membranes of the brain, lungs, or other viscera, readily appears. Hence Galen^h observes, *Quod Erysipelas circa cutim maxime consistat, tum hanc externam, quæ omnium partium commune est tegumentum; tum membranofam & tenuem, quæ singulis internarum circumtenditur.* “That an erysipelas takes up its seat chiefly in the external skin, which is the common integument of all parts of the body, as also in the thin membranes which are spread round each of the internal parts.” But since when an erysipelas is seated in the face, it is considerably swelled into a large tumour, though at the same time the skin only seems to be affected, yet the panniculus adiposus lying under the skin must be equally affected; and hence Galenⁱ well observes, that as a phlegmon, which has its seat commonly in the panniculus adiposus, sometimes invades the skin; so, an erysipelas also sometimes occupies the flesh or fat under it: whence also when an erysipelas raises the parts into an inflammatory tumour, it is called a phlegmoneide erysipelas; and, on the contrary, when a phlegmon occasions but a slight tumour of the parts with a considerable redness and heat of the skin, it is called an erysipelatous phlegmon, taking its principal denomination from the disorder which seems to be predominant.

There is likewise another kind of erysipelas described by Sydenham^k which may be commodiously

^h Lib. XIV. Meth. Med. cap. 2. Charter. Tom. X. pag. 319.

ⁱ Ibidem. ^k Sect. VI. cap. 6. pag. 353.

ly referred to febrile eruptions, though he says it does not so frequently occur as the former kind. But thus he describes it; *Hæc quolibet anni tempore invadit, idque hæc ut plurimum ὑποφάσει; quod scilicet æger vinorum subtilium magis magisque attenuantium potationi paulo liberalius indulserit, aut liquoris similis spirituosi. Febriculam, quæ agmen ducit, mox excipit pustularum per universum fere corpus eruptio, quæ urticarum puncturas referunt, & nonnunquam in vesiculas attolluntur; mox recedentes tuberculorum more sub cute se condunt cum pruritu mordacissimo & vix tolerando, ac quoties levissimam scalpturam subeunt, rursus apparent.*

“ This invades at any season of the year, and that
 “ for the most part with the following appear-
 “ ance; particularly from the patient’s indulging a
 “ little too freely in the drinking of thin wines,
 “ which by degrees more attenuate or rarefy the
 “ humours, or of any spirituous liquor of the like
 “ kind. It begins with a fever, and soon after
 “ is followed with an eruption of pustules al-
 “ most throughout the whole body, resembling
 “ those from the stinging of nettles; and some-
 “ times they rise into little blisters; soon after
 “ they disappear like pimples, and hide them-
 “ selves under the skin with the most intense itch-
 “ ing hardly tolerable, and appear again if the
 “ patient scratches in ever so small a degree.” I
 have several times seen a kind of exanthemata perfectly answering to this description, arising without any apparent signs, as well in the winter as summer, and sometimes in men and women of advanced age. They almost constantly perceived a troublesome itching about the præcordia before these exanthemata broke out; and if they suddenly went in and disappeared, as frequently happened, the anxiety returned, and ceased again if

the eruptions came out. Sometimes they occupy only certain parts of the body, but sometimes they are dispersed throughout the whole skin. I have often wondered at their sudden disappearance, and their returning again as unexpectedly in the space of a few hours; as also at the great velocity with which they sometimes move successively through the most remote parts of the body. In a woman of fifty years old, I saw them investing the whole body on the first day, and on the second they entirely disappeared; but soon after followed anxiety and fainting, which went off, after an hour, when the exanthemata came out again; and again after a few hours they disappeared. But then the patient was troubled with an intolerable itching betwixt the toes of both feet, which ceasing after it had held about an hour, the upper lip immediately began to swell very much. Afterwards a copious sweat was expelled from the body, whereby the disorder seemed to be entirely removed, except a very slight itching which still continued for three or four days in one part or other of the body, which went off at intervals. But in the mean time during the whole course of the disease, there hardly appeared any injury of the functions, if we except the anguish and fainting, which happened when the exanthemata suddenly went in at the beginning.

Scarlet.] Very much like erysipelatous fevers, but of a different kind, because the erysipelas generally invades the face, or if it occupies any other part of the body, yet it does not spread throughout the whole. But in the scarlet-fever the whole skin is beset with small red spots, which yet are more numerous, appear redder, broader, and less uniform than the spots of the measles. These fevers generally appear at the latter end of the summer,

mer, and happen chiefly to infants ^l. After the spots have continued two or three days, they disappear with a scaling off of the cuticle.

Red and purple petechials.] This name is generally applied to such fevers as are usually malignant, spreading epidemically, and accompanied with small spots in the external skin, which do not arise above the surface. They are also called puncticular fevers ^m, because the skin is marked with very small points, sometimes red and sometimes purple. Sometimes they are also termed lenticular, when the spots of the same colour are broader. The red petechiæ are usually of a good kind; but the purple, livid, and black, are more malignant and almost constantly fatal. But altho^o these exanthemata accompany an epidemical fever of a particular kind, as we are taught from medical history; yet purple or black petechiæ appear in other most dangerous diseases, as signs of death at hand. Thus in the plague at London ⁿ people were taken in the middle of the streets with an eruption of purple spots, without being conscious of any disorder, and were followed with immediate death. Also in the cure of pestilential fevers from too soon interrupting the sweats, or from disturbing the cure by bleeding, urged by the persuasion of the patient or friends, these fatal exanthemata have appeared. Sydenham ^o has observed that the measles in adults after a very hot regimen turn livid, and soon after black, and then it is over with the patient, unless immediate relief be given by bleeding and cooling with a more temperate regimen. He observed that purple spots interspersed

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^l Sect. VI. cap. 2. pag. 328.

^m Sennert. Lib. IV. cap. 13. Tom. II. pag. 199.

ⁿ Sydenham, Sect. II. cap. 2. pag. 133.

^o Idem, Sect. IV. cap. 5. pag. 246.

in the small-pox almost constantly presage death ^p: and in the height of the small-pox he also observed small black spots, hardly equal to minikin pin-heads ^q. And the like has been also sometimes observed by myself in the worst species of the small-pox. In a lad four years old, lying ill of an acute continual fever, with an inflammatory pain of the abdomen, towards the end of the third day of the disease, when the pulse was quick and small, the face inclined to livid, and the sudden remission of the pain denoted that a gangrene began to occupy the internal parts of the abdomen: Here I observed black spots to break out upon the legs and thighs, and which were broader in the groins, but in the arms they were hardly so large as a minikin pin's head; but in the breast they appeared more of a red colour, yet they soon after turned livid, and death followed. From whence it is evident, that such exanthemata arise in many diseases; and the like we read to have been observed by the ancient Physicians. Hippocrates ^r tells us, *Quum calida febre detento (ὕπὸ θερμῶλῆς ἐχομένῳ) ulcuscula eruperint in ambitu livida, debili existenti, moritur. Quum a quopiam morbo detento, imbecillo jam existenti livores eruperint, lethale.* "That
 " when ulcuscules break out livid in their edges,
 " in the body of a person lying ill of an inflamma-
 " tory fever with great weakness, death follows:
 " for when the patient is spent or weakened with
 " any other disease, livid eruptions are fatal." Thus Galen ^s remarks in the beginning of a raging pestilence,

^p Idem, Sect. III. cap. 2. pag. 173.

^q Ibidem.

^r Hippocr. de locis in homine, cap. 12. Charter. Tom. VII. pag. 371.

^s Method. Medend. Lib. V. cap. 1. Charter. Tom. X. pag. 122.

pestilence, that a certain young man who had lain ill nine days, had ulcerous eruptions throughout his whole body, as also had every one else who recovered. But that these ulcers were exanthemata, appears from his making use of the word ἐξανθήματα, and soon after towards the end of the same chapter † he expressly says: *Qui evasuri erant, iis exanthemata nigra per totum corpus confertim apparuerunt, plurimis quidem ulcerosa, omnibus autem sicca. Et erat evidens intuenti, corrupti in febribus sanguinis esse residuum, veluti cinerem quemdam pellente natura versus cutim, velut alia plura ex supervacuis.*

“ They who were to escape, had black exanthemata appearing thick set throughout the whole body, many of which were indeed ulcerous, but all of them dry. And it appeared evident to one who considered the case, that what remained of the blood being corrupted in these fevers, was thrown off by nature towards the skin, as a sort of useless ashes, as she likewise throws off many other superfluous matters.”

But petechial fevers, properly so called, are those which spread epidemically, and in which small red, ash coloured, purple, livid or black points break out in the skin, sooner or later, according to the violence of the disease; and indeed this critical deposition of the morbid matter towards the skin is customary in these fevers; in which if they happen at a proper time of the disease, namely, on the fourth or seventh, or (when the violence of the disease is moderate) on the fourteenth day, and especially when the exanthemata are not very numerous, but of a red colour, the event is usually successful; the pulse then rising when the exanthemata break out, and the other symptoms, as watchings, delirium, intolerable

† Method. Medend. Lib. V. cap. 1. Charter. Tom. X. pag. 124.

intolerable thirst, ringing in the ears, dulness of the sight, &c. ceasing, or at least very much lessening. But when these exanthemata did not break out at all, or if they came forth livid or black and very numerous, there was always the greatest danger; and in those who perished of this disease, there was indeed the appearance of these eruptions, but lying very deep under the skin, as if nature, overpowered by the violence of the disease, could not complete this critical translation which she had begun. But the very worst symptoms certainly returned, if these exanthemata suddenly disappeared, as the Physician experienced in himself, who described this disease when it was epidemical at Cologn^u. For then these exanthemata broke out all over the body like flea-bites about the fourth or fifth day of the disease, and on the beginning of the seventh day the pulse became larger and fuller, the habit of body appearing more than usually moist (which he says is a fore-running sign of nature endeavouring to expel the disease by sweat) by very plentiful drinking of a mild decoction of barley a sweat broke out, which continued something less than twenty-four hours. But when the sweat was ended, and he believed all the danger was over, he put on clean linnen, being first warmed; but soon after he felt a chilliness all over his body, and the spots suddenly disappearing, he was taken so ill that every one despaired of his life. He then took a spoonful or two of Spanish wine, and by that means reviving he continued the use of the wine till his whole body grew hot again, and in a little time after not only the former spots returned, but new ones broke out, partly red and large, and partly small and brown. About the fourteenth day he
again

^u Laur. Donckèr, *Idea Febris Petechialis*, pag. 443.

again fell into a critical sweat, whereby the disease was indeed terminated, but not entirely, and therefore he daily made use of a cordial mixture promoting a sweat for some hours by plenty of warm drink; and thus he recovered slowly, but was well before the twenty-first day. We before observed upon another occasion from Sydenham, how dangerous it was to interrupt the sweat once raised in the cure of a pestilential fever before the received contagion was entirely evacuated. See also what has been said upon this disease by Fracastorius de morbis contagiosis, and in Schenkius^w.

The strictest enquiry ought therefore to be made into the nature of the disease, in which these exanthemata appear; for sometimes they arise from the too great violence of the fever, more especially if that is increased by stimulating cordials, or a hot regimen, and then nothing good can be expected from their eruption. But sometimes the like exanthemata attend epidemical fevers, wherein the morbid matter is by these thrown outward; and then they are of service. In the first case a violent fever creates heat, and the signs of an inflammatory disease attend. But in the latter case, as the observations of authors testify, the pulse, though quick is weak, and all the strength overturned, and there appears a fallacious gentleness in the beginning of the disease though it is malignant, and some relief is observed when these exanthemata break out. From hence there seems to be distinction enough to be made betwixt these diseases. Sydenham^{*} observed a kind of fever which he called variolous, at the same time when the small-pox were epidemical, and so named it, because it had many symptoms in common with

^w Observat. Medic. Lib. VI. pag. 768.

^{*} Sect. III. cap. 3. pag. 200.

with the small-pox ; in which fever there was also an eruption of petechiæ. There was a great propensity to sweats attending from the very first day of this fever, but without any relief ; but even if the discharge of the sweats was promoted by cordials, or the hot regimen, the petechiæ became more numerous, and at the same time all the symptoms of the disease were increased. He therefore moderated the too great violence of the fever by a thin diet, with bleeding, and cooling medicines ; and he prevented the sweats which would have been mischievous, by ordering the patients out of their beds. He always observed the success of this method to be happy ; and if the disease treated in the other method had tortured the patient for six or eight weeks, if death did not intervene, he was obliged to place his hopes in a copious spitting, which he had so frequently observed to be salutary in the worst kind of the small-pox.

But there are observed different degrees of malignity in these petechiæ ; for sometimes they look red, and then seem to be nothing more than little inflammations in the cutaneous vessels, dispersing for the most part in a very little time, or going off with a slight desquamation of the cuticle in the affected parts. But when they are ash-coloured, brown, purple, or black, they are justly esteemed of worse import ; perhaps because then the small vessels are broke, and the humours are seen thro' the cuticle extravasated underneath those colours, being, as it were, a sort of ecchymoses ; which seems very probable, since, according to the authors who have described the petechiæ spreading epidemically, they seem to disappear again by degrees, and change from a livid or black, to a more dilute colour before they vanish. In the year 1742, in the month of August and September, I saw one
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or two patients afflicted with petechiæ in this city of Leyden, spots of a black or of a deep purple colour appearing throughout the whole body, which yet by degrees vanished, changing into a more dilute colour. But I had not an opportunity to observe the whole course of the disease, being only called when the exanthemata had already appeared for some days. But there were many more people taken with this disorder, but only those of the lower rank; and some of them I am informed perished of that disease. But Physicians of large practice, who are continually employed among the poor, know well how difficult it is to sift out the history of the preceding disease from such people. But I thought I could perceive a gradual change in the colour for the better, as the eruptions went off, in the same manner as when ecchymoses disappear. But when such exanthemata produce a true mortification or blackness of the skin, or change it of a livid or leaden colour, it is sufficiently evident, that there is the greatest malignity of the disease, but then they never gradually disappear again; but if the patient recovers, the gangrenous and dead parts of the skin are separated from the rest by an ulceration formed in the circumference. Such petechiæ perhaps appear more rarely, yet there are instances of these to be found in medical history. In a certain part of France the purple fever (for thus they usually call the petechiæ) was epidemical, which in the space of two days, or at most of three, carried off the patient; but in those who recovered from this desperate disorder almost the whole skin fell off. But such was the corruption of the bodies dying of this disease, that no one durst open them, and even many died among those who interred them.

These

These ulcerated exanthemata seem also to have been of the kind which Galen saw in those who recovered from the plague; for these, is as evident from the passage lately cited from him, were also changed into ulcers. It is evident from what was said in the comment to §. 423. N^o. 2. that the febrile matter is sometimes deposited upon various parts of the body, and that it is often so malignant as perfectly to destroy the part upon which it settles by a mortification, so that the extremities of the body, being sphacelated from this cause, have fallen off from the rest. The same thing seems to happen in the worst kind of the petechiæ, wherein the like malignant humour is deposited upon the skin. It also appears that this disorder often proves fatal of a sudden, when the internal parts of the body are thus affected by the same matter. For that this sometimes happens seems very probable, as the like has appeared upon opening the bodies of those who have died of the small-pox. Galen^z remarks, where he describes those black and ulcerous exanthemata concerning which we lately treated, that a certain patient afflicted with this disease brought up a scab by coughing, namely the crust which covered the upper part of the ulcer; and by more instances enough he evidently demonstrates, that the like ulcerous eruption was seated in the wind-pipe.

Perhaps it is also worthy of notice, that in the malignant kind of the purple fever observed among the French, those patients who the most readily recovered discharged worms, and then the exanthemata appeared. A discharge of worms is likewise mentioned by other authors who have writ upon petechial fevers^a.

Morbillous.]

^z Meth. med. Lib. V. cap. 12. Charter. Tom. X. pag. 122.

^a Laur. Doncker, Idea febris petech, pag. 3. Forest. Lib. vi. observ. 39. Tom. I. pag. 238, 239.

Morbillous.] For a fever precedes the eruption of the measles; and in the regular kind of the measles this eruption usually happens on the fourth day of the disease. But in the less regular kind of the measles, the exanthemata appear sometimes sooner and sometimes later. In the first stage of the fever of this disease, before the measles break out, there are many symptoms in common with those of the variolous fever. But the fever of the measles is commonly distinguished by a slight cough, with a greater heaviness in the head and sleepiness, and the eyes water. But the eruptions of themselves of the measles following after the fever, usually appear first in the face like flea-bites, which increasing in number and size, run together and compose spots varying as to size and figure. Those spots are composed of red pimples joined together, the elevation of which above the skin is perceptible rather to the touch than the eye. Afterwards the like spots are spread about the belly, arms, legs, and thighs; but yet the pimples do not appear so distinct in these parts as in the face. In the less regular kind of the measles, the eruptions frequently appear first on the limbs and trunk of the body. About the sixth day the exanthemata begin to be less coloured in the face, but then the spots appear very large and red in the other parts of the body. Afterwards these efflorescencies going off, all the parts which they invaded look white, as if they were sprinkled with flour, from the rupture of the cuticle, which falls off like scales. But this peculiarity have the measles, that when they go off, tho' at the proper time of the disease, the fever increases, the cough and difficulty of breathing augment, and even frequently a peripneumony follows. These are the principal marks whereby the measles are distinguished from other eruptive fevers, concern-

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ing which Sydenham gives us many observations in his works, which deserve to be read.

Variolous.] But since we are to treat hereafter of the small-pox under its proper title, it may be sufficient at present only to name them.

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CONCERNING the three latter of these fevers it is customary to treat separately: but the diagnosis and prognosis of the three former may be easily formed.

For the petechiæ, and more especially the purples, measles, and small-pox, as they have frequently a very great difference, are therefore usually treated of separately by authors, though they are comprehended under the general name of exanthemata. For they have a great number of different symptoms, and many things occur which ought to be remarked as well in the diagnosis and prognosis in the cure. But the other febrile exanthemata require almost all of them one and the same method of cure, which we shall presently declare. But the diagnosis is easy, since they lie exposed to the eye by being seated in the external surface of the body. Hence Hippocrates ^b divides these diseases into two kinds, namely those manifest to the eye; and those which are occult; those which break out and swell in the surface, he says, are manifest. From what has been said under the preceding aphorism, the mutual difference of febrile exanthemata with respect to each other is sufficiently apparent. Nor will the prognosis of them

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^b De Arte, cap. 8. Charter. Tom. II. pag. 150.

be difficult, since there does not seem to be much danger to be feared from them. Thus Hippocrates^c remarks, as we observed before upon another occasion in the comment to §. 593, that in fevers happening in the summer-time, there were eruptions like flea-bites raised about the seventh or ninth day in women, and yet none of them were killed thereby. Sydenham^d so little feared the scarlet fever, that he said it was rather the name of a disorder than a disease itself; nor is there much danger attending even in an erysipelas itself seated in the external parts, unless it is made worse by a perverse treatment, otherwise it generally admits of a happy cure; and yet greater caution is necessary in this than in the scarlet fever, or in those fevers where red pustules break out. For Hippocrates^e remarks: *Erysipelas si foras diffusum introvertatur, malum: si vero intus diffusum foras vertatur, bonum.* “That if an erysipelas spread externally turns inward, it is a bad sign; but if being diffused internally it turns outward, it is a good sign.” Even in another place^f he pronounces it fatal; and observes that the erysipelas then turns inward, when the redness disappearing there is an oppression or heaviness at the breast, and a difficulty of breathing. But in the same place he treats of a quinsy, in which frequently, as we shall afterwards declare, there is an erysipelatous redness diffused through the neck and breast, which relieves the patient: but when this erysipelas suddenly disappears there is the greatest danger, and therefore neither does this prognosis in general belong to any kind of erysipelas.

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^c Epidem. Lib. II. Charter. Tom. IX. pag. 155.

^d Sect VI. cap. 2. pag. 330.

^e De Morbis, Lib. I. cap. 4. Charter. Tom. VII. p. 535;
& Aphor. 25. Sect. VI. Charter. Tom. IX. pag. 261.

^f Coac. N^o. 366, Charter. Tom. VIII. pag. 872.

S E C T. DCCXXV.

THE cure of these eruptions is not difficult, since they seldom require any thing, more than to keep their matter fluid and moveable by a sufficient large quantity of thin or light liquors, and by continually maintaining the vis vitæ under its due moderation; for then in a short time they go away with a scaling off of the cuticle.

Since in these eruptions there is a salutary endeavour of nature to derive the matter of the disease towards the surface of the body; and frequently the Physician is not called, 'till the matter itself is deposited on the skin, and the exanthemata appear to view, it is sufficiently evident that the cure is not difficult; and frequently that it requires little or no assistance from art. Hippocrates^s indeed has pronounced, (as we observed before upon another occasion in the comment to §. 605. N^o. 13.) that the matter is to be drawn off by convenient passages the same way that it inclines: But we find that this practical rule has been much abused; because many Physicians believe it necessary to urge the matter forward, that nature might the better and the sooner perform what she had undertaken. But Hippocrates^h has limited and explained this rule in other places: For in his aphorisms he says; that the matter is to be drawn by convenient ways
towards

^s Hippocr. de Humor. Text. 2. Charter. Tom. VIII. p. 516.

^h Aphor. 21. Sect. I. Charter. Tom. IX. pag. 38.

towards that part where nature inclines it; but then he adds, *quæ ducere oportet*. "That which ought to be drawn." And in the preceding aphorism* he well observes; *Quæ judicantur, aut perfecte judicata sunt, nec movere nec innovare oportet, neque medicamentis, neque aliis irritamentis, sed finire*. "That one ought not either by medicines, or any other kind of irritation, to move, nor change the matter in those diseases, which are near upon, or perfectly arrived to a crisis, but that one ought then to do nothing." Concerning which we spoke more at large in the comment to §. 587, where we treated of a crisis. Since therefore in these eruptions, concerning the cure of which we here treat, the matter is carried to the skin, there is evidently no occasion for many remedies. It will be sufficient for the patient to take in a large quantity of diluent liquors to keep the matter fluid and moveable, that it may be easily extricated from the humours, diluted by these drinks; while by the same means the vessels are relaxed; and thus very easily give a passage to the humours to flow through them. For the fluids being rendered moveable, and the vessels pervious, the circulation will become the most free through all parts of the body, whereupon all the secretions depend. Hitherto happily conduce decoctions of the roots of grass, vipers grass, burdock, &c. with the juice of citrons, and a little nitre; or the woods of sanders, saffras, &c. infused in a large quantity of water; which by a gentle aromatic stimulus dispose to a diaphoresis without considerably increasing the motion of the circulating humours, and perfectly answer the curative indication. At the

G g 2

same

* Aphor. 20. Sect. I. *ibid.* pag. 36.

same time also care must be taken to continue to preserve the vital powers in a due moderation, that they may be neither too dull, nor too exorbitant in their operation. But by what signs one may know that the *vis vitæ* is either too intense or remiss, and by what remedies it may be maintained in, or reduced to, a due moderation, has been said before at §. 609 to 612. Hence Sydenham † used no medicines in the scarlet fever, but ordered the patient to keep at home, and abstain from flesh and spirituous liquors of all kinds, lest the cold air, by constringing the cutaneous vessels, should disturb or hinder the incipient deposition of the morbid matter upon the skin. Yet he would not have the patient continually confined to his bed, knowing well that this increased the heat; and therefore his whole practice consisted only in maintaining the present condition, by which a derivation was made of the mild inoffensive matter towards the skin, there to be separated from the blood; and he observes, that thus the disease might be very easily got over without danger or trouble; when, on the contrary, other Physicians, being too busy with cordials, and confining the patient to his bed, with many unnecessary remedies frequently disturbed the disease, or even sometimes rendered it fatal. Yet he advises, that if convulsions or a coma supervene during the eruption, as sometimes happen in younger subjects, then a large and strong blister should be applied to the neck, and a purgative should be immediately given, and repeated every night 'till the patient recovers.

When these exanthemata vanish, there is commonly a scaling off of the cuticle, and during that
time

† Sect. VI. cap. 2. pag. 329, 330.

time he has observed a gentle purge given to be useful; which was also his practice to give after the small-pox.

By this method are safely cured, not only the slighter exanthemata, but also the happy success in the cure of the measles and small-pox depends on a due regimen and moderation of the vital powers; and an importunate hastiness by which the Physician or attendants of the patient endeavour to hasten the eruption, has too frequently made the disease fatal (as we shall declare more at large hereafter in the history of the small pox).

But if the signs denote that foul humours are lodged about the præcordia, from whence exanthemata sometimes arise, as we said at 723, it will then be convenient to expel them by giving a purge or a vomit.

It will be, perhaps, not improper on this occasion to observe, that sometimes wonderful eruptions of this kind happen in the skin in people who are well in other respects, being only a salutary endeavour of nature to expel offending humours by the skin. Thus I have known people, who in the height of the spring have every year had a red spot break out in this or that external part of the body, which, after continuing two or three days, has sweated out a viscid humour expressed from the dilated vessels of the skin, and, which often hardening into a thick yellow crust, has afforded a very ill aspect, more especially if the disorder appears in the face. In others I have seen the like eruptions, but without transuding any humour, and the cuticle always scaled off from the affected part, 'till by degrees the disorder vanished. I confess myself to have performed only the part of a spectator in many such cases, when I had seen

many things tried in the like circumstances without effect, though I endeavoured to evacuate by purges, sudorifics, &c. the matter which I believed to be the source of these eruptions. But to hinder these salutary endeavours of nature, by external desiccative or repellent medicines is dangerous, as many observations testify, unless the like break out again in other adjacent, or more distant parts. Thus Bennetⁱ observed, *Sic Juveni eusarco & robusto impetiginis materiam, topicis toties quoties repressam, ad intestina repulsam, colici atrocissimi paroxysmos intulisse, vidit Benedictus a qua male curata, aut sponte redacta, phthisin dein subortam deprehendit.* “ That the matter of a ring-worm or
 “ cutaneous eruption, whenever it was repelled
 “ towards the intestines by the use of topicals in a
 “ strong lusty young man, it occasioned most severe fits of the colic; and from this case ill-treated, or from a spontaneous return of the
 “ matter, the patient was afterwards seized with
 “ a pulmonary consumption.” Sometimes also these disorders are chronical, and then the body acquires a habit of freeing itself by these passages from such humours, as being retained would be mischievous. For I have seen such eruptions resist all the means that could be tried, happily perhaps for the patient, since a sudden removal of such chronical disorders of the skin may produce the most dreadful consequences, as we may learn from a surprising case related in the memoirs of the royal academy of sciences at Paris^k. A woman of a good habit after a lying-in was troubled with a morpew or mealy ring-worm in her hands for eight or ten

ⁱ Theatr tabid. Exercit. 13. pag. 42.

^k Acad. des Sciences 1703. Mem. pag. 21.

ten years, with which being tired, she imprudently applied to the affected parts a certain limpid liquor like pure water, which took such effect, that the disorder disappeared in the space of twenty-four hours; but at the same time there ensued a most troublesome inclination to vomit, with a sense of suffocation or oppression. When these symptoms ceased the head was affected, and then there was observed a kind of erysipelatous defluxion at the sides of the nose; the menses, which had hitherto flowed as they ought, now ceased; the nose, lips, and eye lids, were so swelled, that she could not open them for several months, the lips were turned outward; upon touching the whole skin of the face it oozed out a liquor, the salival glands swelled, and all the teeth of the lower jaw fell out, together with a great many of those in the upper jaw, though they had not suffered any alteration in their colour, &c. At the expence of so many calamities did the unfortunate patient reap the cure of a disorder, which was easily tolerable of itself, and but little more than a deformity. It is therefore evident, that in the like cases the greatest care is necessary in the cure of such disorders; and that one ought prudently to discover whether the disorder is seated in the skin itself, or whether it is from something secreted and deposited upon the skin from the rest of the humours, in order to free the body from something injurious. There is a piece of good advice given us in this respect by Hippocrates¹, when he says; *Impetigines & lepræ & vitilignes albæ, quibus quidem juvenibus aut pueris aliquid horum factum est, aut paulatim conspectum in multo tempore augefcit, his quidem non oportet*

G g 4

oportet

¹ Prorrhet. Lib. II. in fine Charter. Tom. VIII. p. 828.

oportet putare, abscessum esse hanc efflorescentiam (τὸ ἰξάνθημα) sed morbum. Quibus vero horum aliquid factum est multum & de repente, hoc sane fuerit abscessus. “ Ring-worms, leprous disorders, and
 “ morphews, with which sometimes young people
 “ and children are afflicted, or which appearing
 “ gradually to view, increase in process of time,
 “ we ought not to think in these cases that the ef-
 “ florescence is a critical discharge or deposition,
 “ but an original disease. But when appearances
 “ of this kind happen suddenly, and spread large-
 “ ly, then probably it may be a critical deposi-
 “ tion.”

S E C T. DCCXXVI.

THE rest of the symptoms of a fever are related to those which have been already considered, or else require to be treated as the disease itself.

Thus have we gone through the treatment of the principal febrile symptoms, which were enumerated at §. 617. But since there is hardly any disease but what is at some time accompanied with a fever, it is therefore evident that all those diseases cannot be considered as febrile symptoms. The other disorders therefore which accompany a fever, are either like the febrile symptoms already described, and from the history of which their nature and treatment may be understood; or else they are such as we shall treat of hereafter, when we come to deliver the history of the principal acute and chronic diseases.

S E C T. DCCXXVII.

HENCE it appears, what we are to think concerning the variety of fevers; for those which run through the febrile motion with a continued strain to the end, after being once excited, we call continual; but those which abate their force, and again increase it at intervals, the fever still continuing all the time, are termed continual remittents; but those again which abate their force at intervals, being attended with a plain absence of the fever betwixt any two paroxysms or fits of the disorder, are called intermittents.

Having thus delivered the general history and cure of fevers, with the principal symptoms which usually attend; the various kinds of fevers ought next to be considered, in order to see whether they require any thing different in the cure from what has been laid down for the treatment of fevers in general. Properly speaking, there are but two distinct kinds of fevers; one, *Cujus omne tempus tantum una accessio est, a principio ad solutionem usque*: “Wherein the fever continues present upon the patient, during the whole time of the disease from the beginning to the end^m :” and the other which runs through its course by fits of going off, and returning again at intervals. The first is termed

^m Galen. de Febris, Lib. II. cap. 2. Charter. Tom. VII. pag. 128.

termed continual; but the latter, if there is a perfect absence of the fever betwixt the fits, is called intermittent. But when the violence of the fever only abates and increases again at intervals, never perfectly leaving the patient from the beginning to the end, though it is at one time more violent, and at another time more remiss, it is then called a continual remitting fever, to distinguish it from that kind which runs through its course from the beginning to the end without any exacerbations. But intermitting fevers oftentimes join and continue their paroxysms in such a manner one upon the back of the other, that they put on the face of a continual fever, and that with so much resemblance, that they cannot be distinguished but by those who are well skilled. Thus, for example, if an intermitting tertian is doubled, then a new accession or fit invades the patient on the day which is free from the paroxysm in a simple tertian, and then such a fever resembles a quotidian; from which however it is distinguished, because the paroxysms, which invade every other day, are found like each other as to the hour of invasion, number, violence of the concomitant symptoms, and continuance of the fit itself; and at the same time there is generally a considerable difference betwixt the fits themselves, which follow immediately after each other. For example, the febrile paroxysm in a double tertian, which invades on the first day of the disease, will be like unto that which returns on the third day, but different from the fit which happens on the second day; which last will again resemble the paroxysm which attends on the fourth day, and so on. If now the paroxysms are so protracted in such an intermitting tertian, that a second begins before the first is perfectly ended,

and

and a third like the first comes on before the second terminates, such a fever will be called continual, because it is never perfectly off from the patient; but at the same time it will be also called remitting, because there is observed a remarkable remission or abatement of the fever, which is in a short time followed with a new exacerbation or increase. The same thing may also take place in the protracted fits of a quotidian fever; and also in the protracted and triplicate accessions of a quartan, which sometimes degenerates into a continual remittent of this kind very difficult to discover rightly, especially if each paroxysm comes on at different hours; and also when they anticipate the usual time of their invasion; for then the order of the fits seem to be so much disturbed, that it is very difficult to distinguish to which class the fever properly belongs. Of this nature seem to have been those erratic fevers as they are called by Hippocratesⁿ, concerning which he has the following passage: *At intermittentes, & erratico modo prebidentes, autumno maxime, in quartanam ferè transeunt: & magis illis, qui triginta annos excesserunt.* “The fevers which seize the patient
 “ after the manner of erratics and intermittents,
 “ chiefly in autumn, turn almost into a quartan,
 “ more especially in those who are above thirty
 “ years of age.” And again he observes: *In febribus erraticis, nigræ nubeculæ (in urina) quartanam significant.* “That black clouds in the urine
 “ in erratic fevers denote a quartan^o.” Sydenham^p has observed such fevers as seemed to be continual, though they properly belong to the class
 of

ⁿ Coac. Prænot. N^o. 144. Charter. Tom. VIII. pag. 859.

^o Ibid. N^o. 582. pag. 887.

^p Sect. I. cap. 2. pag. 49.

of intermittents, and make the following remark upon them, which deserves well to be remembered in practice: *Cum præmaturè mense Julio, v. g. intermittentes autumnales ingrediuntur atque increbescunt, non statim genuinum typum induunt (quod intermittentibus vernis quidem solenne est) sed continuas febres ita per omnia imitantur, ut, nisi castigatissimo utrasque examine trituraveris, ab invicem discriminari non possint; at retuso paulisper constitutionis impetu, & frænata vi, jam in typum regularem migrant, atque exeunte autumnò, larva abjecta, intermittentes se esse, quales ab initio reapse fuerunt, palam fatentur; sive Quartanæ illæ fuerint, sive Tertianæ: quod si non diligenter animadvertimus, cum magno ægrorum nostrorum malo medicantes halucinabimur, dum hujusmodi febres, quæ ex intermittentium numero sunt, pro continuis veris & genuinis habeantur.* “ When autumnal intermittents invade, and become frequent before their usual time; as for example, in the month of July, they do not immediately put on their genuine character, which we usually observe in vernal intermittents; but they so nearly resemble continual fevers in all respects that they cannot be distinguished from each other, but by sifting out their nature by the strictest enquiry; but the violence of the disease being a little subdued, the fever appears in its regular character, and throwing off the mask in the decline of autumn, every one may plainly see that they are intermittents, as they really were at the first, whether they were quartans or tertians: which if we did not carefully observe we might be deceived in the cure, to the great detriment of our patients, when such fevers which are of the number of intermittents, are mistaken for true and genuine continual fevers.”

It

It is also to be observed, that intermittent fevers are so called when the paroxysms return at stated intervals, as on the third day in a tertian, on the fourth day in a quartan, &c. For when a continual fever ceases without a good crisis, the patient shall often be without the fever for several days, and then return again; but such a fever cannot for that reason be properly referred to the class of intermittents. For in that case it is called a new relapse, or a return of the disease, which tho' it frequently happens on a critical day, yet it never falls out upon a certain definite time, as we observe in the fits of intermitting fevers. See concerning this what has been said in the comment to §. 564.

Having now explained the different kinds of fevers, we are next to treat of such things as occur, and deserve to be remarked in each of these kinds.

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