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A N D
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dicina in Philosophia non fundata, res infirma est.*

VERULAM de Augm. Scient.

L O N D O N ;

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M. DCC. XXXVIII.

11867



BY BROWNE LINGGRIE
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THE SECOND EDITION, REVISED

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M.DCC.XXXVIII.



T O

Sir *Hans Sloane*, Bar^t.

PRESIDENT of the

Royal College of Physicians
in *LONDON*;

A N D T O

The CENSORS and FELLOWS
of the same.

Gentlemen,

AS the Design of the laborious
Task I have undertaken is
calculated intirely for the
Improvement and Instruction of
young Practitioners in *Physic*; and
as the Office of a *Physician* is of the

highest Concern, I have used all imaginable Precaution in laying down a *Set of Rules* whereby *young Beginners* may steer their Course with Safety to their Patients, and Honour to themselves. But lest I should be prejudiced in favour of my own Performance, and entertain Notions which it little deserves; I, with all Humility, beg leave to make my Appeal to you, who are universally and undeniably acknowledged the most competent Judges.

The generous Encouragement You give to all who endeavour to promote *Natural Knowledge*, is well known; and this prudent Conduct of yours hath done much Honour to the *Profession*, and Good to *Mankind*. Many useful Discoveries have certainly been lost for fear of Censure; but since, *Gentlemen*, You have taken

ken upon you to patronize that which is just, and to defend all laudable Enquiries from the Rage and Insult of those who are too lazy too make Experiments, and too proud to admit of any one's knowing more than themselves ; we hope to see *Nature* more closely pursued, by a continued Series of accurate, and well-grounded Experiments ; from whence only we may expect a *solid Theory*, and a *successful Method of Practice*.

The *Plan* I have here laid down is very extensive : *First*, I propose to *critically* examine into the State of the *Fluids*, by *analysing* the *Blood* in every Disease, where Blood can be drawn with safety ; in order to discover the different Quantities of the several Principles thereof ; which, we hope, may be useful as well as curious : For to know the several Pro-

portions which the *Lymph*, *volatile Salt*, *Oil*, *Air*, *Earth*, and *fixt Salt* bear to each other in a healthy State of the Blood, and the different Degrees of Variation from this *Standard*, in this or that Disease, or when such and such *Phænomena* appear, must needs direct us, in a great measure, to the *true curative Indications*.

As to the *Qualities* of the constituent Parts of the Blood, after they have passed the Fire, we are sensible they are much commuted or altered, and rendered extremely *alkaline*, which Property is not actually to be found in them before Distillation, even in the most *ardent Fevers*; as I am convinced by innumerable Experiments. And therefore all we can infer from hence is, that since all Degrees of Heat tend towards corrupting the animal Juices, and rendering

dering them *alkaline*; so in *ardent Fevers*, the continual, excessive Heat of the Body must necessarily alter the Humours to an *alkalescent* State, though this Quality may never arrive to such a Degree as to ferment with *Oil of Vitriol*, to make a white Precipitate with a *Solution of Sublimate*, or to turn *Syrup of Violets* green.

Secondly, I propose to analyse the *Urine* after the same Manner with the Blood; whereby we shall see how variously it is impregnated with *saline* and *sulphureous* Particles in different Diseases, and in different Stages of the same Disease; and also be able to account for the great Advantages or Disadvantages which arise when the *Urine* is thick and turbid, or when it is thin, pellucid, and clear.

Thirdly, I propose to *statically* examine the several Proportions of
Serum

Serum and *Crassamentum* which the Blood, in every Distemper, divides into, after standing *twenty four* Hours in a cool Place for that purpose. So that by a long Series of such Observations, I doubt not but we may arrive at a perfect Knowledge of the several Degrees of Thickness or Thinness of the Blood in each Disease.

Fourthly, I have invented an Instrument whereby I can exactly discover the several Degrees of the *Vis Cohæſionis* between the Globules of Blood, when cold and united into *Gore*. Hence, I am in hopes, that investigating the different Powers of Attraction or Cohesion between the Globules of Blood, or the various Degrees of Viscidity or Glutinousness of the Blood in each Disease, will further illustrate the curative Indications.

Fifthly,

Fifthly, I have taken especial care in searching after the *antecedent Causes* of Diseases, and in shewing by what *Laws* they produce such and such *Phænomena*, or by what Means such and such Distempers are generated.

Sixthly, From the whole I have deduced *rational Methods of curing Diseases*, not only from my own Experiments and Observations; but I have had recourse to the most *approved Writers*, and have freely taken from them what I found agreeable to Truth, and my present Design.

The few Sheets I now lay before you, *Gentlemen*, are but a Part of what I intend, if by this *Specimen* you shall judge what I have written to be reasonable, useful, and instructive. I am already furnished with

a large Stock of Experiments and Observations on other Diseases, especially of the *inflammatory* kind ; and hope, in time, to deduce many useful and practical Inferences from them.

All that I can plead in Behalf of this Treatise is, that the *Experiments* were made with the utmost Accuracy, and all the *Phænomena* are related exactly as they happen'd ; that the *Theory* is deduced as much as possible from Experiments and known Truths, avoiding all precarious, ungrounded, and merely notional *Hypotheses* ; and that the *Practice* is intirely founded upon, and agreeable to a continued Series of diligent Observations and Experience.

I am sensible however of many Defects in the following Work, and that some will disapprove of it because there are many things contained here,
which

which may be found in other Books;
but if I have collected the scatter'd
Notions of the most *approved Au-*
thors into one View, whereby they
become more useful; if I have added
to, or improved what has been said
before, so as to render the *Theory* and
Practice of *Physic* more conspicuous
and easy; and if, *Gentlemen*, I am
so happy as to obtain your Approba-
tion, I shall not in the least regard
the Cavils of supercilious and pre-
tending Critics.

I am,

Gentlemen,

with all due Respect,

Your most Obedient, and

most Humble Servant,

BROWNE LANGRISH.

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With a General Index.

By GILBERT BURNET, *Vicar of Coggeshal, Essex.*

Printed for Mess. Bettefworth and Hitch at the Red Lion in Pater-noster-Row; and may be had of the Editor at his House on Clerkenwell-Green, London.

As the Abridgment of the Philosophical Transactions has been always esteem'd a singular Benefit to Literature, whereby a vast Treasure of it has been put into the Possession of many, who otherwise could never have had an Opportunity of obtaining it; so one of the usefulest Projects that has ever been executed in favour of Christianity, is this Epitome of the Boylean Lectures, which must be allow'd to be a Collection of the noblest Apologies for Natural and Revealed Religion that the World was at any time bless'd with. But with all their Excellencies it cannot be denied, that they are too voluminous for many to read, and of too great a Price for many to purchase; and I may add, some of them very difficult to be come at. There was still therefore something wanting to render them more universally serviceable, and diffuse the Advantages that may be reaped from them. Nothing could be done so conducive to this purpose, as an Abstract of these inestimable Discourses, such as this before us, where the Argument is suffered to retain its entire Force, and the Reduction is of those things only, which, though they greatly adorn the Subject, contribute little, if any thing, to the real Weight of it.

Vide the Works of the Learned, for August 1737. p. 82.



P R E F A C E.

WHOWER *aspires to an Intimacy with Nature is obliged to an unwearied Attendance upon all her Steps and Motions; he must diligently watch and observe each Phænomena 'till he has gathered together a large Collection; and then, by comparing one with another, such Inferences may be deduced, as will give some Insight into the Laws of their Motions, their Natures, and their Causes: For if the Things observed be true, the Inferences that are drawn may be as certain.*

By these Means we may gain a Prospect of the Out-Skirts or Rough-Lines of Nature, which, perhaps, are the farthest the unassisted Senses are capable of arriving at: But if to
I *these*

these useful Observations we add a number of careful and accurate Experiments, they may let us into the particular Laws of Bodies, and the secret Operations of Nature; whereby we may be enabled to judge rightly, and to proceed upon sure Principles. The particular Properties of Bodies are not to be investigated merely by Reasoning, without diligent Experiment and Observation; and surely nothing can be more commendable than to search into, and endeavour to explore, as far as in us lies, the secret Springs by which all Bodies are set in Motion, continued, and regulated: And though it may not be possible for us to find out the true ultimate Causes of Things, yet if our Observations are faithfully transmitted from one to another, and without Intermission continued for a long time, it is inconceivable what Benefits may accrue from every one's improving upon the Observations of his Predecessor.

When I reflect on the Nobleness, Dignity, and Usefulness of the Art of Physic, I am highly delighted with the Advances that are daily made towards investigating the true
Causes

Causes of Diseases and the Method of Cure. That the Modern Physicians are happily arrived at some Certainty in their Practice; and are infinitely better versed in all the Laws and Motions of the Animal Oeconomy, than what the Ancients could pretend to, is evident and obvious to all such who have been in the least conversant with Medical Writers.

*The Light that is daily derived from Anatomy, natural and experimental Philosophy, Chemistry, Botany, and Pharmacy, is so very advantageous and conspicuous, that, I think, I can't do better, by way of Preface, than exhort and advise all young Beginners, more particularly Apothecaries in the Country, who are obliged to prescribe Medicines by reason of the Absence, or great Distance of Physicians, to a diligent and industrious Pursuit of these Studies; for (according to the learned Helvetius *) He who undertakes the Profession of any Art, without a thorough Knowledge of its Rules and Principles, must expose himself to all the Disgrace that is due*

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* Vide Preface to an Essay on the Animal Oeconomy.

to the Commission of Faults equally gross and numerous. And he who neglects to bestow a close Attention upon the Experiments which his Practice may furnish him with, renounces the most natural Way of Improvement in his Art, and even runs the hazard of deviating in time from the Rules themselves.

First then, the best and surest Foundation for a true Knowledge of the Art of Physic is to be laid with an accurate Examination into the Structure, Make, and Constitution of the human Body (that divine Piece of Mechanism! the most finished Fabrick upon Earth!) and to find out by what particular Springs and Movements each Part is set to work, continued, and regulated.

*Physic being now-a-days reduced to Mechanism, nothing is so much talked of as the Automaton or Machine of the Body; and did not Custom or Sensuality stupefy us *, it must be afflicting to a rational Mind, not to understand the Structure and Contrivance of the Body wherein it resides, and by Means
whereof*

* Vide Boyle on the Usefulness of Philosophy.

whereof it acquires all the Knowledge it has. The Study of Anatomy is so very essential towards a right Knowledge of Diseases, that no one ought to undertake the Cure of a Body, the Structure and Make of which he does not exactly understand; that is, he ought not to endeavour to rectify a Machine 'till he is previously acquainted with its Nature.

We are told by the famous Steno *, that there are but two ways of coming at the Knowledge of a Machine, either to be taught the whole Contrivance by the Maker, or to take it quite to pieces, and examine each Piece by it self, as it stands in relation to the rest. Since therefore the first of these is not to be expected, we must diligently pursue the other Method, by going through proper Courses of Anatomy, 'till we are well versed in the Structure and Disposition of the minutest Parts.

The Knowledge of Osteology and Myology is soon acquired by the Inspection of human Bodies; as also the greater Organs, which Nature uses in performing her Business, appear

* Vide his Dissertation on the Anatomy of the Brain.

to the naked Eye; but what we most want to know is, the true Structure of the Glands, and the Modus of Secretion in the several sorts of Glands. Here we have an ample Field for the Industry of the present and future Ages; here we have room to make Variety of Experiments, in order to trace the Continuation of the Arteries 'till they come to secretory and excretory Vessels; whereby we may reasonably hope to have our Researches rewarded with such important Discoveries, as would let a vast deal of Light into the Causes and Cures of Diseases. Though the Affair of Secretion may be, as yet, very abstruse, and the Glandular Texture may be thought much too delicate and fine ever to be discovered by our finite Intellect, by the most piercing Sight, or by the best of Microscopes; yet it is a Thing the most worthy of our Examination, since the Glands have much the greatest share in the animal Oeconomy, and are the Seat of most Distempers. We are not to be discouraged because at present we know but little more of the Glands than their Surfaces; a large
Series

Series of accurate and well grounded Experiments may discover their constituent Frame, at least of some of them; and as every the smallest Part of this wonderful Fabric is wrought in the most curious and beautiful Manner, consequently every new Discovery in it, must be highly delightful and pleasing, as it gives us plain Signatures of the wonderful Hand of the Divine Architect.

Let us therefore proceed on, and adventure to seek after the hidden Treasure, to discover Nature's Mysteries, and to settle our Judgments upon the best and surest Principles, without regarding the Discouragements and Prohibitions of some of our Predecessors; who, because they took Things and Notions upon Trust, without being at the pains of making Experiments, would fain persuade us we are arrived at our Ne plus ultra, or that no more Discoveries remain to be made. We are all, indeed, too apt to make hasty and erroneous Conclusions; but in Subjects of this nature, we ought never to stint our Researches; we should pursue our Enquiries with the greatest

Diligence and Alacrity, not doubting, as far as the Great Author of Nature allows, of enlarging our Understandings.

Possunt quia posse videntur, was the Opinion of Virgil. And I am persuaded many noble Hints have been dropt and lost for want of Courage to pursue them, or to make proper Experiments in order to illustrate them. That which appears extremely difficult, or unsuitable to human Abilities, at first sight, may, by a closer Attention, and an orderly Course of Experiments, be rendered very conspicuous; and since Health is of an inestimable Value, and by all wise Men preferred to every thing, so every new Discovery in the medical Art transcendently surpasses all other Inventions.

The Glands are well known to be no more than so many Branches of Arteries, Veins, Nerves, and Lymphatics convolved together, and covered by a common Membrane. But the Manner of the several Convolutions, the various Angles which the decreasing Series of Vessels make before they come to the secerning Tubuli; and the several Separations that are
made

made from the Blood, in order to prepare for the Secretion of particular Fluids, are, in a great measure, reserved as Secrets for future Industry to discover.

*By nice Injections we have already found out an infinite Number of Ramifications, and such exquisitely fine Tubes, as must needs surpass all Imagination in those unacquainted with Experiments of this kind. We have discovered Arteries as small as $\frac{1}{3240}$ th Part of an Inch; that is, so fine, that only single Blood-Globules can pass them into the Veins: and among all the Promoters of this Art, the accurate and ingenious Dr. Hales * seems to have advanced it to the greatest Degree of Perfection; and I doubt not but vast Advantages will, hereafter, accrue from these or such-like Experiments, since it is the most extensive Part of Anatomy that remains to be derived from a close Inspection of the minutest Tubuli.*

All the Insight we have of Nature is entirely experimental, and all the Advances

* Vide Statical Essays, Vol. II.

which ever will be made, must be by the same Means. It behoves every one therefore to make the best Researches he can into the Nature of our Bodies, in which there are such innumerable Beauties to be discovered; and could we but investigate how the largest of the Glands are platted and wove together, and the Laws of Secretion observed in them, many useful Things might be deduced, to enrich or illustrate the Practice of Physic.

*The Intestines are really a Gland *, and the most visible one in the Body; whose secretory Vessels are the Laëteals, and whose common Conservatory or Pelvis, is the Receptaculum Chyli. Here the Complications and Circumvolutions of the Tube are visible and beautiful; and the Modus of Secretion is apparent enough. The Testicles also, especially of a Rat, are capable of being unravelled, and from the infinite Number of Plications, or Circumvolutions of the sanguine and lymphatic Arteries, before they come to the secerning Ducts, we learn, in a great measure, the*
Manner

* Vide Cheyne's New Theory of Fevers.

Manner of Secretion in these Glands. And if ingenious and industrious Experimenters could possibly find out Ways and Means of evolving or unfolding other Glands, which are more closely connected than the Intestines or Testicles, and also of distending or enlarging the minute Vessels of such Glands, which, at present, are not conspicuous; I need not say how advantageous such Discoveries would be.

Another Thing that would contribute vastly to the Art of Healing, is dissecting morbid dead Bodies. If this was more customary among us, we should doubtless, in time, investigate the true Seats and Causes of Diseases, as well as the Nature of the peccant Matter which proved destructive: For by diligently observing the Marks and Impressions of Diseases in different Bodies, the Alterations in the Humours, and in what Cavities or Organs they principally lodge, we should be able to solve the various Phænomena upon the best Principles, and to establish a just Methodus Medendi. I cannot therefore but wish that many of our
Phy-

Physicians would take more pains than they do, to advance and encourage a Practice which would so greatly conduce to improve the curative Part of Physic: For since Physic owes its Origin to Experience, so its Improvements must arise from new Discoveries made, either in Art or Nature.

The Advantages that have accrued from comparative Anatomy are also well known to be extremely useful. The lacteal and lymphatic Vessels came first to be discovered by dissecting Brutes alive. The Doctrine of the Circulation of the Blood was greatly confirmed and illustrated by the same Means; and many other useful Discoveries are daily made, because here many minute Tubuli and Passages are open, and appear to the Eye, which are closed and concealed in dead Bodies. Add to this, that we may boldly make such Experiments upon Brutes, which we dare not venture upon in the Bodies of Men. Besides, generally speaking, the Parts of Brutes are so like the corresponding Parts in Men; that by comparing
one

one with another, they serve to illustrate each other, and to shew their Uses.

*Thus the Knowledge of Anatomy is not only a delightful Study, as it unveils to us the secret Springs of the most stupendous Machine of the Universe; but it is highly useful, as it extends it self to the whole Compass of Physic; without which it is either nothing at all, or Empirical. * For the Opinion of the Practitioner perpetually fluctuates, unless he perfectly understands the Principles of his Art: And if by chance any such should succeed happily, he would merit no other Commendation, than that he placed his whole Confidence upon Fortune. But on the contrary, He that thoroughly understands the Animal Oeconomy, will at all times be able to reduce its Rules to Practice, and to apply them, with the greatest certainty, to the Cure of Distempers.*

Secondly, Natural and experimental Philosophy have without doubt enriched the Modern Theory and Practice of Physic with a vast Stock of Certainty; and therefore who-
ever

** Vide Friend's Comment on Fevers.*

*ever designs to do Mankind service by practising of Physic *, must first of all make himself Master of the Laws of Nature, he must constantly meditate and make accurate Observations upon them, and obey them to a Tittle; for it is intirely owing to the noble Discoveries which have lately been made, by experimental Philosophy, that the Modern Theory of Physic is so vastly preferable, and shines out so bright in comparison to the ancient Ignorance; and I am verily persuaded, had the Laws of Nature been as well understood in the Age of Hippocrates as they are now, and had proper Experiments and Observations been constantly made from that time to this, such Inferences would have been drawn, as to have reduced the Practice of Physic very near to a Certainty: By a long continued Series of Experiments and accurate Observations, we should not only have been exactly versed in the Causes of the various Phænomena of Diseases, but in all probability, we should have*
dif-

* Vide Baglivi's Practice of Physic.

discovered, before now, specific Remedies for each Disease.

*Ubi Philosophus definit, incipit Medicus, is a Maxim universally received, by reason of the great Usefulness of Philosophical Enquiries towards investigating and illustrating the Laws of the Animal Oeconomy, and the Causes of Diseases. * If a Physician knows not how Heat and Cold, Fluidity and Firmness, Fermentation, Putrefaction, Viscosity, Coagulation, Dissolution, &c. are generated and destroyed in animal Bodies, he will be at a great loss when he comes to find out the Causes of Diseases; for many of them intirely depend upon the Presence or Absence, or Change of these or the like Qualities. On the contrary, it is a fine Advantage to have learnt by a variety of Experiments, the different Ways whereby Nature sometimes produces the same Effects; for several Solutions of the same Appearances may hence arise, which otherwise might never have been dreamt of. He therefore, who is only acquainted with a few of*

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** Vide Boyle on the Usefulness of Philosophy.*

Nature's Ways of Proceedure, is unlikely to know how Abundance of Diseases are produced; and consequently, will sometimes mistake the Cause, and apply Remedies accordingly, when the poor Patient, perhaps, must dearly pay for his Physician's Ignorance.

Mechanics and Hydraulics must be well understood, before we can assign the Reason of the Phænomena of Diseases, and account for the apparent Motions of Nature. Every Alteration or Change which is made in the Body, either in regard to the Texture of the Solids, or Consistence of the Fluids, is the Effect of Motion: For who can conceive a thing changed, without a Motion made either in the Parts, or the Whole? Motion therefore, being the Means whereby all the Operations in an animal Body are performed, it behoves every Practitioner in Physic to make himself Master of the Doctrine of Motion, i. e. Mechanics.

To shew the Structure of Animals, or the Motion of the Muscles, and to calculate the Weight that is equivalent to the Force they exert, are Tasks that require Mathematical Know-

Knowledge. *All the Fluids likewise are subject to the Laws of Hydrostatics. The Difference there is in the Streams and Velocity of the Blood depending upon the different Courses it steers, and the different Capacity of the Vessels that contain it; the arterial Blood running through Canals that are large at the Beginning, and are always growing less and less; the Venal, on the contrary, running from very small Vessels into large ones, that are continually widening: all these, and many other Curiosities occurring in the animal Oeconomy, are demonstrable by the help of Mathematics and Hydraulics, and cannot be explained, or exactly known without them.*

Nothing is more apparent than that the Solids of our Bodies are formed by their Maker according to the strictest Laws of Geometry; and since all the Fluids are well known to move by Hydraulic and Hydrostatical Laws, certainly the likeliest Means of investigating the Nature of their Motions, is by adapting our Experiments to those Laws; as manifestly appears from what Borellus hath taught us
in

in his most admirable Treatise of the Motion of Animals. And again, since the human Body is nothing else but a fine Contexture of Solids and Fluids, which observe the Rules of Mechanism, it is amazing to find that Men should think of finding any other Principles than the Mechanical to explain it by. Certainly we should endeavour to solve and explain all the Phænomena of Nature, all Animal Oeconomy, Causes of Diseases, Reasons of Cure, and Operations of Medicines by Mechanical Modes: Not that it is always in our power to reduce these Rules into Practice, or to account for all the Phænomena of Diseases, from mechanic Laws; but however, it behoves us to search into them as much as possible, and to explain, by their assistance, the Nature of the antecedent Causes of Diseases, and the Manner how they produce such and such Distempers, with such and such Symptoms. By these Assistancess the genuine Method of Cure will be greatly illustrated, though it must be confessed that Experience only can enable us to foretel the Issue of the Disease, as

well as the Effect of the Remedy administred; and that our best reasoning upon such subjects, how mechanical soever, is only à posteriori.

Mathematical Enquiries, as far as they will enable us to reason rightly, or upon certain Principles, concerning the various Phænomena of Diseases, and the Modus of Operation, whereby the Remedies subdue the same, are vastly useful; but in many Cases, where all is transacted by imperceptible Agents, where the true and real Cause of the Phænomena, as well as the Modus of Nature in preparing and fitting the Matter of the Disease, to be thrown forth, will ever be hidden from us; we must trust intirely to Observation and Experience; since no Dissection nor Mechanism will assist us here, but only a diligent and sedulous Attendance upon all the Motions of Nature, which, by degrees, will let us into the Knowledge of the Phænomena of Diseases, and their Effects; from whence we are to draw our curative Indications. I am not, therefore, so strict an Advocate for Mechanics, as to think we ought to make them the

b

Rule

Rule of our Prescription any farther than Observation in the like Cases, or a well-grounded Experience will justify the same: But I shall ever be of one Opinion, that it is perfectly necessary for Physicians to understand Mathematics or Mechanics, so far at least, as to be able to solve such Appearances which happen in the Body, as are explicable by such Laws.

The learned Boyle very justly imputes many of the Deficiencies in the Reasoning of Philosophers, to their having too hastily, and without due Observation, or a sufficient number of Experiments, presumed to deliver Axioms, and establish Principles. For the Theories that are built but upon a few obvious Experiments, are very liable to be overthrown by a fuller Enquiry into Nature. And truly if Men were willing to regard the Advancement of Philosophy, more than their own Reputations, it were easy to make them sensible, that one of the most considerable Services they could do the World is, to set themselves diligently to make Experiments, and collect Observations, without attempting to establish Theories upon them,

them, before they have taken notice of all the Phænomena that are to be solved: For to regard only a few Phænomena, and to pronounce according to them, is the Bane of Philosophy.

Hence it is that Mechanics have fallen into Disrepute among some learned Men, because some Conclusions, too hastily drawn from thence, would not stand the Test of strict Observation and Experience. But as this is to be imputed to the Eagerness, or want of Skill in its Professors, and not to the Science it self, the Objection is of no force; neither will it, I am persuaded, deter any sensible Person from pursuing these Studies.

The true Method, therefore, of Investigation, is to confirm each Experiment by repeated Trials, and then we may safely proceed to Axioms, which may again point out new Experiments; for in the Interpretation of Nature, the Transitions of Experiments into Axioms, and of Axioms into Experiments, is natural and easy.

Thirdly, Chemistry is highly advantageous both to the Theory and Practice of Physic; by

reason it not only affords and instructs us how to make many noble Medicines, but also lets in a vast deal of Light towards investigating the Causes and Natures of Diseases.

Hence we are instructed that both the Solids and Fluids of a human Body consist of watery, saline, sulphureous, aerial, and earthy Particles; that the Cohesion of these Particles, whether they constitute solid, or fluid Parts, depends upon a certain attractive Power; that different Degrees of Motion or Heat will alter the Bulk, Figuration, or Arrangement of the component Particles of the Body; and consequently, when they are extreme, they will cause great Changes, and produce surprizing Effects.

*Hence also we learn how smooth, mild, demulcent Liquors may gain sharp, rancid, caustic Qualities, & e contra; what Effects must ensue upon a Stagnation of the Fluids in any Part of an animal Body, and what will be the Consequence of a strong Circulation of the Blood, a violent intestine Motion of its Parts, and a burning Heat of the Body. For
since*

since the Blood does not act solely as a Fluid flowing along its Canals, according to the Laws of Hydraulics; but, at the same time, exerts a Force of its own, according as it is more or less impregnated with Salts, Spirits, Oils, &c. it evidently appears that he who rightly understands the Nature of Salts, Spirits, Oils, &c. is infinitely better qualified to regulate any Disorders in the Animal Oeconomy, than one who is ignorant herein.

Chemistry, according to the sagacious Lord Bacon, shews us Philosophy in Action. And according to the learned Boerhaave, speculative Philosophy is made practical by Chemistry; which at the same time that it explains things, actually exhibits them to the Eye. Here we are daily delighted with the different Views of Rarifications, Fermentations, Dissolutions, Concretions, Sublimations, Precipitations, CrySTALLIZATIONS, and many other Phænomena that daily occur in the Laboratory. Many Processes in Chemistry afford us great Light towards investigating the Nature of Digestion, Sanguification,

Nutrition. *Here also we see the natural Causes of Earthquakes, Thunder and Lightning, Snow, Hail, Heat, Cold, &c. Hence Boerhaave * complains of Lemery's Method of Chemistry, because a great number of his Processes are calculated merely for the preparing of Medicines; and his View throughout the whole, is rather to furnish the Shops with Remedies, than to instruct his Readers in the Knowledge of Chemistry. But how hard and unjust, says he, is this on poor Chemistry! To make an Art a Drudge to Physic, which, in reality, is the principal Part of all Philosophy.*

Fourthly, Botany is a very useful and delightful Study; the infinite Number of different sorts of Plants we meet with in every Country, makes the searching after them extremely pleasant; and there is nothing more likely to conduce to the Improvement of the Healing Art, than Physicians applying themselves to make Discoveries of new Remedies. But here I must beg leave to observe, that the
barely

* Vide Preface to his Chemistry.

barely knowing the Facies externa of Plants, the ranging them in regular Classes, and giving them proper Names, is but of little service, unless we know their medicinal Virtues, and what Effects they will produce; which it is impossible to do, without a sollicitous and experimental Scrutiny into their Actions on Animal Bodies.

Physic, without doubt, took its Rise from a Number of Experiments made with Plants, &c. without any Certainty à priori of what Effects they would produce; and by diligently collecting and comparing the various Successes of such Experiments, the Practice of Physic began to be an Art.

In order therefore to investigate the Properties of such Plants as are not yet used in Physic, we must have recourse to proper Experiments with them; and first of all upon Brutes, for fear they should prove deleterious, though their Taste, Smell, or Figure give us no reason to suspect such things: An eminent Instance of which, we have lately met with in the Lauro-Cerasus. We have many unpromising

Plants worthy our Consideration, and might be of singular advantage in the Practice of Physic, were their Virtues and proper Doses thoroughly known. For my part, I shall always be of Opinion, that had half the Cost and Pains been bestowed upon a continued Series of Experiments with the known Plants, in order to discover their medicinal Properties, and Effects on Animal Bodies, as hath been to find out new ones, more profitable Discoveries would have accrued.

Fifthly, Pharmacy is what every Physician ought to be exceedingly well versed in; for he that does not rightly understand the Goodness, and several Qualities of Medicines, and the just Proportion of their Doses, can never be able to apply them successfully. But this is so well known, and evident, that it would be needless to expatiate upon it: I shall therefore conclude this Head, with advising the young Student, after he has made himself Master of Anatomy, natural and experimental Philosophy, Chemistry, Botany, and Pharmacy, to apply himself to the best practical Authors;

to visit the Sick assiduously, and to make constant and accurate Observations on the Phænomena of Diseases. By these Means he will, in time, get an exact History of Diseases, with a true List of the Symptoms that generally attend them; he will see by what Means Nature gets the better of her Enemy; through what Outlets she commonly expels the morbid Matter; and on what days such Crises happen. By a long Catalogue of such Observations as these, a Man cannot fail of being a happy and successful Practitioner; for when the Nature and Rise of Diseases are well known, the curative Indications are plain and easy.

Thus by accurately observing all the Phænomena of Diseases, which daily occur to us in Practice, and by comparing them one with another, we may possibly find out the true Causes of many of them, and afterwards explain them by the Light of Reason, or by mechanic Rules. By the same Assistance we may, in many Cases, investigate the Modus of Nature in producing as well as carrying off Diseases.

*eases. * The chief Defect in the Practice of Physic, does not proceed from the Want of Means to answer this or that Intention; but because we don't rightly know what that Intention is, which is to be answer'd: and truly I am very certain, that nothing can so much conduce to form the Judgment right in this Matter, as an exact Observation of the natural Phænomena of Diseases, and likewise of the Juvantia and Lædientia; and if these were diligently compared one with another, they would shew the Nature of the Complaint, and whence the curative Indications are to be taken: For a Physician may as certainly take the curative Indications from the smallest Circumstances of the Disease, as he does the Diagnostic from them; and therefore I have often thought, if we had an exact History of every Disease, we should never want a Remedy suitable to it; the various Phænomena plainly shewing the Way we ought to proceed in, and which Phænomena, if they were carefully compared one with another, would lead us to*
those

* Vide Sydenham.

those obvious Indications, which are taken truly from Nature, and not from the Errors of Fancy.

Hippocrates acquired his vast Skill and Character by accurately and diligently observing the Phænomena of Diseases, and deducing the curative Indications from them. Experience certainly is the best Guide; for as there is much Subtilty in the Operations of Nature, as well as Medicines, he only can be a happy and successful Practitioner, who is well acquainted with the natural History of Diseases, and has collected a sufficient Number of Observations from the most remarkable Incidents, which proceed either from the Nature of the Distemper, or the Method of Cure.

He therefore that intends to shine in his Profession, and to be thoroughly versed in the Knowledge of Diseases, must not overlook the meanest Thing; he must be sedulous in observing and finding out the Seats of Distempers, what Alterations happen in the Parts affected, what Symptoms attend upon such and such Diseases, and what their usual Consequences are.

Hence

Hence he will make himself Master of the diagnostic and prognostic Signs, which will enable him to distinguish one Disease from another, how like soever they may be: and when he has carefully collected a large Series of such Observations, he will be able to pronounce his medical Prediction from sound Principles, than which nothing gains a Man more Repute, or distinguishes a Physician from a mere Empiric more clearly.

From what has been said it evidently appears, that those who presume to practice Physic without a plenary Knowledge of its Rules and Principles, run great risques, and their Practice must needs be very precarious, absurd, and almost always contradictory. The Lives of Men are of too great importance to be entrusted with those who do not understand how to preserve them. Ought not, therefore, such bold Empirics who dare to prescribe Remedies without knowing the Grounds of the Theory of Physic and Diseases, to be exposed and prosecuted for trifling with the Lives of People? I have been informed there are Laws wisely provided

vided for this purpose, and great pity it is they are not put in execution.

It must be confessed indeed, the Antients were very successful, and did many wonderful Cures notwithstanding their Ætiology, strictly taken, was wrong. And should it be asked, how they cured so well with so bad a Theory, and with such indifferent Materials as they were possessed with; I answer, it was owing to their resolute and indefatigable Application, to their Dexterity and Diligence in observing the Phænomena of Diseases, which, in a great measure, directed them to the Cure. But had they understood the Circulation of the Blood, and the Laws of the several Motions in the Animal Oeconomy, and had they been furnished with as many useful Drugs as we are now-a-days, I am persuaded their Industry would have left but little for the Moderns to discover, and that they would have delivered down to us a most exact natural History of Diseases, together with their genuine Method of Cure.

Proceed

Proceed we now to give the Reader a short Account of the following Work. And,

Ist. Since it ought to be the principal Care of every Phyfician to trace out the original Causes of Diseases, I have taken great pains in remarking the several most usual Antecedents to each Distemper, and to illustrate and explain them in the most familiar manner; whence the Rise of the Symptoms may be easily accounted for, and the curative Indications drawn.

Phyficians too commonly consider the outward and general Appearances of Distempers only, without penetrating into the particular Constitution of the Air, the Abuse of the Non-naturals, &c. which occasioned, and support them, and that require, on these accounts, different Methods of Cure. Hence it is that great Numbers of Medicines recommended to us in particular Diseases, do not answer under different Constitutions of the Air, or when the Distempers take their rise from various Excesses and Irregularities in Life. Our Ignorance of the antecedent Causes is oftentimes
the

the Occasion of fatal Errors and gross Misapplication of Medicines; and if so, we can't be too industrious in searching them out, and accurately examining into their Effects and Influences on the Animal Machine.

2^{ly}. *I have been very careful in giving an exact Description of the Phænomena which characterize each particular Disease; and to shew by what Means, and by what Laws they arise from the Antecedents.*

By a diligent and accurate Observation of the Symptoms, we become able to distinguish and remark their Progress, Variations, and several Accidents that usually attend them. Hence we are taught that a Man actually affected with such and such Symptoms, has certainly such a Disease. And indeed, since Nature so often shifts from one Appearance to another, it certainly is of the greatest Use to have the diagnostic or characteristic Notes of Distempers set in the clearest Light; for it is by these the specific Differences between Diseases are to be determined, however analogous they may seem to a superficial Observer.

3^{ly}. *Because some of the Phænomena of Diseases require that we should perfectly know the Consistence of the Blood, before we can rationally account for them, I have employed myself, for some Years last past, in statically examining the Blood in all the Stages of each Disease, where Bleeding was thought proper; in order to discover the several Degrees of its Fluidity or Thickness, or the several Proportions of the Serum and Gore, which it would let go of its own accord, after standing 24 Hours in a cool place.*

I have also carefully remarked the several Degrees of Cohesion between the constituent Globules of the Crassamentum; whence I have had an Opportunity of seeing the State of the Blood when almost every Phænomenon appeared; and from thence I have demonstrated the Necessity of such and such Appearances from the different Consistence and Disposition of the sanguineous Mass.

4^{ly}. *There are other Phænomena that demand our Knowledge of the several Principles or Qualities of the Blood, and of their several*

Pro-

Proportions, *before we can rightly understand their Causes.* In order therefore to know these things, I have separated and divided the Blood into its primitive and component Parts, by a chemical Analysis; and have very exactly set down the several Proportions of Phlegm, volatile Salt, Oil, Air, Earth, and fixed Salt, wherewith the Blood abounds, not only in Health, but in Diseases.

5^{ly}. *As the Inspection of Urine is oftentimes serviceable in judging of the Symptoms, and foretelling the Events, I have taken the pains to analyse it in the same manner with the Blood, that we might reason from self-evident Principles, and not from precarious and ungrounded Hypotheses.*

Thus by observing the Quantities and Qualities of the several Principles of the Blood and Urine in every Distemper, I have met with vast Advantages towards illustrating the Theory of Diseases, and in establishing a safe and successful Method of Practice: For to know the State of the Fluids, from the Beginning of the Distemper to the End of it, is of the utmost importance.

*It is consonant with the right Method of philosophising *, first to analyse the Subject, whose Nature and Properties we intend to make any Researches into, by a regular and numerous Series of Experiments: And then by laying the Event of those Experiments before us in one View, thereby to see what Light their united and concurring Evidence will give us. If we reflect on the vast Discoveries that have been made in the Animal Oeconomy, we shall find that the most considerable of them are owing to statical Examinations, and chemical Processes. By the former were discovered the Quantities and Proportions of the Solids and Fluids in an Animal Body; the different Rapidities and Force with which the Fluids are carried about in their proper Channels; the Proportion between the Aliment taken in, and the recrementitious Matter cast out of the several Emunctories, &c. By the latter, we have received great Light into the Nature of Digestion, and Sanguification; the Properties of the several Fluids; the Manner of their*
Action

* Vide Hales's Analysis of the Air.

Action on each other; the Nature of Fermentation; the Cause of Heat; and many other Things too tedious to enumerate. In short, experimental Philosophy puts us upon thinking farther and farther, and upon searching into the Recesses and Finesses of Nature without end.

*The capital Things of Nature generally lie out of the beaten Paths; so that he that would make new and useful Discoveries, must take the pains to walk by himself in untrodden Roads. And here let none despair, or be confounded, (according to the Advice of Lord Bacon *) if the Experiments they attempt should not answer their Expectation: for though Success be indeed more pleasing; yet Failure, frequently, is no less informing.*

Hence I was encouraged to pursue these Methods of Enquiry, and hope that the Tables I have given of the Crasis of the Blood, and the Proportions of the several Principles of the Blood and Urine, both in a sound and diseased State, will be highly useful in investigating

* Vide de Augm. Scient. Sect. xii.

the Causes of the Phænomena of Diseases, and the most expeditious Way of relieving them.

6^{ly}. *The Method of Cure, which I have laid down in the following Sheets, is deduced intirely from the antecedent Causes, and the Phænomena that attend upon each Disease; so that nothing can be more rational, intelligible, or plain. It is the Result of many Years Experience, intermixed with the Observations and Directions of the most approved Authors; for I have always made it my Business, since I have been conversant in Practice, to minute down all remarkable Cases, with their Method of Cure. Hence I have the Satisfaction to think that the following Sheets are pregnant with known Truths, useful Observations, a just Theory, and sure Directions for Practice; and that they cannot fail of being greatly serviceable to young Practitioners.*

7^{ly}. *I have carefully avoided giving a long Detail of Prescriptions; and have only pointed out a few, plain, simple Medicines, which long Experience hath taught us to be most useful; being well assured that general Forms serve chiefly*

chiefly to deceive the unskilful, by reason they cannot be suitable to the various Circumstances of different Patients: For as various Causes and Phænomena require different Medicines, therefore no Specific, or certain Formulæ can be depended upon in any Disease, but must be always carefully varied and suited to the particular Disposition of the Humours, and to the Strength of the vascular System. I don't know of any thing which has been more prejudicial to the noble and generous Art of Physic, or has more exposed it to Reproach and Contempt, than crying up of Specifics, or giving pompous Forms of Medicines with magnificent Titles: for since it is absolutely impossible they should answer alike in different Constitutions, so when the Credulous or Ignorant make use of them, and are deceived by their own Experience, they are apt to despise and blame the Art of Physic, as delusory and uncertain, when the Fault was not in the Medicine, but in a wrong Application.

He therefore, and only He deserveth the Name of a good Physician, who always deduces

his curative Indications from the Cause of the Disease, and the Symptoms that attend it. And as the Causes of Diseases are more simple and plain than they are generally thought to be, so it is, most times, an easy matter to cure them by the Use of a few, and frequently plain Medicines. Those who prescribe a Multitude of Things, seldom have clear Ideas of the Causes of Diseases; they are diffident and wavering in their Opinion, and for want of a sure Basis to found their curative Indications upon, they rely on a Farrago of Medicines, in hopes that some of them may be useful.

Lastly, I have made a Distinction between slow Fevers and those which are actually malignant and putrid; because I am well assured that there are Fevers which strangely affect the Nerves, and exhibit all the Signs of a depressed State of the animal Spirits, without the least Degree of Putridity or Malignity in the Humours; and therefore for want of such Distinction, fatal Errors are oftentimes committed, as we shall shew in its proper Place.

If it be objected, that many Things mentioned in this Treatise, may be found already accounted for, and demonstrated in the Writings of others; I answer, that I am not ashamed of having sought Assistances from the Labours of others: I frankly acknowledge to have transcribed many Things; but since I have generally pointed out the Place and Person, I hope I shall not be accounted a Plagiary for so doing. It has cost me no small Pains to collect the scattered Notions of the most approved Authors into one View; and as I have illustrated some, and added many useful Observations to others, such a Work must needs be serviceable in many respects; since it is making some advance in Knowledge, further to illustrate even known Truths, or to confirm and explain them in the most intelligible and familiar manner.

Some of my Readers, perhaps, may think me too prolix in describing some Things, which to them may appear minute and trivial; but as this work is designed merely for the Use of young Practitioners, I would desire them to consider that a Design of this nature cannot

be too plain: It is oftentimes for want of Perspicuity in Authors that the Unexperienced commit Blunders. My great Endeavour therefore, throughout the whole, has been to lay down the most exact Rules in regard to Practice; and though in respect of some Readers I might have been excused the Trouble, yet, I flatter my self, there are not a few to whom the following Papers will be serviceable and useful.

If any think my Style rough and unpolished, I would have them reflect, that in a Work of this kind, Elegance of Style is not to be expected. My greatest Care has been to collect and lay up such Materials for the Work, as are sound and good; and to describe them closely and concisely, by plain, clear, and significant Expressions, rather than such as are ornamental. Rhetorical Flourishes ill suit, where the Design is only to inform; so that if what I have wrote be but intelligible, I shall be in no concern for the Roughness of the Language.

*If I have erred in any material Circumstance, I shall be ready to retract upon the
least*

least Notice; but as for trifling Mistakes, I answer, that he who employs his Time in searching into the Arcana of Nature, and is so generous as to communicate his Discoveries, ought to be esteemed a Benefactor to Mankind; and though some Inaccuracies should happen in his Description of things, and some of his Deductions should not be so strong and conclusive as they might have been, yet they ought to be kindly received in regard to the Intention.

To conclude; I have taken a deal of pains in collecting Observations for the History and Cure of Diseases; I have diligently spent my leisure Hours in accurately examining into the various Phænomena of Nature; and if what I have written will add, in the least, to the Advancement of natural Knowledge, and to the Cure of Diseases, I shall think my Time well bestowed, whatever malevolent and ill-natured Men may think fit to say of it.





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THE
MODERN THEORY
AND
PRACTICE of PHYSIC.

CHAP. I.

Of the Antecedents to acute continual Fevers.

I. **B**EFORE we enter upon the Subject of this Chapter, we beg leave to lay down the following *fundamental Propositions*; the Truth whereof is so clear and well established, that they may safely pass for *Axioms*, or known Truths.

PROP. I.

An animal Body is a delicate Machine, or a Compages or Congeries of vascular Tubes differently modified, platted, and wove together; and this Mechanism is governed and

conducted by the same *Laws* that support the great *Orbs* of the Universe: whence it is impossible for any Change, or Variation to be made in it, but from an Alteration of its Matter and Motion.

PROP. II.

The several productive Causes of Diseases have their peculiar and certain Effects in producing particular *Phænomena* or *diagnostic Signs*, according as they alter the Texture, Figuration, or Bulk of the component Parts of the *Fluids*; or according to their Influence over the *Solids*, either by rendring them too tense and contracted, or too soft, flabby and relaxed.

PROP. III.

Matter, by what Name soever dignified or distinguished, can have no other Virtues or Properties, than such as result from the particular Figures and Modifications of its constituent Particles.

2. From these *Propositions* therefore, it appears, that the Method in which we are to proceed, requires us diligently to examine into, and investigate the *predisposing*,
or

or *procatartic Causes* of acute continual Fevers; and to shew upon what *Principles* they act, and by what *Laws* they influence the delicate fine *Fibrillæ* of the Body, and their contained Juices.

3. *First* then, *Hippocrates* * assures us, that the *Changes of Seasons* are the most effectual Causes of Diseases. And as daily Experience sufficiently teaches us the Truth of this, it is evident that there is not any Thing in all Nature of more immediate Concernment to us than the *State of the Air*; there being no Distemper but what may derive its Original from, or owe its Growth to some Alteration in its Properties or Qualities, either in respect to its different Degrees of *Density* or *Levity*, *Moisture*, *Dryness*, *Heat*, *Cold*, *Motion*, or as it happens to be more or less impregnated with *heterogeneous Particles* of one kind or another. And since our Bodies are only *Congeries* or Bundles of infinitely minute Vessels, upon which every Alteration of the Atmosphere has a peculiar Effect, it is extremely requisite that we should be careful to remark these Alterations, and the *Phænomena* they produce.

* Vide *Aphor.* 1. Sect. 3.

4. Almost every body knows what vast and sudden Alterations a little Change of Weather makes in a *Barometer*, *Thermometer*, *Hygroscope*, &c. And we should not fail to observe as great and regular Changes in the *Tubes*, *Chords*, and *Fluids* of our own Bodies, were it not partly for our Inattention, and partly for our unequal and intemperate Course of Living.

5. The Difference of Air in point of *Gravity*, may have very considerable Influence over our Bodies, as is evident from climbing over tall Mountains, and from various Experiments in the *Receiver* of an *Air-Pump*; where it is no uncommon Thing for the Blood to gush out of the *Nose*, *Mouth*, &c. by reason of the vast Expansion of the Air included in the Vessels, when the external Pressure is, in a great measure, taken off from the Body.

6. Mr. *Boyle* * discovered by very accurate Experiments, that the Air, without any adventitious Heat, would, by the Force of its own Spring, possess *thirteen Thousand Times* the Space it doth when pressed by the incumbent Atmosphere. The Difference of the Weight of Air that our Bodies sustain

* Vide *Chapt.* of the Rarification of the Air.

tain at one Time more than another, is also very great. The whole Weight of Air which presses upon our Bodies, when the Mercury is highest in the Barometer *, is equal to 39900 Pounds *Troy*. And the Difference between the greatest and the least Pressure of the Air, is equal to 3982 Pounds *Troy*.

7. Hence it is evident, that an Addition of the Atmospheric Pressure must have great Influence on Animal Machines ; by condensing the Fluids, and rendering the Blood-Globules more compact, gross, and viscid ; and by uniting the component Parts of the Solids : Whence the Diameters of the several Series of Vessels are lessened, whilst the Globules, which constitute the Fluids, coalesce and are enlarged. Add to this, that as the Lungs are more forcibly expanded when the Gravity of the Air is increased, and as the Circulation of the Blood meets with most Resistance towards the external Superficies of the Body, when the Pressure of the Air is greatest ; it must necessarily follow, that the Velocity and Quantity of Blood will be greatly increased in the larger Arteries : Whence the Friction and Heat

* Vide *Wainwright* of the Non-Naturals.

6 *Of the Antecedents*

of the Blood may be great enough, especially if this State of the Air continues long, to inspissate the Juices, to generate Obstructions, and to produce *ardent Fevers*.

8. It is observable, that *acute Fevers* are most rife and violent in *hot dry Summers*. *Hippocrates*, in his most excellent *Books of Epidemical Diseases*, takes notice, that an *Excess of Drought* produceth continual *Fevers*, with *Delirium* and *Thirst*.

9. *Dry Air*, if it continues too long, may render the Fibres rigid and stiff, and the Blood viscous and dense, by absorbing the watery, humid Particles from the external Superficies of the Body, and from the internal Superficies of the Lungs, in too great Quantities. Hence the *Areas* of the transverse Sections of the several Series of Vessels may be diminished, greater Resistance may be given to the Circulation of the Blood and Lymph (especially in the capillary Tubes,) the Pulse will become quick, strong, and hard, the vital Heat will be increased, the Globules of Blood and Lymph will be rendered more gross and compact, and *ardent Fevers* will unavoidably occur more frequently in such Seasons.

10. *Moist Air* does not seem capable of producing *ardent Fevers*, by reason of its relaxing and diluting Property ; and therefore we shall defer speaking of it, 'till we come to treat of *Intermittents*.

11. *Hot Air* may be pernicious to the Constitution, by thickening and inspissating the animal Fluids, and rendering them unpassable through their Canals. The Blood of Animals in hot Countries, is found to be thicker and blacker, by the dissipation of the ferous Part, than in cold Climates. And indeed the Symptoms which we feel in extremely hot Weather, resemble those of a Fever ; viz. *A Pulse quicker than natural, great Thirst, Debility, Restlessness, and profuse Sweats.*

12. *Boerhaave* * observes, that the Heat of a temperate Air may be reckoned about *forty eight Degrees* ; which being much cooler than the animal Fluids, is very serviceable in abating the Heat of the Blood, and preventing a mortal Coagulation. But if the Heat of the Air should rise to *eighty or ninety Degrees*, no Person could live in it ; because such a Degree of Heat would inspissate

* Vide New Theory of Chemistry.

fate or thicken the Fluids in such a manner, as to bring on immediate Death.

13. The natural and healthful Heat of our Blood is reckoned *ninety two Degrees*; and Heat not much exceeding a *hundred Degrees* is found to coagulate the *Serum*, like the White of an Egg: Whenever therefore, the Heat of the Air is much increased, it will tend to render the Blood and Lymph thick and grumous.

14. Another pernicious Property of *hot Air* is exalting and volatilizing the *saline* and *sulphureous* Principles of the animal Fluids; whereby they become acrid and corrosive, and stimulate the Vessels into more frequent Contractions. By several *Chemical Processes* we learn that a moderate Degree of Heat, no greater than that of a healthy Man, will soon render the *Blood*, *Lymph*, *Bile*, *Urine*, &c. highly acrid and alkaline; No wonder then that the excessive Heats of a Summer should sometimes exalt and subtilize the Animal *Salts* and *Oils*, and render them much more volatile, active, and powerful than at other times. Add to this, that in *Summer-Time*, the Air is replete with volatile *Spirits* and *Oils*, raised from Animal and Vegetable Substances, which

which may stimulate the Fibres, and exhilarate the Spirits, and thereby contribute towards increasing the Celerity of the Circulation.

15. It is true, moderate Heat relaxeth the Fibres; but when it is violent, and continues long, Experience testifies, that it hardens and renders them more rigid and stiff; by exhaling their Moisture, and bringing their constituent Particles into closer Contacts. Upon the whole it appears, that excessive Heat will dispose the Animal Fluids to be viscid, acrid, and alkaline, and the Vessels to be stiff, elastic, and tense.

16. *Extreme cold Weather* has very sensible Effects on our Bodies, by irritating the Fibres, and condensing the Fluids. We may plainly perceive the Obstructions in the *miliary Glands* of the Skin, especially upon the Arms and Thighs, when cold Air has free Access to them; their excretory Ducts being thrust forward by the Pulsion of the perspirable Matter, and distended in such a manner, as exactly to represent the Skin of a deplumed Fowl.

17. *Sanctorius* assures us, *Aphor. ix. Sect. 2.* If in a warm Season a cold Day happens, supposing the way of Living to be the same,
about

about a *third* Part of the perspirable Matter will be obstructed And it is well known, that even a cold Evening supervening an excessive hot Day, will contract the Pores, and congeal the insensible Steams; and the Violence of Diseases arising from such Contrarieties of Weather, is always in proportion to the Degree of the former Heat, and supervening Cold conjunctly.

18. In all Countries betwixt the *Tropicks* *, their continual hot Fevers arise from a severe cold Wind suddenly blowing after excessive Gleams of Heat. This is so true, that all *Travellers* assign this as the Cause, having constantly observed their Fevers to succeed such sudden Changes of the Air. A pregnant Instance of which we have in the *Phil. Trans.* for *Decem.* 1669. N. 259. in a Letter from Mr. *Hugh Jones* to Dr. *Woodroof*, concerning some Observables in *Mary-Land*; his Words are these: “ The
 “ North-West Wind is very sharp in Winter,
 “ and even in the Heat of the Summer it
 “ mightily cools the Air; and too often at
 “ that Time, a sudden North-West Wind
 “ strikes our Labourers into a Fever, when
 “ they are not careful to provide for it,
 “ and

* Vide *Cheyne's* New Theory of Fevers.

“ and put on their Garments while they are
“ at work.”

19. *Cold* both congeals the *Fluids*, and constringeth the *Solids*. It acts like a small Ligature on the Vessels, by which the Circulation to the external Surface of the Body is retarded, and the Blood driven upon the inward Parts with a greater force. By many Experiments we are taught that *Cold* condenses and fixes all sorts of Matter; the most solid Things are found so much the more firm and contracted, the freer they are from Heat or Fire: So that were a Man intirely destitute of Heat, he would immediately freeze into a Statue.

20. Hence it follows, that in cold Weather even the most solid Parts of our Bodies sink into less Bulk, and their component Particles cohere more strongly: which seems to be all that is requisite to augment their elastic Force, and to create a strict Constitution of the Fibres; For as the Vicinity of the Particles to one another, gives them new Power; inasmuch as the Force of Attraction between them, is hereby increased; so it will require a greater Impulse to bend such Bodies; and when they are bent, they will fly out again with a greater Velocity.

21. *Cold*, in a moderate Degree, is a Preservative of human Bodies, by acting in opposition to Heat, and maintaining the Balance: For, as hath been observed above, was the Atmosphere immediately surrounding us, in as great Agitation, Motion, and Heat, as the constituent Parts of our Bodies, both the *Solids* and *Fluids* would soon putrefy, corrupt, and fly off in volatile, alkaline Vapours.

22. The Interchanges, therefore, of *Heat* and *Cold*, between the *Day* and the *Night*, are perfectly necessary towards the Preservation and Oeconomy of animal Bodies; for the constant oscillatory Motions of Contraction and Dilatation produced by these Alterations, greatly assist in carrying on the Circulation, removing Obstructions, or dilating such Vessels as were too narrow before. Were it not for this Variation of Day and Night, animal Bodies could never subsist; the perpetual Presence of the Sun would be intolerable; it would heat our Atmosphere to such a degree, that all animal Substances would grow alkaline, corrupt and stink. Hence it is that the *Tropical Heat* under the *Pole*, is greater than that under the *Line*, in proportion of 5 to 4; the Duration of
the

the Sun above the Horizon, the whole 24 Hours, over-ballancing the Difference of the Inclination of its Rays; as the accurate and learned Dr. *Halley* * hath demonstrated. And on the other hand, if there was no Day, or no Sun above the Horizon, the Fluids in our Hemisphere would soon become as rigid and hard as Stones; all Things would fall towards the Centre of the Earth, and remain in eternal Rest.

23. But however, hot, sultry, suffocating Weather does not always proceed meerly from the Action of the Solar Rays upon the Particles of the Air, or by being reflected back again from the Earth; for it oftentimes happens from an intestine Motion or Effervescence between the strongly elastic, repulsive, aerial Particles, and some strongly attracting sulphureous Vapours exhaled from the Earth. The Rev. Dr. *Hales*, in his *Analysis of the Air*, gives us many Instances of the brisk Agitation and Effervescence, which arises from the Mixture of fresh Air, with Air that is strongly impregnated with sulphureous Fumes, which are raised by Effervescence from several mineral Substances; and since we have many Proofs
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* Vide *Phil. Transf.*

of the brisk Action and Reaction there is between elastic Air and sulphureous Particles, we may, with the above-mentioned *Author*, reasonably conclude, that the irksome Heat which we feel in what is called a close, sultry Temperature of the Air, is occasioned by the intestine Motion between the Air and the sulphureous mineral Vapours which are exhaled from the Earth. But to proceed ;

24. *High Winds* have their Influence over our Bodies, by bringing a Succession of fresh Air, and by blowing off the Atmosphere of warm perspirable Matter that surrounds us. Hence a strong Current of Air appears far colder to the Touch, than the same Air not formed into a Stream ; and for this Reason, the *perspiratory* and *sudatory* Vessels may be obstructed by Winds, without any real Addition of Cold to the Air.

25. The Air may be rendered unwholesome by mineral, sulphureous, saline Vapours which float in it, and which not only vitiate the Aliments by mixing with them, but they insinuate themselves into the *Vasa inbalantia*, situated on the external Superficies of the Body, and through the Pores
of

of the *pulmonary* Membranes, and pass on to the Blood through the *recurrent* Vessels.

26. *Air* *, if we consider it in general, is an universal Assemblage or *Chaos* of all kinds of Bodies, elevated from the Earth, by the celestial or subterranean Heat. It is a Mass of Matter which continually surrounds our Bodies, in which we live and walk, and which we are continually receiving and casting out again by Respiration. No wonder then, that it is capable of producing surprizing Alterations in the animal Oeconomy, according as it is more or less impregnated with mineral, sulphureous, or saline Particles.

27. By the Influence of the Sun, Ferments and intestine Motions are perpetually raised in the Earth, which emit and diffuse through the vast, subtile, fluid Expanse, either their kindly and grateful, or their malignant, congealing, and putrefying Qualities. For though the Purity of this heterogeneous Fluid in general, is most wonderfully preserved by various Agitations and Motions, such as are produced by Heat, Winds, Fermentation, &c. yet it must necessarily happen, that the Air of particular Regions, Seasons,

* Vide *Boerhaave's* Chemistry.

Seasons, and Places, will differ very much in the Proportion to the Mixture of its Ingredients; and therefore different Air must affect human Bodies variously, in proportion to the Excesses of such and such Principles contained in it.

28. The sagacious Lord *Bacon* * proposes an useful Experiment in order to try the Wholesomeness or Unwholesomeness of the Air. As *Flesh*, says he, putrefies sooner in some Cellars than in others, 'twere useful to transfer this Experiment to the Examination of *Airs*, as to their being more or less wholesome to live in; by finding those wherein *Flesh* remains longest unputrefied: And the same Experiment is applicable to discover the more wholesome or pestilential Seasons of the Year; for doubtless it is to these Vapours and Exhalations, that particular Healthfulness or Unhealthfulness in some Places more than others should be ascribed.

29. The Variety of these Vapours is almost infinite; and there is scarce any Body in Nature that can be excepted from the Number †: For Gold sticks close to Sulphur in

* Vide De Augm. Scient. Sect. xii.

† Vide *Boerhaave* ubi supra.

in the Mines, and is raised with it. And, with the other Metals, alike inflammable, arsenical Sulphur is found intermixed; which being agitated by Fire, readily carries them off: And the other Fossils, as Coals, Marcasites, &c. rise still with more ease. So also all sorts of Waters, Spirits, Oils, acid, alkaline, inflammable, compound, &c. must be ever floating, in abundance, in the Air; as follows from the continual Distillations, &c. made thereof. Earths; we add, are many of them easily volatilized, and made to float in the Air; for all, even the most subtile, Oils yield a considerable Quantity of Earth at the second Distillation; so that the Earth must float with the Oil. What then can be excepted? Nothing.

30. Now since it is plain from many Experiments, that an animal Body absorbs or imbibes the Vapours floating in the Air, it is evident that as the Air is more or less impregnated with Corpuscles or Principles of this or that sort, or as they happen to coalesce or unite with other Principles of a different nature, they may be exalted into dangerous Weapons, and become the Instruments of sundry Diseases. Thus when the Air is impregnated with

Particles whose Nature it is to stimulate and contract the several Series of Vessels in an animal Body, and to coagulate the Blood and Lymph, or to compact their component Globules together, so as to make them too bulky to pass freely through the lymphatic or sanguine capillary Vessels; the Lungs, Heart, and larger Arteries will be more than ordinarily distended with Blood, the Pulse will become full and strong, the Heat of the Body will be augmented, and *acute continual Fevers* may ensue, as we shall demonstrate hereafter. From what has been said it is plain, that *He* who would perfectly understand the *Art of Physic*, ought to learn thoroughly the peculiar Constitution of every Season. We come now,

31. *Secondly*, To consider the Effects of good or bad *Water* on animal Bodies. *Water* being the Fluid wherein all Manner of Nutrition is conveyed to the several Parts of the Body, may properly be esteemed the *Stamen* of Life, or that elemental Matter which principally conduces to the Growth of Bodies, and to the maintaining and preserving them afterwards. For though pure Water, as such, is not generally reckoned
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the proper Nourishment of the Body, but chiefly the Vehicle thereof; yet it is surprizing to see how great a share Water has in the Composition even of the most solid Parts. *Bones* which have been dried and kept 'till they were almost as hard as Iron, afforded, by Distillation, half their Weight of Water; and from the *Tendons* of an *Ox*, I have procured very near $\frac{1}{2}$ Parts of Water, as we shall give a particular Account of in the subsequent Chapter. Hence we may observe the fixed State of the watery Particles in animal Substances, which adhere so strongly to the other constituent Parts, as not to be discovered in them, nor separated from them, 'till they are exposed to the Fire.

32. The Purity and Simplicity of Water therefore, is of the greatest Importance in regard to Health. *Boerhaave* * indeed tells us, he is convinced no body ever saw a Drop of pure Water. The utmost of its Purity known, only amounts to its being clear of this or that sort of Matter. Even *Rain-Water*, which seems to be the purest of all Waters we know of, is replete with Exhalations of all kinds, which it imbibes

* Vide New Theory of Chemistry.

from the Air, or were raised up with it from the Earth; so that tho' filtred and distilled a *Thousand* Times, there still remain *Fæces* behind; and if it be let stand some time, it corrupts and stinks.

33. But not to carry our Enquiries so far as this, we may content our selves with finding out the several Degrees of Purity, by the different *specific Gravity* of Water. *Hippocrates*, in his Treatise *de Aere, Aqua, & Locis*, observes, that the *lightest* Waters are the best. And in his Aphorisms*, he tells us, Water which is soonest hot, and soonest cold, is most light. For the Truth of these Assertions many Reasons might be offered, were they necessary; but since all Physicians agree in it, it would be trespassing on the Patience of the Reader to produce them.

34. Next to the Levity of Water, we are to take care that it be perfectly *insipid* and *inodorous*; for it does not appear, by any Experiment, that pure Water has the least Taste or Smell. Hence therefore, we may reasonably conclude, that all Waters that have either Taste or Smell, are impregnated with Salt, or Sulphur, or Vitriol, or
Copper,

* Vide Aphor. xxvi. Sect. 5.

Copper, or the like, and consequently not proper for the common Diluent, or Dissolver of our Food.

35. Hence also it is evident that all stagnant, putrid, corrupted Water is highly mischievous, and capable of producing the worst of Diseases. Those Waters that contain the most active, pungent Particles are most likely to produce *ardent Fevers*.

36. *Drinking too little Water*, or too small a Quantity of watery, cooling, diluting Drinks, in proportion to the solid Aliment, may have the following Effects.

I. The Blood-Globules will coalesce, and the whole Mass of Blood and Lymph will become too viscous and thick, for want of proper Dilution.

II. In a viscid State of the Blood and Lymph, the several Excretions are well known to be diminished.

III. The saline and oleaginous Particles not being sufficiently diluted for Excretion by the *Renal Ducts*, they will necessarily be accumulated in the Blood.

IV. The *Serum* of the Blood being the Receptacle and Vehicle of all animal Salts; consequently, when it is in too small a Quantity, the saline, sulphureous and bilious

Particles will be aggregated and united into larger Corpuscles; whereby they will irritate, corrode, and pass with difficulty through the minutest and remotest *Tubuli*.

V. A Rigidity or too great a Stiffness of the Fibres and Vessels may proceed from insufficient Supplies of suitable, diluting Drinks, to mollify and malax them, and to wash off the acrid, irritating Salts adhering to their Sides, or sticking in their Interstices.

VI. A Viscidity of the Blood and Lymph; a Diminution of the Excretions; an Augmentation of the Quantity of saline and sulphureous Principles in the Blood, and too great a Tensity or Rigidity of the vascular Frame, are the only Requisites necessary towards the Production of *acute continual Fevers*, as we shall prove in the Sequel of these Papers.

37. *Thirdly, Gluttony*, in regard to its Frequency, and pernicious Effects, ought to be placed foremost of all the *Antecedents* to *acute Diseases*. The bad Consequents of this Vice are so very obvious and plain, that they have been remarked in every Age, to produce Legions of Illnesses. *Solomon* * admonishes us thus: *Be not greedy in thy Banquets,*

* Vide Ecclesiasticus.

*quets, and give not thy self over to Meat; for in much Meat there is Sicknefs, and Greediness will turn to Choler. Many have died through Fulnefs, but he that is temperate lengthens his Life. Hippocrates * also cautions us against Excefs after a very particular Manner, and endeavours, with all his Rhetoric, to inculcate Abstinence and Exercise. He that studies his Health, fays he, must not over-fill himself with Meat, nor be idle and lazy. And, to mention no more, Sanctorius, in his admirable Aphorisms, takes a deal of pains to discover to us the malign and fatal Effects of Gluttony. They need not fear any Distemper, who diligently take care that they be not overcharged with Crudities. Aphor. 89. Sect. 3. And again, If it be exactly known how much Food is convenient for every Day, such a Person may easily preserve his Health and Strength to a great Age. Aphor. 34. Sect. 3.*

38. Doubtless a well-regulated Diet has a principal share in the Prolongation of Life. If the *Epicures*, or such as indulge themselves in sensual Pleasures, and value the Gratification of their Palates and Tastes before any Thing else, did but know or con-

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* Vide Epidem. Aphor. 10. Sect. 4.

sider the incomparable Structure of their Bodies, of what delicately fine Filaments they are composed, and how easy it seems to be to destroy these *Stamina Vitæ*; they would surely be afraid to cram or gorge in the manner they do. Such a superfluous Load put upon their poor passive Machines, must needs wear them out much sooner than ordinary, and would immediatly put a stop to their finest Springs and Movements, did not *Nature*, or the Strength of Constitution, or whatever you please to call it, find out Ways and Means to discharge the superabundant Matter through the excretive Glands, or to heap up so much Fat out of the Verge of the Circulation.

39. The Friction and Collision that necessarily follows upon the Impenetrability of Matter *, the Communication of Motion, and the Impressions of the Bodies that surround us, must necessarily rub off, and wear out some Parts from our bodily Machine. The necessary Collisions that are made in our Juices, in breaking and subtilizing their Parts, to render them fit for the animal Functions: the various Secretions of what is not proper to be retained, or what is necessary

* Vide *Cheyne's Engl. Mal.*

cessary for the Preservation of the Individual, make a continual Waste of our Substance. To supply all which, it is absolutely necessary that a due and equal Proportion of proper Nourishment should be designed us: But whenever it happens that the Ballance is cast too much on either side, that is, when the Excretions by the several Emunctories do not tantamount to the daily Recruits by Eating and Drinking, or *e contra*, some Indisposition or other must follow.

40. Too much Use of any particular Sort of Aliment which tends to create an alkaline, acrid, or glutinous Quality in the Humours, may be ranked among the Causes of *ardent Fevers*. Thus living too much upon *Flesh-Meats*, with rich and poignant Sauces, fires the Blood, and renders the Juices acrid and predatory; and is the original Cause of many Fevers: For when the solid Food is in too great a Proportion, either in Quantity or Quality, a greater Number of red Globules will necessarily be generated; and as they are naturally more receptive and retentive of Heat than the serous Part of the Blood; and as the Solids in such Constitutions are generally very elastic and strong, the Velocity of the Circulation, and the
Heat

Heat of the Body are oftentimes increased, by these means, to a vast degree.

41. *Variety of savoury Dishes* therefore, must be very unwholesome, as they convey into the Blood great Quantities of *saline* and *sulphureous* Particles, which are of great Activity, Solidity, Force, strongly attracting, and withal fiery, and caustic; especially if they are too long retained in the circulatory Organs. Hence, as we shall shew hereafter, the several Series of Vessels may be irritated and stimulated into more frequent and more forcible Contractions; the Friction between the several Orders of Blood-Globules increased, the Heat of the Body augmented, and the strongly attracting Power of the Blood-Globules excited, so that the smallest Order may coalesce into larger ones, and these again into others of the highest Order, and so on, 'till *ardent inflammatory Diseases* are brought on, and sometimes *mortal Coagulations*.

42. Hence it is evident that an *Excess* in the Quantity of *wholesome Food* may too much increase the Quantity of the Fluids, and produce morbid Effects by sending into the Blood more Chyle than can be properly assimilated by the vital Powers: In consequence

quence of which, the Blood-Globules will grow too bulky, and incapable of passing freely through the minute sanguinary *Tubuli*. But if the *Qualities* of the Aliment are unsuitable or incongruous to the Constitution, by its abounding too much with *saline* and *sulphureous* Matter, it will still prove more morbidic, on the account of these sort of Particles attracting and being attracted by, and cohering with some Parts of the Blood, so as to produce a greater Viscidity in the animal Fluids.

43. No Person is able to support a Diet of *Flesh* and *Fish* without *Acids*, as *Salt*, *Vinegar*, *Bread*, &c. and without large Quantities of cooling diluting Drinks; for an Excess of all animal Food is sure to occasion an alkaline Disposition of the Humours, and especially all delicate flavoured Meats, as *Venison*, *Pidgeons*, &c. which greatly abound with Salts and subtile Oils: And in *Wild-Fowl*, and such Animals as feed on animal Diet, the Salts and Oils are still more active, and naked, and tend more strongly to an alkaline Nature.

44. That all *animal Diet* is more apt to excite Heat than Vegetables, is most evident from common Observations, and the Reason

Reason of this is certainly owing to the *Salts* of Animals being volatile and alkalescent; whereas the *Salts* of most Vegetables are of a fixed Nature, and aciescent; and thence, when received into the Blood, remain inactive and quiet: Whereas the former, by the Heat of the Body, being volatilized and made more active, not only excite a greater Agitation in the Fluids, but stimulate the Solids into quicker and stronger Vibrations.

45. The ingenious and learned Dr. *Arbutnot* hath lately instructed us how to regulate our Aliment. And *Boerhaave*, in his *New Theory of Chemistry*, assures us, that it intirely depends upon *Chemistry* to know when *animal* and when *vetegable* Food is proper; to what Constitutions *Water*, and to what *Wine* is best adapted; where *Bread*, and where *Flesh* is to be used; what is the Diet requisite for a Man of a studious, sedentary Life; what for a Man of an active Employ; and what for a Child; which Habits demand the Use of *Alkalies*, and which of *Acids*: with many other Particulars of the like kind. 'Tis true, all these Things are discoverable by Experiments, made on the Persons; but Danger attends the

the making such Experiments: whilst Chemistry, without running any risque at all, shews us, that the natural Heat of our Bodies will turn Vegetables acid, and putrefy animal Substances. Whence we may learn, that in case of an *alkaline* Disposition of the Blood and Juices, when the *Urine* appears red, smells ill, and tastes alkalious; *vegetable Acids* are the proper Diet, and *animal* Food prejudicial. On the contrary, if the Humours are *acid*, as frequently happens in *Infants* convulsed from a Coagulation of the Milk in their Stomachs, *Broths* made of the Flesh of Animals, Eggs, or the like are excellent; whilst vegetable Acids would prove hurtful. And this can be learnt from nothing but Chemistry; which also instructs us how to give each kind of Food its proper Sauce or *Menstruum*, to forward its Concotion or Dissolution in the Stomach.

46. Hence more particularly appears the Inconveniencies arising from an Excess in any one sort of Diet; for if it be ever so innocent, a long Continuance of it, without any Alteration, may dispose the Humours to tend towards an *acid*, or an *alkaline* Disposition: so that our *modern Dishes*, which are so well fraught with *Salt* and *Spices*, must

must needs be very prejudicial, especially to those of an indolent, lazy Temper, by rendering their Blood hot, acrid, and grumous; and the Fibres dry, crispy, and tense.

47. If we consider that the *Crises* of almost all acute Diseases happen either by rank and fetid Sweats, thick, lateritious, and lixivious Sediments in the Urine, black, putrid, and fetid Dejections; it will evidently appear that the *Rise* of such Disorders is chiefly from *Gluttony*.

48. But notwithstanding all these Things; it is a common Observation among your *Free-Livers*, that if a Man is able to eat a great deal, it prevents, in a great measure, the ill Effects of strong spirituous Liquors. Indeed, when the Appetite and Digestion remain good after a Course of repeated Debauches for many Years, it is an Argument of great Strength of Constitution, and that the *Fibrillæ* of the Stomach were originally very elastic and strong: but to the thinking, intelligent Man, it will appear, that it is not cramming down a *Pound* or more of *Beef*, &c. the Morning after a *Drunken-Bout*, that preserves the *Debauchee*; but, on the contrary, it helps to destroy him the sooner, by laying a greater Load on the Vessels,

sels, which were before too full, and by that means rebating the Elasticity of the Fibres, and preventing their assimilating the Juices so properly as they ought. If therefore our Appetites are ever so keen after drinking too much, we ought to refrain large Meals, or Meats hard of Digestion, 'till the superabundant Load is discharged through some of the excretive Glandules, and the Fibres are restored to their former Tone and Vigour.

49. But because we seldom see *Drunkards* fail whilst their Appetites remain good, *they* therefore conclude that eating a vast deal takes off the bad Effects of strong, spirituous Liquors: Whereas, I beg leave to assure them, the Fallacy of their Argument consists in their Ignorance of the *Laws of the animal Oeconomy*, and the malign Influences that *Eating* and *Drinking* to excess, have on their Bodies, 'till they actually become visible. A Man with strong, robust Nerves, will bear many Shocks of this kind before he gives way; and all the while the destructive Agents of *Gluttony* and *Excess* are privately undermining him, and destroying the Texture of the delicately fine *Machinulæ* of his Body, he flatters himself with the
Thoughts

Thoughts of Safety, 'till some Disease or other lays fast hold of him, and makes him too sensible of his Mistake.

50. *Acute Diseases* are oftentimes the immediate Consequents of this pernicious Custom; and *chronic Disorders* are much sooner brought to maturity when *Gluttony* is joined with *Drunkenness*. I readily confess, where the Stomach is already depraved, or where the Nerves were originally weak and relaxed, *Drunkenness* will sooner compleat *chronic* Distempers, than in a Man who is strong, and can eat heartily; because of the vast Disproportion of their Strength, it requiring perhaps some Years to reduce the latter to the same Standard of Weakness with the former. But what I insist upon is, that a Man of a strong, robust Constitution, whose Appetite does not fail him after a *Drunken-Bout*, may last longer by denying himself his usual Quantity of Food, and by chusing Meat of easy Digestion, with or after a Debauch, than if he indulges himself with the most luscious Meats, and high-seasoned Sauces.

51. As to spirituous Liquors, some certain Proportion of them may be absolutely necessary for all Men, to excite, rouze, and
carry

carry on the Circulation, Perspiration, and all the Secretions and Excretions with their proper Force and Vigour, for the way of Life which promotes a generous Perspiration without inflaming, is the best Preservative of Health, and greatly conduces to Longevity. But then, too free a Use of them, especially of the stronger kind, will render the Fibres rigid, and dry, and coagulate the Blood, from the vast Quantity of acrid Salts and volatile Oils they contain; which Salts and Oils being reduced *ad minima* by Fermentation, and Distillation, attract most strongly, and by that means fix and bind together the constitutive Parts of the Blood, so as to render it thick, black, and grumous.

52. The mere mixing of strong Spirits with Blood heats it, by the intestine, fermentative Motion immediately brought on by the Action of the saline and sulphureous Particles contained in both Liquors. *Boerhaave* * proves that Spirit of Wine being mixed with pure Water, increases its Heat some Degrees; and certainly so heterogeneous a Fluid as the Blood, must produce more sensible Effects.

53. And here I must observe what is evident by Experience, that the Excretions from the Blood are manifestly stopped by the Use of strong, distilled Spirits: *Diarrhæas* and *profuse Sweats* have been known to be checked by taking a little *burnt Brandy*. Hence the sure Effects of an inordinate Use of strong, spirituous Liquors, are a *Stimulus* on the Vessels, too great a Degree of Heat in the Fluids, a *Lentor* in the Blood, and a Diminution of the Evacuations.

54. *Fourthly, Immoderate and violent Exercise* is oftentimes an *Antecedent* to *acute Fevers*: For notwithstanding Exercise is so very beneficial to the Body, that there is hardly any such Thing as enjoying a good share of Health without it; yet if it be used to an extreme degree, it requires a deal of Care to prevent its Inconveniencies.

55. When the muscular Force is raised to its highest pitch, and continued so for some time, it is almost inconceivable with what Celerity the Blood is pushed on; the Friction between the Solids and Fluids is vastly increased; the Heat of the Body is augmented; the Juices are broke into their *Minima*; and by this Division of their constituent Parts they rarify and possess a larger Space than usual:

usual: Whence the *Areas* of the transverse Sections of all the Canals are enlarged, the Secretions are increased, and great Quantities of serous Matter are thrown off from the Blood; whereby what remains is rendered more thick and viscous. Let us add, that Persons heated to this degree, are oftentimes desirous of cooling themselves; for the sake of which they incautiously expose themselves to the cool Air, or pull off their Clothes, or drink large Quantities of cold small Liquors, or sit upon the Ground, &c. whence it is great odds but the *perspiratory* and *sudatory* Vessels or *Tubuli* are obstructed, and *ardent* Fevers are oftentimes the Consequents of such indiscreet Practices.

56. Another ill Effect of violent Exercise, if it be continued long, is the Inspissation of the animal Fluids, and rendering them acrid and alkaline by mere Heat. *Ninety two Degrees* of Heat in the Blood, is found to be the Standard which preserves the animal Fluids in that Consistence, which best subserves the Purposes of Life; but if it be increased some Degrees above this healthful Standard, the Blood and Lymph will grow glutinous and fizy, and the Salts and Oils will be exalted and volatilized; as we shall

demonstrate in the subsequent Chapters. The Blood of labouring Persons is always more dense than that of inactive People.

57. *Sydenham* observes, that the evident, external Cause of most Fevers is to be sought from hence, *viz.* because the Sick either left off Clothes too soon, or after being hot with Exercise, exposed himself unwarily to the Cold; upon which account the Pores being suddenly stopt, and those Vapours retained which would otherwise have passed through them, this or that sort of Fever is kindled in the Blood, as either the general Constitution which at that time reigns, or the particular Disorder of the Humours is more inclined to this or that sort of Fever: and I verily believe, says he, more have died on this account, than by the *Plague, Sword,* or *Famine* all together. For if any Physician shall enquire strictly of the Sick concerning the first Occasion of their Disease; if it be of the Number of acute Diseases, he will almost always find that either the Sick rashly left off some Clothes that he was accustomed to, or that he exposed himself suddenly to the Cold, when his Body was heated with Motion; and that upon one of these accounts he was seized with the Disease.

58. *Fifthly, Acute Fevers* may arise from a *Suppression of any natural or accustomed Evacuation*: For the Matter which is retained generally gives a greater Saltness and Acrimony to all the Juices, and alters their Quality from a soft, unctious, into an acrid and irritating Disposition. Besides, when any Discharge from the Blood is suppressed, and no other is increased in proportion, the Vessels will necessarily grow turgid and full, from the Accumulation of that particular Humour; from a Plenitude of the Vessels, (if it be not carried too far) the Secretion in the Brain will be augmented; from a greater Quantity of nervous Juice, the Action of the Solids will be more vigorous; from a more frequent and stronger Contraction of the whole vascular System, the Circulation of the Fluids will be accelerated; and from a more rapid Motion of the Blood, will arise a greater Degree of Heat, the most distinguishing Mark of a Fever.

59. Hence an unseasonable Use of *strong, astringent, stiptic Medicines* may lock up the excretive Glandules so as to produce an *ardent Fever*: as I remember it happen'd once, upon the Use of the *Bark, &c.* given to stop

an Evacuation, falſly imagined to be deſtructive to the Conſtitution.

60. *Sixthly, Sharp, pungent Pain*, eſpecially in the membranous Parts, will either cauſe or increaſe a Fever *; for it is always attended with a Contraction of the pained Part, (as is evident from the *Bellinian Doctrine de Stimulis*) and by this Contraction, the Motion of the Blood and Spirits is either totally obſtructed or retarded, and the Part ſwelled; and by their Preſſure againſt the ſides of the Veſſels, more forcibly, as they will, when their direct Motion is hinder'd, the Pain is both increaſed and propagated further, and the Contraction is more or leſs communicated to all the Parts of the Body; whereby the Secretions and Excretions are ſtopped, and the Quantity of Blood increaſed, which will either cauſe or increaſe a Fever.

61. *Seventhly, Watching too much*; or ſitting up night after night, may be an *Antecedent* to this Diſeaſe, by obſtructing Perſpiration, and rendering the Fibres too ſtiff and rigid: for ſince by Sleep the whole Syſtem of the Solids is in ſome meaſure relaxed, and as the Heat of the Bed greatly promotes the Excretion by the ſubcutaneous Glands

* Vide *Wainwright's Non-Naturals*.

Glandules, it evidently follows that the want of Sleep, and the warmth of the Bed, may produce the above-mentioned Effects.

62. *Eighthly*, By intense and severe Study the *Meninges* of the Brain, together with the other Membranes and delicate *Fibrillæ* of the Body, may be braced up too tight and strict, and the Evacuations suppressed: as is manifest from the costive Habit of Body, which mostly attends the Studious, and from the great Difficulty of getting to sleep after intense Thinking.

63. *Ninthly*, It has been observed that those who have died of *Hunger* and *Thirst*, as at *Sieges* and at *Sea*, &c. have always died *delirious and feverish*. For as the Office of the Chyle is to attemperate, cool, and dilute the Blood, as well as to afford Nutriment to the several Organs of the Body; it must necessarily follow, that when this demulcent Liquor is wanting for some time, the Blood will grow dense, hot, acrid, and alkaline, to such Degrees at least, as will be sufficient to render the whole Mass, in a few days, unfit for any of the Faculties of Life. For all the *passive* Principles of Putrefaction *, being actually in the Substance of

the Blood, and all the *active* Principles of Heat and Attrition being at work upon it to produce this Effect, it cannot fail to be brought about in a few days; and the same would happen to all Animals, if what is effete, corrupted, or altered, so as to be unfit for the Use of the Animal, was not continually carried off by the *Emunctories*, and a fresh Recruit daily supplied from the *primæ Viæ*, which Evacuations and Supply being kept up in their due Proportions, effectually prevent all Putrefaction and Acrimony, and keep the Blood and Humours in their natural Temperature.

64. It is not then a Defect in the Quantity of Fluids that kills an Animal in Fasting, but a poisonous Acrimony which the Blood and Humours naturally contract, for want of fresh Recruit and equal Evacuation. All Degrees of Digestion, from its first Beginning in the Stomach, through its whole Course, have a Tendency to Putrefaction: so that without a constant Supply of fresh, smooth, cool Chyle, the Humours will soon grow sharp, acrid, and alkaline, and in a few days degenerate into a fatal Degree of Putrefaction.

65. Hence, though too much Abstinence, or fasting too long, is a thing we seldom or never meet with, unless by Compulsion; yet it is what we ought to take notice of among the *Causes of acute Fevers*, because it really is one. Proceed we now to shew after what Manner the most usual *Symptoms* incident to this Disease, arise from the *Antecedents*.



C H A P. II.

Of the Rise of the most usual Symptoms incident to an acute continual FEVER.

66. **H**IPPOCRATES, in his Books *de Morbis*, and that *de Affectionibus*, advises that none presume to enter upon the Province of curing Diseases, that have not first well considered their Causes. The great Affinity and Resemblance there is between the Symptoms of different Diseases, makes it absolutely necessary for every *Practitioner* to rightly understand the Cause of each Symptom, and the Root from whence it springs; or otherwise he will be apt to mistake one Disease for another, or in forming the true Indications, and the most effectual Method of Cure.

67. In describing Diseases we can't be too careful in remarking the peculiar and perpetual *Phænomena* which characterize them; but as to the accidental or adventitious Symptoms, which arise from the different Temper, Age, Management of the Patient, &c. as they are almost innumerable, and
since

since many of them are collected in one Person, and none appear in another; it is almost impossible as well as unnecessary to remark them all. The *Reader* therefore is not to expect that every one seized with a Fever is to have all the Symptoms we shall enumerate, or that he will never meet with others which are not taken notice of here: what we design being to explain those which most deserve our Attention; the chief *pathognomonic Symptoms*, whereby this Disease may most certainly be known from another.

68. From what has been said in the preceding Chapter, it evidently appears that the *Body of Man* is to be looked upon as a most excellent Fabric, a very compounded Engine, consisting of gross, hard, solid Parts, as well as Fluids of several Denominations, and Consistencies; all which are incessantly and variously moved: and as long as the Solids act upon the Fluids, and the Fluids react upon the Solids equally and regularly, the Constitution is preserved, and the Machine remains in perfect Order.

69. *A Disease*, therefore, arises from a Depravity of the Fluids, or Solids, or both; whereby the usual Oeconomy is disturbed, irregular Motions are excited among the Solids,

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Solids, and unnatural Coalitions, and Separations among the Fluids. Or, if the Blood is not sufficiently supplied with suitable Chyle, if all the Series of Vessels are not duly replenished with their proper Liquids; if the excrementitious, superfluous, heterogeneous Humours are not sufficiently excreted; if any thing be deficient or redundant in any Part of the Body; Health will be impaired, and some Disease or other will be the Consequence of it.

70. Hence the Nature and Manner of Production of all the Symptoms incident to Diseases, are to be deduced from the Structure and Oeconomy of the human Body, which always exhibits the *Phænomena* in consequence of its primitive Construction. And now if we look back to the *antecedent Causes* of this Disease, we shall find that all of them are disposed to render the animal Fluids acrid, gross, and viscous, or to generate Obstructions in some of the Outlets of the Body, whereby they augment the Quantity, Velocity, and Heat of the Blood.

71. Obstructions are generally formed in the last Series of the Vessels, or in the ultimate Branches of the sanguine and lymphatic Arteries; and always arise from an

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Excess in the Diameter of the obstructing Matter above that of the Canal through which it ought to flow. Thus when one or more of the *Antecedents* form Corpuscles in the Blood or Lymph of a different Texture, Figuration, or Bulk, than what are natural to the Constitution, and which are too large to pass freely through the minutest *Tubuli*; or if too great a Stricture of the excretory Vessels should happen from a *Stimulus* applied to them, so that what is secreted by the Glands cannot be discharged out of the Body; it is plain to Demonstration, that morbid Matter will be pent up in the Habit.

72. *Those* who are conversant in the *Practice of Physick* know that many of the Glands do not perform their Office as usual, during the Continuance of an *ardent Fever*; the Dryness of the *Skin, Mouth, Larynx, &c.* are manifest Proofs of this: But whether these Symptoms proceed merely from an Incapacity of the Juices to be secreted, by reason of their Thickness, or from an actual Obstruction or Stagnation of gross Matter in the *secretory* or *excretory* Ducts, I shall not take upon me to determine; it being sufficient for our Purpose, that the *Excretions* are diminished, and the retained Mat-
ter

ter accumulated in the Lungs, Heart, and larger Arteries.

73. The Office and Use of the Glands in general, is to separate and throw off from the Blood those Recrements and worn-out Parts which are no longer required for any of the animal Functions, or to secrete those Juices which are required for the Preservation of the animal Machine ; so that if we reflect on the Proportion which the several Glands bear to the rest of the Body, and that the muscular Parts receive but little Blood in regard to their Bulk ; it will evidently appear, that Obstructions to the Circulation of the Blood and Lymph through the Vessels which constitute the Glands, will give the most immediate Rise to *acute Fevers*. For supposing the *miliary, renal, mesenterial Glands*, or any other excretory Ducts, not to discharge their proper Contents from the Blood ; those particular Fluids must necessarily be accumulated in the pervious and patent Vessels, contrary to the common Course and Design of Nature ; and by being retained in the Habit longer than ordinary, they will grow sharp, viscid, and ill-condition'd.

74. Most of the *Phænomena* incident to Distempers take their rise from an Increase or Diminution of the Quantity of Fluids; for though the Blood may be vitiated, and Disorders may seem to arise from thence, yet if we strictly examine into it, such Viti-ation is generally occasioned by an Aug-mentation or Diminution of the Quantity of Fluids: that is, the Quantity of the Fluids greatly depends upon their Motion, and their Motion upon their Quantity. Thus for instance, an impetuous Circulation continued long, will render the Blood hot, acrid, and alkaline; whereas too slow a Motion will suffer it to be cool, grumous, and acefcent: and when any of the Juices stagnate in their respective Vessels, or lie out of the verge of the Circulation, they will ferment, and turn putrid, from an intestine, fermentative Mo-tion, occasioned partly by the Heat of the Body, and partly from the Heterogeneity of their constitutive Parts.

75. Thus when any of the animal Juices grow too thick and tenacious, or when the gross, earthy, saline Parts of the Blood abound too much; they are apt to adhere to the delicate fine Vessels, and leave viscid *Striæ* behind them; whilst the watery, or
more

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more ferous Parts are easily squeezed forwards by the *Conatus* of the sides of the Vessels to come together ; whence they may furr up the inside of the Vessels, and in the end totally occlude an infinite Number of the minuteft *Tubuli*. But if this be not the Case, the necessary Effect of a viscid State of the Juices, is a Retardment of their Circulation through the capillary Vessels, and an Accumulation and Increase of their Velocity through the larger ones : and when such a Number of the Parts of the Blood and Lymph are brought to coalesce, as renders the Course of the Blood through the capillary sanguine Arteries, and the Course of the Lymph through the minuteft lymphatic Vessels, difficult and slow ; the Blood and Lymph will be accumulated in the largest and most pervious Tubes.

76. Hence the *first* Symptom of this Disease is a *Rigor* or cold Chill, which chiefly affects the extreme Parts, and external Surfaces of the Body, from the Check which is given to the Circulation, by reason of the *Lentor* adhering to the capillary Vessels.

77. II. The *Pulse* are low and slow, at the very Beginning of *acute Fevers*, for the same reason.

78. III. The Course of the Blood being more and more retarded in the ultimate Branches of the *Arteriolæ*, it will soon occasion a quicker Flow in the larger Arteries, and the Circle of the greatest Part of the Blood being by these means shorten'd, the Return to the Heart will be quicker; in consequence of which, the Heart will begin to beat oftener, and the Heat of the Body will increase: For such are the established Laws of the animal Oeconomy, that these things are only the necessary Effects or Consequents of the Fabric or Mechanism of the Body.

79. We have many Reasons to admire the Structure and Contrivance of the *animal Machine*, both as to the *Solids* and *Fluids*, which are so excellently adapted to the mutual Succour of each other, that one cannot be offended, but the other has immediate Intelligence of it. Thus when many of the minutest Vessels are rendered impervious, the Quantity of Blood in regard to the patent Vessels, is increased, each Canal is bowldened with its respective Liquor, the Impulse and Velocity of the Blood is increased in the larger Arteries, and as they are distractile Vessels, the lateral Pression will be

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greatest when they are most distended.
Hence,

80. IV. *A large, quick, full Pulse* is the necessary *Concomitant* of a *Plethora ad vasa* (if it be not carried too far) occasioned by a difficult Circulation through the minutest and remotest *Tubuli*; and this is no more than an Effort of Nature to attenuate the Blood and Lymph, so as to pass freely through all the decreasing Series of Vessels without Stagnation or Obstruction.

81. V. *The Skin feels dry and hard, and the whole vascular System seems to be too elastic and tense.* Now this does not seem to be owing intirely to the Quantity of the Fluids distending the Vessels; but to the Quantity of the *saline* and *sulphureous* Principles in the Blood, being augmented by some of the *Antecedents*, or to their being attenuated and volatilized by an impetuous Motion and Heat, whereby they become more acrid, sharp, and irritating; and consequently they will stimulate the Fibres and increase their Tension to a greater Degree than before.

82. But since the *Theory of Diseases* depends so much upon a true Knowledge of the Nature of the Elasticity or Springiness of the Fibres, that many *Phænomena* cannot

rationally be accounted for without it; I shall here present the Reader with a *chemical Analysis* of the *solid Parts* of an *animal Body*, in order to investigate the Proportions and Qualities of their several constituent Parts; whereby we may probably receive some Light towards finding out which Principles contribute most towards the Cohesion of the Fibres, and which actuate and invigorate their elastic, contractile Property.

EXP. I.

83. I took the *Tendons* from the *Legs* of an *Ox*, and having exactly cleared them from the *Membranes* and *Fat*, I put a *Pound* of them into a *Copper Body* which held *five Pints*; to this I fixed a *glass Still-head*, and to the Neck of the *Glass-head* I fitted a large *Recipient*, by means of a *wooden Plug* turned round for that Purpose, and having a Hole bored through it just big enough to admit the Neck of the *Still-head*. I also bored a small Hole through the *wooden Plug*, and in that I fixed a *glass Tube* $5 + \frac{1}{2}$ Feet high, whose Bore was $\frac{1}{8}$ Inch diameter. The use of this Tube was to let out the Air that was generated and rarefied by Heat, or otherwise the *Glass-head* would have blown off,

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or burst, before we could have increased the Fire so as to raise the *volatile Salt* and *Oil*; and by reason of the smallness of the Bore, and the height of the Tube, we prevented the escape of any thing else: for we could not perceive, in any of the following *Processes*, that either the volatile Salts or Oils ever rose above eighteen or twenty Inches in the Tube.

84. The *Apparatus* thus prepared, and every Part being closely cemented together, I committed the Copper-Body to a *Sand-heat*, and by a moderate Degree of Fire, raised all the *Phlegm*. The first that came over was almost insipid and inodorous; after that it grew stronger and stronger, and at last, about an *Ounce* of it was so highly charged with fetid *Oil* and *Salt*, that it deserved the Title of *Spirit*.

85. After this I took the Copper-Body out of the Sand-heat, and set it upon a *naked Fire*, which soon filled the *Glass-head* and *Recipient* with thick *Clouds*; and in this State I continued it as long as any thing would rise.

86. *Lastly*, I calcined the *Caput mortuum* poured boiling Water upon the *Calx*, filtered it through Paper, and evaporated it to a
Dry-

to an acute continual FEVER. 53

Dryness. By these means I gained as follows,

	Ounc.	Dr.	Grains.
1. Lymph ———	xij.	vi.	
2. Volatile Salt ———		ij.	vi.
3. Oil ———		iiij.	iiij.
4. Cap. Mort. before Calcin. ——— } 5. Cap. Mort. after Calcin. ——— }	ij.	i.	x.
6. Fixt Salt ———	i.	ij.	xxxxiiij.
7. Lost in Distilla- tion ——— }		iiij.	xxxx.
8. Lost by Calcina- tion ——— }		vj.	xxvj.

87. Thus we see how vastly the *watery* or *phlegmatic* Principle abounds above the other Principles; it being almost $\frac{1}{18}$ Parts of the whole Mass. And indeed it is surprising to observe how great a share of Water goes to make up several Bodies, whose Forms promise nothing near so much: even *Bones*, as we have observed before, afford half their Weight of Water.

EX P. II.

88. I dissected a *Muscle* from the *Buttock* of a very lean *Bull*, and having cleared it from the *Membranes* and all visible *Fat*, I distilled a *Pound* of it, in the manner above-mentioned, and obtained,

	Ounc.	Dr.	Grains.
1. Lymph ———	xij.	iiij.	xx
2. Volatile Salt ———		iiij.	Lv.
3. Oil ———	i.	i.	
4. Cap. Mort. before } Calcin. ——— }	i.	ij.	
5. Cap. Mort. after } Calcin. ——— }		vi.	xx.
6. Fixt Salt ———			
7. Lost in Distilla- } tion ——— }		iiij.	xxxxv.
8. Lost by Calcina- } tion ——— }		iiij.	xxxx.

89. Here we may observe, that since *three Drams* and *forty Grains* of Matter was lost in the *first Process*, and *four Drams*, and *forty five Grains* in the *second*; and since such Care was taken that nothing but *Air* should escape, we may reasonably conclude
that

that much the greatest Part of that which was lost, was *true permanent Air*; and for the same Reason, I doubt not, but a great Share of that which was lost by *Calcination*, was *Air* likewise: for, as we shall shew hereafter, Air in solid Bodies, is of so fixed a Nature, that it will not rise, or be separated from them, but with the greatest Degree of Heat.

90. Here also we have evident Proof of the *Proportions* and *Qualities* of the several *Principles*, or constitutive Parts of the Fibres; but in what manner they are ranged, or after what manner they cohere together, so as to be *springy* or *elastic*, is a Question not very easy to be solved. However, since daily Experience informs us, that when the animal Fluids are most of all impregnated with *volatile Salts* and *Oils*, the Fibres are highly rigid, elastic and tense; and when the *phlegmy* Principle abounds too much, they are soft, flabby, and relaxed; it is reasonable to conclude, that though *Water* or *Phlegm* has much the greatest share in the Composition of the Fibres, yet the *saline* and *sulphureous* Principles are the chief Agents which actuate and invigorate the watery and earthy Parts, and which, by their

strongly attracting Power, are the greatest Support of the Texture and Cohesion of the other Principles. The watery Part is easily separated, and rises with a small degree of Heat; but the saline and sulphureous Principles adhere to each other, and to the earthy Part so tenaciously, that a great Violence of Fire is required to separate them; and therefore they seem to be the strongest *Gluten* which binds together the other constitutive Parts of animal Bodies.

91. I had almost forgot the *Air*, which certainly has a great share in fixing and uniting the other Principles; for in the most solid Parts of the Body, or where the Cohesion of the Parts is the strongest, there we find great Plenty of Air. That the Air-Particles are capable of being united, and fixt to solid Bodies, and by that means may be esteemed a part of their Composition, we have many evident Proofs in Dr. *Hales's Analysis of the Air*; and that those Particles do in their fixt State strongly attract the other component Particles, is evident, it being well known that the most strongly repelling and elastic Particles, when in a separate State, are the most strongly attracting when fixed to other Bodies.

92. Now, according to Dr. *Hales*, since a much greater Proportion of Air is found in the solid than in the fluid Parts of Bodies; may we not with good reason conclude, that it is very instrumental, as a Band of Union in those Bodies; those Particles (as Sir *Isaac Newton* * observes) receding from one another with the greatest repulsive Force, and being most difficultly brought together, which upon contact cohere most strongly. And if the Attraction or Cohesion of an unelastic Air-Particle be proportionable to its repulsive Force in an elastic State; then since its elastic Force is found to be vastly great, so must that of its Cohesion be also. Add to this, that the Air generated from the solid parts of the Body, is not separated without great Violence; for it does not rise till the Clouds do, which contain and bring over the Salt and Oil: whence it is evident that the aerial Particles are firmly fixed, and consequently are very instrumental in the Union of the other constituent Principles.

93. † Small Bodies act upon one another in the same Manner, and by the same Laws and Mechanism, that the *Systems* of the greater

* Vide Optics Qu. 31.

† Vide *Cheyne's* Engl. Mal.

greater ones do : and he who would understand the Effects of little Bodies, Fluids, or material Spirits upon greater Bodies, and the Nature of the Action of their Particles upon one another, has nothing to do (if he reasons rightly) but to resemble small Bodies to great, under particular Laws and Conditions.

94. Since therefore there is in all the Fibres an innate Springiness or Elasticity, which seems to be owing to the close Contact or Cohesion of their component Particles ; and since too many *serous* or *watery* Particles soften or weaken the Cement between the *saline*, *sulphureous*, *aerial*, and *earthy* Parts ; we may reasonably conclude, that the Strength and Elasticity of an animal Fibre is chiefly preserved by the strongly attracting Power of the saline, sulphureous, and aerial Particles, which seem to solder and unite the watery and earthy Parts together.

95. The more Points the constituent *Ma-*
chinulæ touch at, the stronger will be their Cohesion ; and consequently they will give more Resistance to any impressed Power, or require more Force to dilate or distract them ; and when they are bent or stretched
out

out longer than usual, they will vibrate, or return to their former Positions with a greater Velocity.

96. Hence it is that the Membranes and Fibres become unfit to be moved with Vigour, and are rendered stiff and unactive by Age; because, in length of Time, their component Particles get into the closest Contact, and consequently the *Copula* is more powerful and strong.

97. From what has been said it will evidently appear that in *acute Fevers*, where the *saline* and *sulphureous* Particles of the Blood are exalted and volatilized, and where all the Fluids are more acrid, sharp, and irritating than usual; the Fibres which constitute the Canals will be extremely elastic and tense, and their contractile Power raised to the highest pitch: hence the Blood will be propelled out of the Heart with the greatest Impetus, and its Velocity increased to the greatest Degree, through every pervious Vessel. Hence,

98. VI. Arises *Heat*, which is the chief *pathognomonic* Sign of a Fever: for since it is well known that (*cæteris paribus*) the Heat of an Animal is in compound Proportion to the Quantity of the red Blood-Globules, (they

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(they being most receptive and retentive of Heat) and the different Degrees of Friction; or, in other words, since the Heat of the Blood depends upon the Quantity of red Globules multiplied into their Velocity; it naturally follows, that where both the Quantity of red Globules (as we shew in the Sequel of this Chapter) and their Velocity are increased, the Heat must also.

99. The animal Solids and Fluids are in an incessant mutually vibrating State; the Canals contract and push on the Blood, the Blood recoils and resists in Proportion, and as Action and Reaction are always equal, the Blood-Globules must necessarily, in a Fever, strike much oftner against each other, and the Sides of the Vessels: whence such Friction is produced, as raises their Heat to a vast Degree,

100. We find by daily Experience that an accelerated Motion of the Blood, by Labour or Exercise, does constantly increase its Heat; whence we may with good reason conclude, that it principally acquires its Warmth by the brisk Agitation it undergoes at such times. And that the Heat of the Blood does arise principally from this Friction, is hence also probable, that on
strong

strong or brisk Motion of the Body, its Heat is increased much faster, than it could by any effervescent or fermentative Motion.

* As, therefore, fermenting and effervescent Mixtures acquire Heat by the brisk Agitation and rubbing of the Particles of the effervescent Mixture against each other ; so the Globules of the Blood may well acquire their Warmth by being briskly agitated, in passing with great Velocity through innumerable, divaricating, and converging fine Canals.

101. We are not however positively to deny a fermentative Motion in the Blood : for it must needs be that the Parts of a Fluid, which is stored with so heterogeneous, active Principles, will be in a vibrating State, while actuated with so considerable Degrees of Friction and Heat, as the Blood is in an *acute Fever*. A violent Effervescence or Ebullition indeed, as from a Mixture of *Acids* and *Alkalies*, is what never happens in the Blood ; but that there is always a small Degree of intestine Motion, from the attracting and repulsive Power of the several constituent, heterogeneous Particles, is highly reasonable to believe.

* Vide *Hales's Statical Essays*, vol. 2.

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102. It is surprizing to think what vast Alterations different Degrees of Heat produce in animal Bodies. When it is intense, it has a very considerable Effect on the *saline* and *oleaginous* Parts; for though it is evident from many Experiments, that the *essential Salts* in the animal Fluids, are, in a natural, healthy State, neither *acid*, nor *alkaline*, nor *fixed*, nor *volatile*, but of a *neutral* Quality; yet in the Height of *ardent Fevers*, many of the Symptoms evince, that the Juices are tending towards an *alkaline* State; and by many obvious Experiments we learn, that the smoothest Oils will grow rancid by Heat, and lose their mild and gentle Nature, and become exceeding sharp, corrosive, caustic, and poisonous. The * Chyle contains a latent Acid; which easily discovers it self by Putrefaction; but this acid Salt having undergone a due Fermentation, or some other Action analogous to that in the animal Body, is changed into a volatile Alkali, obtainable in great plenty from Blood, Serum, Bile, Urine, &c. In a healthful Body, however, these volatile Alkali's are never perfectly formed, the animal Salts being more of the Nature of Sal Armoniac,

* Vide *Geoffroy* on Animal Substances.

Armoniac, with a Mixture of earthy and oily Parts, to which Mixture the glutinous Quality of the Blood and Serum is owing.

103. The Blood in a State of Health, is a smooth, demulcent Liquor, whose Globules both of the red and ferous Parts are spherical and polite; but whenever the natural Forms of the component Parts are broken, and destroyed, they must necessarily become angular, acrid, and pungent, and thereby, more or less, introduce an acriminous Quality, which will weaken and destroy the vital Powers.

104. Heat and excessive Motion therefore, seem to produce volatile, acrid, corrosive Salts in the Blood and Humours, by dividing and subdividing the Corpuscles of the essential Salts, 'till they attain a certain Degree of Minuteness and Asperity; but if ever the Heat be violent enough to render the animal Salts of an alkaline Disposition, it is reasonable to believe, that they are then conjoined, by their strongly attracting Power, which is vastly increased by Heat, and the Division of their Particles, to some other Matter, which in a healthful State is never in Combination with them. For since the saline and sulphureous Particles do evidently
exist

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exist in the Blood before the Heat is applied to it, and yet exhibit no Signs of an *Alkali*; it plainly follows, that the Alteration is produced by the Union of some Principles, which thereby become different from what they were before the said Combination.

105. Dr. Cox* is of Opinion, that *alkaline Salts* do result from the Combination or Union of the volatile Salts with the oleaginous or sulphureous Principles; from which Mixture of the saline and oleaginous Particles, there results such a *Tertium quid* as readily ferments with any *Acid*. And *Tachenius's* Method of preparing *medicated Salts* from Vegetables by Calcination; *viz.* by condensing the Smoak upon the Coals or Ashes, whereby he procured more Salt, seems to confirm the Truth of this Supposition.

106. But however this wonderful Alteration is performed, we are assured by *Bellini* and *Boerhaave*, that the *White of Eggs* (and the very same thing will happen with the *Serum* of the *Blood*) will putrefy by Digestion, and turn *alkaline*; and that a *single Grain*, or even half that Quantity of this putrefied Substance being taken into the Body, will, like the strongest Poison, presently

* Vide Phil. Trans. N^o. 107.

sently cause a violent *Nausea, Vomiting, and Eruptions, a Fever, a Diarrhœa, &c.*

107. Hence it is reasonable to believe that in a *Causus*, or the most intense burning Fever, which lasts, perhaps, *twelve or fourteen Days*, the *Salts* and *Oils* must necessarily be rendered *alkalifate*, tho' not in such a degree as to ferment visibly with *Acids*. And hence it is that the Matter which is suppressed and pent up in the Body, by the *antecedent Causes*, or during the Continuance of a Fever, is vitiated, and of a noxious ill Quality; the Salts are attenuated and dissolved, and the Oils are exalted and rendered volatile; in consequence of which, they gain a sharp, acrid, corrosive Quality; the Salt which was before mild, and somewhat indisposed to Volatility, becomes volatile and pungent; and the Oil, which before was gentle, viscid, and harmless, proves violently sharp and rancid.

108. Another ill Effect of the *febrile Heat*, is tending to inspissate or incrassate the Blood, it being, in an intense Fever, sometimes above the coagulating Point; and since the accelerated Pulses, and the strong vibratory Motion of the whole vascular System do necessarily continue to increase the Heat, it is amazing to think how the animal Machine can possibly hold out so long, as it sometimes

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does, under such violent Conflicts. Nothing could have preserved it in such Cases, had not the great *Wisdom* and *Forefight* of the *Creator* so order'd it, that the accelerated Motion of the Blood, and the strong vibratory Motion of the Vessels greatly promote Attenuation at the same time that they increase Heat: so that there is a sort of reciprocal Action between the strongly attracting Power of the Blood-Globules, assisted by Heat, which perpetually inclines them to coalesce, and the vibratory Motion of the Solids, which is continually dashing the Globules, and preventing their Cohesion.

109. But for a further Illustration of the Texture and Consistence of the Blood, I have taken the pains to examine it, in a *statical* Way, in every Stage of this Disease where Blood could be drawn with safety; in order to discover the different Proportions of *Serum* and *Gore*, and the different Powers of Cohesion between the red Globules which constitute the *Crassamentum*.

110. But before we proceed to the Experiments themselves, it may be proper to advertise the *Reader* of the Manner in which they were made. *First*, I always took care to bleed into a Porringer as near the same Shape and Size as possible; because a larger Surface of Blood should not be exposed to the Influence of the Air in one Trial, than in another. *Secondly*,

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All the Blood was received in one Porringer, because I have found by Experience, that a Pound of Blood does not separate so much Serum when divided into several Parcels, as when contained in one Vessel. *Thirdly*, I always set the Blood in a cool Place, and after it had stood 24 Hours, I very carefully weighed the *Serum* and *Cruor*, separately, in order to find their different Proportions. *Fourthly*, I took a very thin glass Tube 12 Inches long, and $\frac{1}{3}$ Inch Diameter, and having hermetically sealed up one End of it, I blowed it out to an obtuse Point about the Bigness of a middling Pea. Now this Point being set upon the *Crassamentum*, the Weight of the Tube was not of itself sufficient to press thro', and but very seldom when filled with Water; so that my way of trying the Cohesion of the *Gore* was to pour Mercury into the Tube 'till it was just heavy enough to cut its way thro'; and as the Tube was exactly graduated, I could by this Means, very nicely determine the Power of Cohesion between the Globules which constituted the *Crassamentum*. N. B. Every Degree was $\frac{1}{8}$ Inch; so that when it is said in the following Table, *Degrees of Cohesion* N^o. 48, we mean that the *Cruor* was so tough as to be equal to the Weight of six Inches of Mercury, besides the Weight of the Tube, which was three Drams, and fifty six Grains,

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<i>The Age of the Per- son.</i>	<i>The Day of the Disease.</i>	<i>The Symptoms.</i>	<i>The Quan- tity of Blood ta- ken away.</i>
A Man aged 45.	2d.	Intense Heat, Thirst, Vo- mitings, Looseness, excru- ciating Pains in the Head, Back, and Loins, and clear, pale, limpid Urine.	℥xiiij, ℥ij.
A Woman aged 32.	1st.	A quick, full Pulse, ex- treme Pain in the Head, and Loins, and delirious.	℥xiiij, ℥i.
A Man aged 23.	4th.	A foul, moist Tongue, crude Urine, strong, full Pulse, Delirium, excessive Heat, and frequent Vomi- tings.	℥xv, ℥ij. gr. xxv.
A Man aged 42.	3d.	Great Incalescence, strong, full Pulse, a Pain in the Head, and Back, giddy, and Nausea Ventriculi.	℥xiiij, ℥j, ℥j.
A Boy aged 12.	2d.	A Phrenzy, with ex- treme Talkativeness, a wild Stare with his Eyes, a dry, brown Tongue, a thick, black Film or Skin adhering to the Teeth and Lips, Subfultus's, and a quick, labouring Pulse.	℥vj, ℥j.
A Boy aged 10.	4th.	A flushed Countenance, an extreme quick, full Pulse, a brown, parched Tongue with a white List round it, a Delirium, high- coloured Urine, and costive.	℥vj, ℥ij, gr. xij.
A Girl aged 11.	3d.	Exceeding delirious, a full, quick Pulse, pale, lim- pid Urine, a dry, parched Skin, and costive.	℥vij, ℥ij.
A Man aged 34.	5th.	A burning Heat, un- quenchable Thirst, general Uneasiness, Watchings, full Pulse, and high-coloured Urine.	℥xij, ℥j, gr. xvj.

<i>The Quan- tity of Se- rum.</i>	<i>The Taste and Colour of the Serum.</i>	<i>The Colour and Consistence of the Crassamentum.</i>	<i>What Days the Cri- ses happen'd, and by what Outlets.</i>
℥iij, ℥iij, ℔j.	Something more brackish than healthy Serum, and of a flaming yel- low.	Very florid, except here and there a blue Speck. Degrees of Cohesion 34.	On the 7th Day, by Sweat, and tur- bid Urine.
℥iij, 3v, ℔ij.	Almost in- sipid, and of a wheyish Co- lour.	Extremely florid. Degrees of Cohesion 26.	On the 9th Day, by profuse Sweats, and thick Urine.
℥iij, ℥j, ℔j.	Quick, fa- line Taste, and straw-co- loured.	Exceeding florid. Degrees of Cohesion 38.	On the 7th and 8th Days, by an Hæmorrhage at the Nose, plentiful Spitting, turbid U- rine, and moderate Sweats.
3v, ℥ij, gr. xvj.	Brackish, and of a Ci- tron Colour.	Of a vivid red, with here and there a fizy Speck upon it. Degrees of Co- hesion 43.	On the 7th Day, by turbid Urine, and profuse Sweats.
℥j, gr. xvj.	Very salt, and of a bright yellow flammeous Colour.	A thin white Coat at top, and florid under- neath. Degrees of Cohesion 48.	Died on the 7th Day.
℥j, ℥iij, ℔j.	Brackish, clear, and flammeous.	Of a vivid Co- lour. Degrees of Cohesion 23.	On the 8th and 9th Days, by mo- derate Sweats, and 5 or 6 loose Stools.
℥ij, gr. xiiij.	Very pun- gent, and ex- tremely yel- low.	Of a vivid red. Degrees of Cohesion 26.	On the 10th Day, by Spitting, tur- bid Urine, and swelled Legs.
℥ij, gr. xv.	Quick, fa- line Taste, and of a bilious Colour.	Very florid. Degrees of Co- hesion 56.	On the 11th and 12th Days, by pro- fuse Sweats, tur- bid Urine, and Spitting.

70 *A Statical Examination of the BLOOD,*

<i>The Age of the Per- son.</i>	<i>The Day of the Disease.</i>	<i>The Symptoms.</i>	<i>The Quan- tity of Blood ta- ken away.</i>
A Man aged 26.	1st.	Giddiness, sick Fits, great Incalescence, a strong, full Pulse, Pains in the Head and Back, and clear, limpid U- rine.	℥xiiij, ʒij.
A Woman aged 22.	3d.	Excruciating Pains in the Head and Loins, extreme Thirst, inward Burnings, dry, parched Skin, and strong, full Pulse.	℥xij, ʒj, ʒj.
A Man aged 24.	5th.	A very strong, quick, full Pulse, Vertigo, bilious Vomitings, intense Heat, and unquenchable Thirst.	℥xiiij. gr. xxvj.
A Man aged 46.	2d.	A brown, dry, parched Tongue, Pains in the Head, and Back, general Uneasi- ness, and full Pulse.	℥xij, ʒvj.
A Man aged 21.	4th.	A quick, full Pulse, great Thirst, Pain in the Head, giddy, clear, limpid Urine, and costive.	℥x, ʒij, gr. viij.
A Man aged 38.	2d.	Great Incalescence, ex- treme Thirst, bilious Vo- mitings, a parched Skin, and strong, quick Pulse.	℥xv, ʒij.
A Girl aged 15.	12th.	A Phrenzy, Subsultus Tendinum, a full, labour- ing Pulse, intense Heat, and a parched, brown Crust up- on the Tongue.	℥vi.
A Man aged 36.	13th.	A full, heavy Pulse, lix- ivious Urine, a slight Pain in the Side, a quick and dif- ficult Respiration, a black, parched Tongue, intense Heat, Subsultus Tendinum, and delirious.	℥viiij, ʒj, gr. xvj.

<i>The Quantity of Serum.</i>	<i>The Taste and Colour of the Serum.</i>	<i>The Colour and Consistence of the Crassamentum.</i>	<i>What Days the Crises happen'd, and by what Outlets.</i>
℥iiij, gr. xxxvj.	No Difference to be perceived from healthy Serum.	Of a good Colour. Degrees of Cohesion 22.	On the 6th Day, by 8 or 9 loose Stools.
℥iiij, gr. viij.	Pungent, saline, and straw-coloured.	Exceeding vivid. Degrees of Cohesion 36.	The 8th Day, by Mensium Profluvium, and moderate Sweats.
℥iiij, ℥v, ℔j.	Much more brackish than healthy Serum and deeper-coloured.	Very florid. Degrees of Cohesion 28.	The 11th Day, by profuse Sweats, and thick Sediment in the Urine.
℥iiij, ℥j, gr. xij.	Quick, pungent, and yellow.	A thin, blewish Film at top, and florid underneath. Degr. of Cohesion 33.	The 9th Day, by Spitting, Sweat, and thick, lateritious Sediment in the Urine.
℥ij, ℥iiij. gr. xv.	Saline, and bilious.	Very vivid. Degrees of Cohesion 28.	The 5th Day, by an Hæmorrhage at the Nose, and moderate Sweats on the 6th Day.
℥iiij. ℥iiij. gr. vj.	Pungent, and very yellow.	A delicate red. Degrees of Cohesion 34.	The 7th Day, by profuse Sweat.
℥j. ℥iiij.	Very salt, and of a bright, flameous Colour.	Florid, and without a Speck upon it. Degrees of Cohesion 28.	The 22d and 23d Days, by moderate Sweats, Spitting, and very turbid Urine.
℥ij. gr. xxij.	Exceeding pungent, and of a deep bilious Colour.	A thin Buff-Coat at top, and more dusky than ordinary underneath. Degrees of Cohesion 64.	Died on the 19th Day.

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III. Before we proceed to make any *theoretical* or *practical* Deductions from these Experiments, I beg leave to take notice of the Reasons which induced me to draw away Blood from one Patient on the 12th Day, and from another on the 13th Day of the Disease; especially since I have endeavoured, in the following Pages, to shew the great Usefulness of *Bleeding* in the *Beginning* of this Distemper, and the Danger of doing it towards the *Crisis*. 1st. I was not consulted for either of them 'till those Days on which I drew Blood. 2^{ly}. No Evacuations of any kind had been made before those times. 3^{ly}. As to the *Girl*, it was about the time of Age that we might expect the *Menstruæ Purgationes*; Pains in her Back, Giddiness, Retchings to vomit, &c. preceded this Illness; her Pulse were full and weak, and seemed to struggle for want of room. 4^{ly}. As to the *Man*, the Day before I visited him, he had taken an Ounce of the *Cortex*, his *Apothecary* mistaking a little *Remission*, for a true *Intermission* of the Fever: *Subsultus's*, *intense Heat*, *a difficult Respiration*, and *a slight Pain in the Side* soon followed the use of the *Cortex*; and for these Complaints I found him taking *Bolusses*

lusses of *Lap. Contray. Crocus, Castor. Sal. Vol. Suecin. &c.* By this Treatment, I presume, he became *delirious*, his *Countenance* was *flushed*, his *Tongue* black and dry, his *Urine* extremely high-coloured, his *Pulse* full, heavy and something unequal. These were the *Symptoms*, and these, in my humble Opinion, were sufficient *Indications* for *Phlebotomy*, though so late in the Disease. I must add, that I never saw the Blood stream out so violently, and with so large an *Arch* as it did from the Arm of the Man; and had not my Timidity prevented taking away more Blood, I am persuaded, I had stood a better Chance for the Recovery of my Patient. But to return.

112. From these Experiments it plainly appears, that in *ardent Fevers*, the *red Globules* exceed the Proportion which they ought to bear to the *serous Part* of the Blood: for, according to Mr. Boyle's Experiments and Observations of the Weights of the *Crassamentum* and *Serum*, after they have separated one from another, it appears that the Quantity of *Serum* which may be poured off from the *Crassamentum*, is about *one half* of the whole Mass. And indeed, from Experiments which I have purposely made on
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the Blood of *three young Men* in perfect Health, I find it to be nearly the same; the *Serum* in all three Trials, much exceeding *one Third* of the whole Mass, tho' I can't say that in any of them, it fully arrived to *one half*.

113. Here we may also observe the different Consistence of the *Cruor* in a *febrile* State, from that in Health. The *Degrees of Cohesion* in the Blood of the *three young Men* just mentioned, were 8, 9, 12, or the most viscid of their Blood gave way to the Weight of $1\frac{1}{2}$ Inch of Mercury: whereas we find in the *Tables* above, that the Cohesion of the Globules which constituted the *Crassamentum*, was sometimes equal to a Column of Mercury *seven or eight* Inches in Height.

114. Since therefore the Blood in *acute Fevers* is more than ordinary viscid and tenacious, and contains too great a Quantity of red Globules, notwithstanding the usual, most fluid Excretions are greatly diminished, even from the very Beginning of the Disease; let us enquire by what means this Alteration is most likely to be produced.

115. That accurate Observer of Nature *Leeuwenhoek* has shewn us that the largest
red

red Globules of the Blood are made up of *six* smaller Spheres clustered together in a very regular Manner; and that so nicely, that in a perfect Globule the Composition comes to be imperceptible. He likewise assures us, that he saw Globules in the Blood much less than those which composed the red Globules; whence we may reasonably conclude, there are several Orders of Globules in the Mass of Blood, the smallest of which, if properly united to others, and those again to the largest Order, exhibit red Globules. And on the contrary, the largest Globules may be broken down into their compounding smallest Globules, and by that means come again under the Denomination of *Lymph* or *Serum*.

116. Hence we may conclude, that whatever will dispose the smallest Order of serous Globules to aggregate or unite into larger ones, and those again into such as are still larger, will at last produce red Globules. Now we know of nothing more likely to produce this great Change than strongly attracting, saline, and sulphureous Particles, together with Heat, which invigorates their attractive Power, and thereby greatly con-
duces

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duces towards fixing and uniting the smallest Globules to each other.

117. From what has been said in the preceding Chapter it is evident that most of the *Antecedents* are disposed to charge or impregnate the Blood with saline and sulphureous Matter; and indeed, I can give no other Reason why one Man shall catch Cold, and have a Fever, and another, perhaps, shall have the perspiratory Ducts more fully stopt, and yet have only a serous Defluxion on the *Nose, Eyes, Lungs, &c.* but because in one the Blood is more impregnated, by an intemperate Use of the *Non-Naturals*, with saline and sulphureous Particles, than in the other; and for that Reason the Juices are more likely to become hot, acrid, and grumous, fit for the Production of a Fever.

118. To be a little more explicit: Let us reflect on the different States of the Blood under different Diseases; e. g. in the *Leucophlegmatia, Anasarca, Ascites*, and indeed in all Distempers where the vital Powers are depressed, the Pulse weak, low, and slow, and the Heat of the Body is much below the natural Standard; here, I say, we may observe how very apt the Globules of the higher Order are to lose their Contexture, and to
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be broken down into the smaller compounding Globules, so as to increase the Quantity of *Serum*. Whereas in *ardent Fevers*, where the saline and sulphureous Particles abound too much, where the vital Heat is augmented above the healthful Standard, and all the Powers of the Body exert themselves to the greatest Degree; there we may observe the smallest compounding Globules intimately united into larger ones, whereby the red Globules increase, and the whole sanguineous Mass becomes more dense, heavy, viscid, and tenacious.

119. Hence we have good reason to conclude, that the most necessary Requisites towards forming of red Globules in the Blood, and causing these red Globules to coalesce, are a certain Proportion of saline and sulphureous Particles, and a certain Degree of Motion and Heat; whereby the constitutive Parts of the Blood are made to attract each other more vehemently.

120. *Heat*, which coagulates the *White of an Egg*, has not its Effect merely by evaporating the most fluid Part, and thereby suffering the other Parts to approach nearer and nearer to each other; but it performs this sudden and wonderful Change by increasing

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creasing the attracting Power of the saline and sulphureous Particles, whereby the smaller Order of Globules run into each other, and form larger ones; and these again join with others 'till the whole Mass is consolidated.

121. Thus it is with the Blood; a proper Quantity of saline and sulphureous Matter, and a moderate Degree of Heat are perfectly necessary towards maintaining a natural and healthy *Crafsis*; but whenever they are increased above, or decreased below the natural Standard either in regard to their Quantity, or Motion, the Blood will become too grumous, and florid, or too thin, limpid, and pale.

122. In regard to the Action of the Vessels; if they have any share in compressing and uniting the serous pellucid Globules of the Blood, and forming them into red Globules, we may reasonably conclude that in *ardent, continual Fevers*, where the Action of the whole vascular System is greatly increased, the Globules will be most of all compacted and joined together.

123. From the whole it appears highly reasonable to believe, that a mere *Plethora* of languid, inert, unactive Matter, is not the
Foun-

Foundation of *ardent Fevers*; but that the Blood, at such times, is too plentifully stored with acrid, sharp, irritating, strongly attracting, saline, and sulphureous Particles. However, that nothing may be wanting towards investigating the true Causes of this Disease, I have thought it worth while to separate the constitutive Parts, or Principles of the Blood, and to take a just Estimate of their several Proportions.

124. By proper Distillations, and the Force of Fire, we may compel Nature to an Account; and though the Bulk and Figuration of the saline and sulphureous Parts are undoubtedly much altered and commuted by the Action of Fire; yet the Proportions of the several Principles of the Blood are not increased or diminished thereby; and consequently by carefully separating and weighing them, and seeing the several Proportions they bear to each other, we may arrive at a Knowledge very useful in accounting for some of the *Phænomena* of Diseases, and directing us to a right Method of Cure. It is satisfying and useful as well as curious, to reduce to Measure and Weight the constituent Parts of the Blood; and I am persuaded,

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no inquisitive Person will judge it a vain Undertaking.

A Chemical Analysis of the BLOOD, both in HEALTH and in ardent FEVERS.

EXP. I.

125. *Eight Ounces* of Blood, taken from a young Man in perfect Health, and distilled in the same Manner, and with the same *Apparatus* above mentioned, afforded as follows:

	Ounc.	Dr.	Grains.
1. Lymph ———	vi.	iiij.	xxxxv.
2. Volatile Salt —			xxxviij.
3. Oil ———			Lij.
4. Cap. Mort. before } Calcin. ——— }		vij.	xxv.
5. Cap. Mort. after } Calcin. ——— }		ij.	x.
6. Fixed Salt ———			v.

126. The first three or four Ounces of *Lymph* seemed to contain but little *volatile Salt or Oil*, it not being fetid or disagreeable either in Taste or Smell; neither did it fer-

to an acute continual FEVER. 81
 ment strongly with *Acids*: but the latter
 Part was highly impregnated therewith,
 and fermented violently with *Oil of Vitriol*,
 made a white Precipitate with *Solution of*
Sublimate, and turned *Syrup of Violets* green.

EXP. II.

127. From *eight Ounces* of Blood, drawn
 from a Man, *fifty Years* of Age, in perfect
 Health, something corpulent, and one who
 indulged in good Eating and Drinking,
 without using much Exercise, I obtained,

	Ounc.	Dr.	Grains.
1. Lymph ———	vj.	iiij.	xxv.
2. Volatile Salt —			xxxxvj.
3. Oil ———		i.	xij.
4. Cap. Mort. before } Calcin. ——— }		vij.	xxxvij.
5. Cap. Mort. after } Calcin. ——— }		iiij.	xv.
6. Fixed Salt ———			vij.

128. Two Grains of the *fixed Salt* being
 laid upon a Piece of clean Glafs, I dropt
 upon it one Drop of *Oil of Vitriol*, from
 whence arose a violent Fermentation, and a
 white, pungent Fume.

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129. Four Grains of the same Salt being dissolved in two Ounces of Rain-Water, I added to it four Drops of a Solution of *Silver* in *Aqua Fortis*, which caused a manifest Milkiness, and evidently discovered the fixed Matter to be *Sea-Salt*; for no other Salt produces a white Fume with Oil of Vitriol, or a white Cloudiness with a Solution of Silver.

EXP. III.

130. *Eight Ounces* of Blood extracted from a Man, on the *second Day* of an *intense burning Fever*, afforded,

	Ounc.	Dr.	Grains.
1. Lymph ———	vj.	iiij.	vj.
2. Volatile Salt —		i.	v.
3. Oil. ———		i.	xxxij.
4. Cap. Mort. before } Calcin. ——— }		vij.	xxvij.
5. Cap. Mort. after } Calcin. ——— }		ij.	xxxxv.
6. Fixed Salt ———			iiijfs.

EXP. IV.

131. *Eight Ounces* of Blood drawn from a Man of a robust Constitution, on the 4th Day of a most *acute Fever*, afforded,

1 Lymph

	Ounc.	Dr.	Grains.
1. Lymph ———	vj.	ij.	xxvij.
2. Volatile Salt ———		i.	xxxij.
3. Oil ———		i.	xxvij.
4. Cap. Mort. before } Calcin. }		vij.	Lvj.
5. Cap. Mort. after } Calcin. }		ij.	Liiij.
6. Fixed Salt ———			vj.

132. The fixed Salt in these Experiments exhibited the same *Phænomena*, with that in the preceding ones.

133. The Lymph in the two last Processes seemed to be more strongly charged with volatile Salt and Oil, than the others, and fermented more violently with Acids.

134. These were the Proportions of the several Principles which the sanguineous Mass afforded us by the most careful Distillation, &c. Whence it is evident, that the saline and sulphureous Parts did abound more in those seized with *acute Fevers*, than in those in *Health*: But as the Experiments may be thought too few to deduce any practical Inferences from, we shall stop here, 'till we have had an Opportunity of

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examining more particularly into this Affair. Proceed we therefore, to the other *Symptoms* of this Disease.

135. VII. *Pains* in the *Head*, *Back*, &c: arise from too great Distress or Extension of the Vessels; for as all Pain proceeds from some Violence offered to the Nerves, either by too great Contraction of the Fibres, as in Spasms or Cramps; or by an over Distension of the Fibres from Plenitude; or from some acrid, pungent, corrosive Matter irritating and corroding the Extremities of the Nerves; and since both the Quantity and Velocity of the Blood are mightily increased in *acute Fevers*, there must consequently be more Blood contained in each Section of a Vessel than what is common; and as every such Distension is in some measure a Solution of Continuity, it must of course excite *Pains*, and those chiefly in the *Head*, *Back*, and *Loins*, because there the Muscles do not support the Blood-Vessels and resist the Expansion of the boiling Humours, as in other Parts of the Body.

136. VIII. *Vomitings* commonly happen in the beginning of this Disease; from too great a Quantity of *Bile*, *Pituit*, and *indigested Matter* lying in the *first Passages*, and fret-

fretting them into frequent, and violent contractile Motions. By incessant Vomiting fresh Bile or Choler is pumped up by the inverted Motion of the *Duodenum*, which gives a yellow Colour, and a bitter Taste to what is vomited up. And at other Times, some *subacid* Juices, from the *Pancreas* and neighbouring Glands, are brought up, which give a greenish Tincture to the *Gastric Juice*, or what is contained in the Stomach.

137. The *Bile* is an unctuous saponaceous Liquor, which may be altered from a mild, useful Fluid, into one of a pungent, corrosive, pernicious Nature, merely by the Heat of the Body; especially if it happens to be confined, or lie stagnant for some time in the *Primæ Viæ*, and therefore ought always to be suspected in the Beginning of *ardent Fevers*.

138. IX. *The unquenchable Thirst* so much complained of in Fevers, arises partly from the Viscidity and rapid Motion of the Blood, which is an Enemy to Secretion; partly from the Tension, or too contractile State of the secretory and excretory Ducts; and partly from the extreme Heat of the Body, which soon evaporates the most fluid Part of that little which is secreted; so that the

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Tongue is discoloured with the Refidue of it, and its Fibres are left stiff and dry.

139. X. *The Breath is short.* If we consider the Reason why People grow short-breathed by violent Exercise, as Running, &c. viz. by virtue of the Blood being more forcibly impelled into the Lungs, and accumulated in the *Pulmonary* Artery and Vein, we may reasonably conclude that in a *Fever*, where the Quantity and Velocity of the Blood are greatly augmented, the short and difficult Respiration arises from the same Cause. The Impulse or *Momentum* of the Blood, when the Pulses are vastly accelerated and strong, seems to be sufficient to keep the Lungs in a greater Degree of Distension than what is natural, and by that means will not suffer them to subside so much as usual in Expiration: Hence, as this Dilatation of the Lungs proceeds merely from the Force of the Blood in the pulmonary Artery and Vein, it evidently appears that the little Air-Bladders or Vesicles, which are situated immediately between these Blood-Vessels, will be greatly compressed, and Inspiration rendered difficult. But notwithstanding the Impetus of the Blood in the pulmonary Artery is greatly in-

increased, it is not self-sufficient to expand the Lungs enough to promote a free Passage through the *Arteriolæ*, and consequently a quick Respiration is perfectly necessary to unfold the corrugated Extremities of the Arteries and Veins, and to let the impetuous, boiling Blood pass through them in proportion as it is derived from the Heart. Add to this, that since the Blood, in ardent Fevers, abounds too much with red Globules, its Passage through the minuteſt ſanguine Arteries of the Lungs may be ſomething retarded, by which means alſo Respiration may be more difficult.

140. XI. The *Urine* is but little in Quantity; ſometimes it is very flammeous or high-coloured; and at others limpid, clear, and pale.

141. The *Kidneys* are an Organ deſigned by Nature to throw out of the Body a recrementitious Liquor, which in Health is ſtraw-coloured, or of a pale yellow, and contains little or no Sediment, or feculent Matter; being in effect a *Lixivium*, in which a Portion of the animal Salts and Oil is diſſolved and waſhed away. If therefore, as we have Reason to believe, the ſecretory Ducts of the Kidneys are more than

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ordinarily contracted, in an *acute Fever*, either by the sharp, acrid Salts and Oil stimulating them as they pass along, or else by the general Tension of the Vessels at that time; or if the Union or Attraction between the ferous and globular Parts of the Blood is so strong as not to be separated by the *renal Tubuli*, we have a manifest Reason for the small Quantity of Urine.

142. Another Cause indeed, may be the Velocity of the Fluids; for a strong and swift Circulation is an Hindrance to all Secretions, by reason they are performed by lateral Branches going off at or near right Angles, and consequently a swift Circulation or Motion along or parallel to the *Axis*, carries along with it what should be laterally secerned.

143. As to the *Colour of the Urine*, that depends upon the Quantity of *oily* or *sulphureous* Particles wherewith it is impregnated; it being well known that Oil or Sulphur is the Cause of all Colours in Liquors, since neither pure Salt, pure Water, nor pure Earth can communicate any Colour at all. Add to this, that *Oil* gives the deeper Colour, the more it is attenuated and exalted by Heat and Motion. And again, when the
in-

increased Heat of the Body hath exalted the most fluid, aqueous Particles of the Blood, the Urine may become higher coloured, or intensely red, by the Proximity of the sulphureous Particles.

144. Hence we sometimes meet with Urine so saturated with *oily, saline, and terrene* Particles, as to be a perfect *Lixivium*; and at other times, when the Salts and Oil are not determined to the Bladder along with the Urine; that is, when the Fibres of the Kidneys are over and above contracted, or the Salts and Oil are not attenuated and divided enough to suit the Orifices of the fecerning Ducts, the Urine is as limpid and clear as common Water. The former of these argues an *inflammatory* Disposition of some of the inner *Viscera*; and the latter threatens *Deliria*, and *Convulsions*, as we shall shew hereafter.

145. The *rank, fetid Smell* which oftentimes attends the Urine of Persons in *ardent Fevers*, proceeds from the Salts being volatilized and rendered alkaline, and the Oil tending towards Putrefaction: all which is repugnant to the natural State of the Fluids.

146. Towards the *Crises* of *Fevers*, when the saline, sulphureous, and terrene Particles
are

are attenuated and ground fine enough to pass through the *renal Tubuli*, the Urine is loaded with Contents, and lets fall a thick *Hypostasis*, or turbid Sediment, after it has stood some time.

147. Since therefore the Urine, by its several Contents and Appearances, furnishes us with *Signs* as well *diagnostic*, as *prognostic*, it ought to be inspected every day, in order to deduce our *curative Indications*, or to make our *medical Prediction* with greater Certainty; either from the *Nubes* at the top, the *Eneoræma* suspended as it were in the middle, or the *Hypostasis* or *Sedimentum* subsided to the bottom: The last of which is the best Indication of a kindly and regular Concoction.

148. Thus by daily inspecting the Urine, we are taught the State and Progress of the Disease; and thereby enabled not only to make our Prediction, but we are also greatly directed thereby in our medicinal Practice, *Hippocrates* laid great stress upon his Observations on the Urine. And our own Countryman *Willis* is so sanguine as to tell us, that the *Acidulæ* or Spaw-Waters do not more certainly shew the Nature of the hidden Mine, through which they are strained, than

than Urines give Testification of the divers Manners of Dyscrasies of our Bodies and their Habitudes.

149. If therefore a bare Inspection of Urines is of such advantage towards investigating the Nature, State, Progress, and Cure of Diseases; most certainly the *natural History* of it, or a more curious Search into the Contents of the Urine, in every Period of the Disease, will be of more moment in discovering the several *Dyscrasies* of the Blood, and in indicating the *Method of Cure*, than what we can meet with in the *Urinal* only. For this Reason I thought it worth while to make the following Experiments, that by an exact *Analysis* we might see the different Contents of the Urine, and the various Proportions of its Principles, in the several Stages of this Disease.

*A Chemical Analysis of the URINE,
both in HEALTH, and in acute
FEVERS.*

EXP. I.

150. I took all the Urine that was made in the space of *twenty four* Hours, by a
Man,

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Man, *thirty five* Years of Age, in perfect Health, and of a regular Life; and shaking it together, I weighed out *two Pound*, and distilled it after the same Manner, and with the same *Apparatus* above mentioned. By these Means I gained,

	Ounc.	Dr.	Grains.
1. Lymph —	xxx	vij	ij.
2. Volatile Salt —		ij	xviiij.
3. Oil —			xxxij.
4. Cap. Mort. before } Calcin. ————— }		iiij	xvij.
5. Cap. Mort. after } Calcin. ————— }		i	xxxxiiij.
6. Fixed Salt —			xxxij.

151. The greatest Part of the Lymph was pellucid, insipid, and inodorous, and exhibited no Signs of an *Acid* or an *Alkali*; but the latter Part was very strong and offensive, and fermented violently with *Oil of Vitriol*, made a white Precipitate with *Solution of Sublimate*, and turned *Syrup of Violets* green.

152. When the volatile Salt first began to rise, it shot all over the *Glass-Head* and *Recipient* into most beautiful Crystals: some
of

of which resembled fine Boughs, or Feathers; whilst others radiating from a Point or Centre, formed Stars or Roses of various Sizes.

153. When the *volatile Oil* was mixed with an *Acid*, a stinking Vapour arose, which smelt like a nasty Corner where People have pissed for a long time.

154. I repeated this Experiment three times, but as there was no material Alteration either in the Quantity or Quality of any of the Principles, it would be encroaching upon the Patience of the Reader to insert those Processes; and as this was the Mean between the other two, I have chose it for the Standard of healthy Urine, whereby we may judge of all Variations from it.

EXP. II.

155. *A young Lad*, ten Years old, being seized with an *acute Fever*, attended with a *Phrensy*, *Subsultus's*, and many other dangerous Symptoms; it continued 'till the *eighth Day*, on which moderate Sweats broke forth, and the Urine let fall a vast *Hypostasis*.

156. All the Urine which was made on the 8th and 9th Days, being saved by my
1 Order,

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Order, it amounted exactly to *two Pound* ; which being committed to the Still, and treated as in the former Experiments, it afforded,

	Ounc. Dr. Grains.		
1. Lymph ———	xxx	ij	
2. Volatile Salt —		v	xxxxvj.
3. Oil ———		i	xxiiij.
4. Cap. Mort. before } Calcin. }		v	iiij.
5. Cap. Mort. after } Calcin. }		i	Lvj.
6. Fixed Salt —			xxxxiiij.

157. Hence we may not only observe a great Difference between the Contents of healthy Urine, and that made at the *Crisis* of a Fever ; but we plainly see the Reason of the vast Advantages which generally accrue when the Urine is loaded with Contents, and lets fall a thick and turbid Sediment : For we have good Reason to believe from this Experiment, that the greatest Part of the *Hypostasis* consisted of *saline* and *sulphureous* Particles, which, whilst in the Blood, irritated the Vessels, and increased the Fever.

158. The Lymph also seemed to be much stronger in this than in the former Experiment; and as it contained more volatile Salt and Oil, it fermented more violently, and smelt stronger when mixed with *Oil of Vi-*
triol.

EXP. III.

159. *A young Woman, 17 Years of Age,* lay ill of an *ardent Fever*, and from the 10th to the 15th Day, the Urine came away involuntarily; so that none could be saved except about a Spoonful of limpid, clear Water on the 12th Day, at which time she was raving, gathered up the Bed-Clothes, caught at imaginary Flies, &c. On the 13th and 14th she lay comatose. The 15th she raved again, had strong *Subsultus's*, and a black, parched Tongue. On this and the next Day, we saved *eight Ounces* of Urine, which was something deeper coloured than a Citron, smelt strong, and had a very thin, bright Cloud swimming in the middle. This Urine being distilled as above, we procured,

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	Ounc.	Dr.	Grains.
1. Lymph ———	vij.	v.	
2. Volatile Salt ———			xxxx.
3. Oil ———			xxxij.
4. Cap. Mort. before } Calcin. }		i.	vj.
5. Cap. Mort. after } Calcin. }			xxj.
6. Fixed Salt ———			iiij.

EXP. IV.

160. The dreadful Symptoms which attended this poor young Woman on the 15th and 16th Days, were something alleviated on the 17th, by a gentle breathing Sweat, which happened that Morning; but the *Remission* was very short, a *Rigor* succeeded, and the Fever seemed to return with greater Violence than ever. All that Night she raved much. The next Day, *viz.* the 18th, I found her delirious, with frequent Catchings of the Tendons, and her Pulse so extremely quick as scarce to be counted.

161. *Nine Ounces* of Urine being saved on the 17th and 18th Days, I distilled *eight Ounces* of it, and obtained,

1 Lymph

	Ounc.	Dr.	Grains.
1. Lymph ———	vij	iiij	XXXXV.
2. Volatile Salt —			XXXXVIIj
3. Oil ———			XXXIIij.
4. Cap. Mort. before } Calcin. ——— }		i	x.
5. Cap. Mort. after } Calcin. ——— }			XXIIj.
6. Fixed Salt ———			IIj.

162. It may be proper to observe, that about four Ounces of this Urine, which was made during the little Remission of the Fever, was highly red at first; afterwards it grew thick and cloudy, and the next Morning it had a laudable *Hypostasis* subsided to the bottom. The other Part was much the same with that of the former Process.

163. Having one Ounce of Urine to spare, and it smelling exceeding rancid and strong, though the Glasses were very clean in which it was contained; I thought it worth while to try if I could possibly discover any *alkaline* Property in this Urine, before the Fire had any share in it: and accordingly I divided it into four equal Parts; to the *first* I let fall some *Solution of Sublimate*, which made

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no Alteration in it; to the *second* I dropt in some *Solution of Alum*, which also lay very quiet; to the *third* I added *Oil of Vitriol*, which manifestly gathered together, and collected the groffer thicker Contents of the Urine (which, by shaking the Bottle before we weighed out what was distilled, were equally scattered all over, so as to render it of an even turbid Colour) into little Rags, and left the Interstices clear. With the *fourth* I mixed *Oil of Tartar*, which immediately dispersed the Thickness or Muddiness, and rendered it clear and almost of a Straw-Colour.

164. Hence it is evident, that though the Urine was not alkaline enough to raise a visible Fermentation with Acids; yet as the saline and oleaginous Particles were undoubtedly attracted and collected together by *Oil of Vitriol*, and repelled and dispersed by *Oil of Tartar*, we may reasonably conclude that the prodigious Heat of the Body had exalted the animal Salts and Oil to an *alkalescent* State: For this was the most intense Fever I ever met with, and as the Heat had been continued for *eighteen* Days, I am persuaded it might be the Cause of these *Phænomena*.

EXP. V.

165. On the 19th Day of this young Woman's Illness, we had a Remission for four Hours; during which time she came to her Senses, drank plentifully, her Tendons were quiet, her Pulse regular, in comparison to what they had been, and by the assistance of a *Clyster* we procured two Stools. In the Evening the *Rigor* returned, though not with so much Vehemence as on the 17th. The *Fever*, *Delirium*, *Subsultus Tendinum*, &c. soon succeeded, so that the Night was passed with great Inquietude. On the 20th, in the Morning, she had two Hours Sleep, which greatly refreshed her, and slacken'd the Pulse, both in their Hardness and Velocity. She now began to spit a good deal of frothy Matter; her Skin felt smoother and softer than it had done before; and the Urine on both these Days was loaded with Contents, and let fall a very thick *Hypostasis*. Eight Ounces of this Urine afforded,

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	Ounc.	Dr.	Grains.
1. Lymph —	vij.	iiij.	xxxij.
2. Volatile Salt —		i.	xxxviij.
3. Oil —			Liiij.
4. Cap. Mort. before } Calcin. ————— }		i.	xij.
5. Cap. Mort. after } Calcin. ————— }			xxvj.
6. Fixed Salt —			vls.

166. Having mentioned in the former Experiment, that *Oil of Vitriol* plainly collected, and *Oil of Tartar* as manifestly dispersed the turbid Parts of the Urine, I was induced to try it again with some of this Urine, before Distillation; because it seemed to be more impregnated with volatile Salts and Oil, and consequently it might exhibit the *Phænomena* more plainly. Accordingly I dropt a few Drops of *Oil of Vitriol* into an Ounce of it, from whence a thin white Froth arose to the top of the Mixture, whilst the grosser Contents run together, and after some time subsided to the bottom. The Ferment, indeed, was but weak, however it was enough to discover, to any unprejudiced Person, an *alkaline* Matter in the Urine.

I must confess indeed, I have repeated this Experiment a great many times on the Urine of other Persons in *ardent Fevers*, and never could observe the same Appearances; but, as I said before, since all the Vessels which received this Urine were very clean, and since the Heat was most extreme, as well as of very long continuance, I am positively sure the *Phænomena* proceeded from an alkaline Disposition in the Urine.

EXP. VI.

167. On the 20th Night this young Woman slept well. The next Morning I found her greatly refreshed, though not free from the Fever. All that Day, and the next she continued mending; she spit much, had little breathing Sweats, and a Multitude of Contents in the Urine. All the Urine she made on the 21st and 22d Days being mixed together, and shook, in order to disperse the Contents equally, I distilled *eight Ounces*, and obtained,

	<i>Ounc. Dr. Grains.</i>		
1. Lymph ———	vij.	iiij.	xx.
2. Volatile Salt ———		i.	xxxxij.
3. Oil ———		i.	viiij.
4. Cap. Mort. before } Calcin. }			Liiij.
5. Cap. Mort. after } Calcin. }			xxix.
6. Fixed Salt ———			iiij.

EX P. VII.

168. The critical Evacuations, by Sweat, Urine, and Spit, continuing on the 23d and 24th Days, my Patient was past all Danger; she slept quietly, and only complained of great Lassitude and Faintness: But as the Urine on these two Days continued to be very turbid and thick, I was invited to pursue my Enquiry, and from *eight Ounces* I procured,

	<i>Ounc. Dr. Grains.</i>		
1. Lymph ———	vij.	iiij.	v.
2. Volatile Salt ———		i.	xv.
3. Oil ———			Lvj.
4. Cap. Mort. before } Calcin. }			Lviiij.
5. Cap. Mort. after } Calcin. }			xxvj.
6. Fixed Salt ———			iiij.

169. The *Oil*, and latter Part of the *Plegm*, or *Spirit*, which came over in this Process, being left in the Recipient all Night, I found the next Morning, several large and beautiful *Crystals* shot from them, some of which were as large, and much resembled the crystal Stones used for mourning Rings.

170. From these five last Experiments we may plainly observe, that the *Urine* became more and more impregnated with *saline* and *sulphureous* Parts in proportion to the Abatement of the bad Symptoms; 'till at the *Crisis* it contained more than double the Quantity it did at first. Hence the several Organs of the Body were vastly relieved, their Tension was abated, the Blood grew polite and smooth, and the Cohesion between the several Orders of Blood-Globules grew less and less, by a constant Diminution of the Quantity of strongly attracting, acrid, irritating, saline, and sulphureous Particles.

EXP. VIII.

171. A young Man, on the 6th Day of an *acute Fever*, made exceeding limpid, clear, and pale *Urine*, which was soon followed with a *Phrensy*, *Subsultus Tendinum*, and other dangerous Symptoms. From eight Ounces of this *Urine* I obtained,

H 4

1 Lymph

	Ounc.	Dr.	Grains.
1. Lymph ———	vij.	v	xxxxvij
2. Volatile Salt ———			xij.
3. Oil ———			xix.
4. Cap. Mort. before Calcin. }			xxxxiiij
5. Cap. Mort. after Calcin. }			xxiiij.
6. Fixed Salt ———			ijfs.

172. It is an old Observation, founded on Experience, that if the Urine changes suddenly from a deeper Colour, to a crude Paleness without a Sediment, towards the Height of a Fever, it is the Forerunner of some fatal *Metastasis*, as of *Deliria*, *Convulsions*, &c. And here, in this Experiment, we have plain Demonstration of the Cause of it; *viz.* Because the animal Salts and Oils are not determined to the Bladder along with the Urine, but are accumulated in the Blood, and irritate the *Meninges*, and delicate *Fibrillæ* of the Brain, increase the *Lentor* in the Blood and Lymph, and generate Obstructions.

EXP. IX.

173. On the *tenth* Day, the Urine of this young Man grew exceeding turbid, with an even white *Hypostasis* at the bottom, and all the bad Symptoms vanished. *Eight Ounces* of this Urine afforded,

	Ounc.	Dr.	Grains.
1. Lymph ———	vij.	ij.	xxxij.
2. Volatile Salt —		i.	xxxxv.
3. Oil ———		i.	vj.
4. Cap. Mort. before } Calcin. }			xxxxvij
5. Cap. Mort. after } Calcin. }			xxij.
6. Fixed Salt —			vj.

174. Here again we have manifest Proof of what vast Advantage it is to the animal Oeconomy, to have the *Salts* and *Oils* properly attenuated, diluted, and drained off from the Blood, by the secerning *Tubuli* of the Kidneys.

175. Thus in the most natural way of *analysing* the Urine, without Fermentation or Putrefaction, or without the Addition of any suspicious *Analyser*, we have separated

rated the several constitutive Parts of Urine; whereby we have evidently demonstrated that the *Urine* in *Fevers* abounds more with *saline* and *sulphureous* Particles than it does in Health; and especially towards the *Crisis*, when the Salts and Oils are sufficiently attenuated, ground, and comminuted, it is loaded with a multitude of Contents which gives great Relief to the Sick: But when it is pellucid, pale, and clear, and continues so for some time, it is a very dangerous *Phænomenon*, and requires the utmost Skill and Diligence to remove it. I shall only add, that the fixed Salt in all these Experiments, appeared, by the strictest Trials with Oil of Vitriol, and a Solution of Silver, to be Sea-salt. Proceed we now to other Symptoms.

176. XII. *The Countenance is flushed and inflated; the Eyes look bright, and seem to start out further than usual.* If we consider that the *Cheeks* are most plentifully stored with capillary, sanguine, and lymphatic Arteries, as is evident in Blushing, it will obviously appear that whenever these Vessels are more than ordinarily distended and tumid with Blood, the Countenance will be flushed and inflated; and for the same Reason, and the great Tension of the Vessels, the Eyes shine,

shine, and seem to protrude further than usual.

177. XIII. *There is a total Loss of Appetite.* In many Places we have already expressed our Admiration of the most excellent Machinery and Contrivance of the human Body ; which is so wonderfully formed and put together, that each Part conspires to the Preservation of the Whole, and *secondary* Uses are allotted to most of the chief Springs and Movements : But in no one Part of the Body is the great Wisdom of the *Creator* more manifest than in the Stomach and Parts belonging to Digestion, which are most admirably contrived both to excite the Appetite, and to concoct the Aliment ; and yet, in a *Plethoric* State, where the Blood-Vessels are already too full, and *Eating* would consequently do much mischief, there the Appetite is generally palled. Thus in a *Fever*, where all *Flesh-Meats*, or solid Aliment, would inevitably heighten the Disease, and destroy the Body ; there the Secretion of the proper *Menstruum* or *Dissolvent* is interrupted, and for want of this Irritation, and from the Pressure of the distended Blood-Vessels on the Nerves, the
Stomach

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Stomach seems to be full, and loaths every thing but cooling, and diluting Liquors.

178. XIV. *Immoderate Watchings* are generally very tedious to People labouring under this Disease, and arise chiefly from an unusual Contraction or Tension of the *Meninges* and nervous *Fibrillæ* of the Brain. Or it may proceed from the first Beginning of an Inflammation on the Membranes: whence a Relaxation proper for Sleep cannot be procured.

179. XV. A *Phrensy* arises from a general Plenitude of the Vessels, and the Acrimony of the *animal Salts* and *Oils*, which towards the *Height* of the Disease are rendered acrid, sharp, and irritating, so as to prick and wound the delicate tender Vessels of the *Cerebrum* and *Cerebellum*. Hence the *Ideas* are hindered from being communicated to the common *Sensorium* in a regular manner, and consequently the Discourse of such a Person must be irrational and inconsistent.

180. XVI. The Thoughts being in the utmost Confusion and Hurry, and every Muscle in the Body ready for immediate Contraction, the *Patient eats or drinks any thing very greedily, and sometimes requires three or four Men to hold him in Bed*; both
which,

which, Experience hath taught us to be very dangerous Symptoms.

181. XVII. The Pulse continuing to beat quicker both in the Stroke and in the Time, and no Excretions being forwarded in due Order, the *Arteriolæ* oftentimes burst, either in the *Nose*, *Uterus*, &c. from mere Plenitude, and Violence of Motion: whence large *Hæmorrhagies* sometimes ensue, to the great Relief of the Patient.

182. XVIII. *Petechiæ* sometimes break out upon the Skin by reason of the extreme Velocity of the Blood's Motion, or from the unseasonable Use of strong *Sudorifics* and *Cordials*; which violently agitate and fuse the Blood, divide the *Globuli*, and dispose some of its Parts to get into improper Vessels: for when one Globule is divided into two or three, they then may be capable of entering into the lymphatic Arteries of the Skin, which before would not receive nor admit them when only one; and as these divided red Globules are still too large to pass the Pores, they will stick in the excretory Ducts of the subcutaneous Glands, and form *Petechial Spots*.

183. XIX. *Rank, fetid, ungrateful Sweats* commonly arise towards the Decline of *ardent*

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dent Fevers. It is generally thought that one great use of the *fat, oily Globules* deposited in the *Cells* of the *Membrana adiposa*, is to be reassumed into the Mass of Blood, and to correct and blunt any acrid, sharp, irritating Particles which may happen to get into the Blood. In most Diseases we may observe the *adipose Cells* to empty apace; and particularly in acute Fevers the Heat not only melts down the fat *Globuli*, but it renders them, if continued long, *acrid*, and *alkaline*: whence we may with good Reason conclude, that the rancid, strong, offensive Sweats proceed chiefly from the oleaginous Particles being exalted and volatilized.

184. XX. If some favourable Turn, or a *Crisis* should not happen in a reasonable time, the Humours will corrupt and grow putrid, the Spring of the Fibres will decay, the vital Heat will languish, the Circulation of all the Fluids will grow feeble, and then the most grievous Symptoms of all will be introduced; *viz. a Coma, Subsultus Tendinum, Singultus, cold and clammy Sweats, and a quick, low, intermitting Pulse.* For as the Blood, at this time, runs into thick Grumes and Clots, Obstructions will multiply

tiplied in every Part, and those in the Brain will render the Person comatose, as well as interrupt the Secretion of animal Spirits. From a Paucity of Spirits arise involuntary Twitchings in many Parts of the Body; and as the Contraction of every Organ is now extremely weak and irregular, the Pulse are low and intermit. *Lastly*, The excretory Ducts of the *miliary* Glands being greatly relaxed, a profuse Sweat breaks forth, which is cold, by reason of the slow Motion of the Blood; and clammy, because very viscid Matter is now capable of passing the Pores of the Skin.

185. These are the Symptoms which are generally observed to precede Death; for since such a Relaxation or Weakness of the vital Powers, as is capable of producing these direful *Phænomena*, cannot rationally be supposed to happen 'till there is the greatest Deficiency of animal Spirits, or 'till the *Vis Vitæ* is vastly decayed; so it is almost impossible for one in such a Case to recover: The Circulation must necessarily stop, and the Vessels collapse.

186. Thus we have endeavoured to explain the Nature of this Disease, as far as the *antecedent Causes* and *Symptoms* are obvious

to our Senses, and deducible from *mechanic Principles*; but we are far from imagining that every thing is explored that ought to be known: there are many things yet in the Dark, and some, perhaps, which will ever be beyond the Reach of our finite Capacities. However, we are not to be discouraged from seeking after them, because we don't know but a proper Series of accurate Experiments, attended with diligent Observations, may disclose every thing that is necessary towards the *Cure*; to which we now proceed.



188. There is nothing conduces so much towards forming a right Judgment in curing Diseases, as an exact Observance of their *natural Phænomena*; and to investigate from what Sources they spring, after what manner they arise, and what it is that supports them.

them

them at such and such Heights. Hence it is universally acknowledged, that the *true curative Indications* are to be taken either by diligently observing the Method which *Nature* commonly makes use of, to free her self from the Enemy; or else by making our selves perfect Masters of the *specific Cause* of the Disorder. Since therefore we have taken great pains in delineating all these Things, in the above written *natural History* of this Disease, we flatter our selves, that our *Method of Cure* is deduced from self-evident Principles, and that it will be highly useful and instructive to *young Beginners*, because it is most obvious and easy.

189. From the *Principles* laid down in the preceding Chapters, it may readily be conceived that all the bad Symptoms of this Disease arise from the Blood and Humours being too *viscous* and *thick*, and too fully impregnated with *saline* and *sulphureous* Particles; whence the Course of the Blood is rendered more difficult through the minutest *Tubuli*; the Excretions by *Perspiration*, *Sweat*, *Urine*, *Stool*, &c. are diminished; too much Blood is accumulated in the more patent and pervious Canals; the Vessels grow too strict and tense; the Circulation be-

comes too quick ; and all the Humours, by their impetuous Motion, acquire a much greater degree of Heat and Acrimony than what is natural or consistent with the well-being of the animal Oeconomy.

190. The *Cure*, therefore, manifestly, consists in lessening the Quantity of Blood ; in attenuating, dissolving, and diluting the viscid, glutinous Juices ; in rendering the Fibres of the several Parts of the Body more supple and flexible, particularly those which surround the secretory and excretory Ducts ; in diminishing the too active and disproportioned Force with which the Blood is impelled against the Sides of the Vessels ; and in sheathing, subjugating, and destroying all acrid, sharp, irritating Particles, abounding in the Blood and Humours.

191. In order to do these Things, we are convinced by Reason as well as innumerable Instances which daily Experience furnishes us with, that *Bleeding* is the first Remedy : For though it may be remarked that Bleeding during its performance increases the Blood's Velocity, especially in the Canal which is cut, and its corresponding Arteries ; yet such an Augmentation quickly ceases, and a slower Motion is soon the Conse-

quence of the Blood's Diminution in Quantity. Besides, when the Vessels are in some degree emptied by Bleeding, there being then a less Quantity of Blood in the Arteries and Veins, and consequently a less Quantity passing in equal Times through the Heart, it finds proportionably less Resistance from the precedent Blood; whence an Abatement in the Vigour of the Pulse. And it must be confessed, that since diminishing the Quantity of Blood reduces the Force of it, so it increases the Softness of the Flesh and the Laxity of the Vessels.

192. Dr. Lobb, in his *Rational Methods of curing Fevers*, has evidently demonstrated the ill Effects of taking away Blood where there is no real *Plethora*, or where the red Globules bear too small a Proportion to the serous Part; but where the Quantity of Blood in general is too great, or where the red Globules abound in too great Proportion, though the Quantity of that Compound, or mixed Fluid in the sanguine Vessels, does not exceed, *Phlebotomy* gives the most immediate Relief; because the Blood being less forcibly propelled through the capillary Vessels, after Bleeding, and consequently undergoing

dergoing much less Friction, it grows sensibly cooler.

193. By the *statical Experiments* above mentioned, we are convinced that, in *ardent Fevers*, the red Globules of the Blood do bear too great a Proportion; and by other Observations we are well assured, that all the Series of Vessels are too rigid and tense; whence the usual Excretions by *Perspiration, Sweat, Urine, Stool, &c.* are diminished. Hence it naturally follows, that the Humours which ought, in a healthy State, to be excreted, are now accumulated in the Body, and by the prodigious Force of the vital Powers; by the Strength and Fulness of the Pulse; by the flushed Countenance, swollen Veins, extreme Heat, &c. I am fully satisfied there is hardly any such thing as an *acute continual Fever* without a *Plethora* in some Degree or other, at the *Beginning* of it. Indeed where the Strength is dejected, where there is no real Plenitude; where there is a small, weak, obscure Pulse; where the Nerves, and whole vascular System are lax; where the Habit is soft, pale, and fat, with small Blood-Vessels, *Bleeding* is most certainly improper: But on the contrary, it is commonly observed that this Disease is

peculiar to those who abound in Blood and Strength, and are of a full muscular Habit of Body, with large Blood-Vessels, and who indulge themselves in Eating and Drinking savoury and high-seasoned Things.

194. The Neglect of Bleeding therefore, at the Commencement of the Distemper we are treating of, is a Fault not to be compensated in all the subsequent *Stadia*; the morbid Juices being not as yet prepared or concocted enough for any *critical* Discharge by *Sweat, Urine, Stool, &c.* If we omit this most salutary Evacuation, the *Plethora* will increase, the Blood and Lymph will grow more acrid, viscous, and fizy, and the capillary Vessels may be so far distended, as to bring on *Deliria, Distraction of the Nerves, Inflammations of the Viscera, &c.* All the cooling, refrigerating, diluting Medicines will avail but little without *Bleeding* beforehand; or if a *Sweat* happens to be forced out in the Beginning of a *Fever*, it will be very far from relieving the Symptoms, but will rather exasperate them, by leaving the Blood more dense, hot and acrid.

195. *Bleeding* is pointed out even by *Nature* her self, as an Evacuation the best adapted to check the impetuous Motion of
the

the Blood, to unbend the Solids, and to promote a *Crisis*. How often do we see her set to work, and discharge the superabundant Quantity by a spontaneous Eruption from the *Nose*, *Hæmorrhoids*, *Uterus*, &c. when Bleeding has been neglected in the Beginning of the Disease, either through the Unskilfulness of the Physician, or the Obstinacy of the Patient? For when there is a Fulness of effervescent Blood; when the *Momentum* is too great, and the capillary sanguine Arteries are violently distracted, it is no wonder that they burst, and the Blood gushes out where it meets with the least Resistance: *Quâ data porta ruit*. Nay, it hath been observed, that even after *Death*, large Bleedings have happened at several Parts of the Body; which further shews the great Necessity of drawing Blood in time. Nothing can suggest the Use of *Plebotomy* more plainly than these spontaneous Hæmorrhagies; and if we reflect on all the other Indications, the Advantages are so clearly demonstrated, that it is (as *Willis* expresses it) *a Wickedness to omit it*.

196. If the Physician is to look upon his Patient's Body as an Engine out of order; though so constituted, that, by concurring

with the Endeavours, or Tendencies of the Parts of the Machine, it may be brought to a better State; if he find, that, in the present disposition of the Body, there is a Propensity to throw off the Matter that offends it, in a convenient Way, and at commodious Places; he ought then to act so, as to comply with, and further that way of Discharge, rather than another. It is the Duty of a Physician to tread in the *Footsteps* of *Nature*; and Experience teaches us, that whatever Method *Nature* takes to remove the Distemper, may, for the most part, be attempted by Art, to the advantage of the Patient.

197. Sometimes it happens that the Strength of the Body is oppressed with a superabundant Load of Humours; or there is such a Plenitude in the Vessels, that it, in a great measure, overcomes their Power; whence there arises a false Appearance of Weakness, and unless the *Equilibrium* be soon restored by Bleeding, there will be great Danger of a mortal Stagnation. By Bleeding in such a Case, the Vessels will be so far eased of their Burthen, as to be enabled to contract more easily, and to propel the
several

several Humours through their proper Canals, in a more regular manner.

198. As to the *Quantity of Blood* to be taken away, we must make our Estimate from the Violence of the Symptoms, and the Strength of the Body; both which are best known by the Pulse: *to wit*, whenever we meet with a strong, full Pulse, attended with bad Symptoms, it is the surest Indication for Bleeding largely. The *Ancients* used to bleed 'till the Patient fainted, or very near it; but the *Moderns* think it more adviseable, at least in our *Climate*, to take away a much less Quantity, and to repeat the Operation according to the Urgency of the Symptoms. Indeed it requires the nicest Judgment, the greatest Sagacity, and the most exact Knowledge of the animal Oeconomy, to know when to bleed, and when not, and how much Blood should be taken away.

199. The following *Precept* is founded upon Reason, and confirmed by daily Experience; *viz.* That it is always safest to stop something short of the full Quantity of Blood which may be spared, than offend the Strength by too profuse an Evacuation: for whatever may possibly be found defective,
may

may afterwards be compensated by repeating the Operation, or by promoting other Evacuations, such as *Stools*, *Sweat*, or *Urine*. Whereas the injury which may be done by too immoderate a Discharge of Blood, cannot be so easily repaired.

200. But however, there is no such thing as laying down Rules which will suit every Constitution; for as the *Concomitants* of Diseases are very different in different Subjects; so also the Season of the Year, the Habit of the Body, the Manner of Living, the Difference of Sex, the Age of the Person, the Bulk and Weight of the Body, with many other Things, are to be considered, before the Quantity of Blood, which is to be drawn away, can be adjusted and determined. And therefore all that we shall say at present, in regard to *acute continual Fevers*, is, that whatever Quantity of Blood is thought proper to be let, it ought always to be done in the *Beginning* of the Disease; lest such an Evacuation towards the *stationary Period* should interrupt *Nature* in bringing on a *Crisis*: For when the Distemper is far advanced, and the *febrile* Matter begins to be concocted and separated from the founder Juices, the Plenitude is best carried off by
Sweat,

Sweat, Urine, Stool, &c. and not by *Bleeding*. Whoever maturely considers this, will soon understand why *Galen* advises *Bleeding* early in this Distemper, and not when the morbid Matter is concocted.

201. But to carry this Enquiry further, it will be proper to examine into what part of the Body, or from what *Vein* the Blood ought to be drawn, when such and such *Phænomena* appear; since much has been said concerning *Derivation* and *Revulsion*, and since great Stress ought sometimes to be laid upon them in curing Diseases.

202. By *Revulsion* is commonly meant, *a driving back, or turning a Flow of Blood from one Part of the Body to another*. But this is such an obscure way of expressing it, that no one is ever the wiser for it: it appearing at first sight, at least to those who have been conversant in the *Laws of the animal Oeconomy*, to be absolutely impossible for the Blood to be driven back, or made to flow both ways in the arterial Tubes.

203. By *Revulsion* therefore, I would be understood to mean (though perhaps the Term is not very adequate to my Meaning) *whatever will lessen the Quantity of Humours circulating to any given Part of the Body*.
And

And this can be performed no other ways, than by diminishing the *Areas* of the *transverse Sections* of the several Vessels leading to, or properly belonging to the Part affected; or by abating the Velocity of the Fluids.

204. The *first* of these is, properly speaking, the only true Way of making *Revulsion*, *to wit*, by diminishing or contracting the Diameters of the Vessels. Thus for instance, if we would make a *Revulsion* from the *Leg*, dipping it in *cold Water*, applying *astringent Medicines* to it, or rolling it up in *Swathes*, or *laced Stockings*, will answer the End, by stimulating, contracting, and pressing upon the Vessels, whereby their Cavities will be lessen'd, the Resistance and Friction between them and the Fluids will be increased, and consequently the Quantity of Humours flowing to the *Leg* will be diminished in proportion as the *Vis inertiae* prevails.

205. Hence it appears, that *repelling Medicines*, as they are commonly called, do not produce their Effects by driving back the Humours already received, through the same Vessels they arrived in, that being absolutely inconsistent with the *Laws of the Circulation*; but they do it by contracting

and diminishing the *Areas* of the *transverse Sections* of the several Series of Vessels, whereby they propel the sluggish, stagnant Fluids on in the Course of their Circulation; that is, through the capillary, sanguine, and lymphatic Arteries, into the capillary, sanguine, and lymphatic Veins; and they prevent a fresh afflux of so large a Quantity of Blood and Lymph again, as long as the Influence of these Medicines is capable of giving proper Resistance to the Impulse of the respective Fluids.

206. The *second* way of *repelling*, to wit, by abating the Velocity of the Fluids flowing to any Part, is, properly speaking, *secondary* to, or the *Consequence* of *Derivation*. As for Example, a *Revulsion* may be made in this Sense, by *Bleeding*, *Purging*, *Vomiting*, *Sweating*, or whatever will cause a *Derivation* of more Matter into any particular Part of the Body. Thus *Bleeding* in a *Vein* which arises from any of the ultimate Branches of the *Aorta descendens*, will make a *Revulsion* from every Part belonging to the *Aorta ascendens*, and *vice versa*. *Purges* and *Vomits* derive a greater Quantity of Blood into the *cæliac* and *mesenteric Arteries* than commonly circulates through them,
and

and thereby they decrease the Quantity which would otherwise flow to the *Head, Limbs, and external Superficies of the Body.* A *profuse Sweat*, as it is the greatest Evacuation which can possibly be made from the Blood, in the same Space of Time; so consequently it makes the greatest *Revulsion* from the *Viscera*, and from the whole *internal Superficies*, by deriving the greatest Quantity of Lymph to the *sudatory Vessels*.

207. Hence it appears, that an animated human Body is not a mere *Statue*, or *Congeries* of the Materials it is composed of; but an admirably fram'd Engine, consisting of *solid, liquid, and pneumatic* Substances, so exquisitely adapted to their respective Functions and Uses, that an Alteration cannot be made in one Part, but it will produce its Effect in another. A *Derivation* in one Place, will occasion a *Revulsion* in another, & *e contra*.

208. And here I beg leave to enquire whether the late learned Dr. *Friend* was not mistaken, in asserting in his *second Commentary on Fevers*, That *Bleeding in the external Jugular Vein is not only the most compendious and expeditious of all Revulsions, but also the*
 very

very strongest of those which are made from the Brain.

209. I shall make no Apology for dissenting from the Opinion of so great a Man; because in the *Practice of Physic* we are not to regard *Authors* so much as the Force of Reason. His Sentiments indeed, (to say the same of *Him* as he did of *Galen*) oftentimes industriously to despise or reject, as it would be a Mark of great Arrogance, so to be willing to follow him in every thing, of much Superstition.

210. Too much Credulity in Matters of Physic has been a principal Cause of the slow Advancement of that Art. An absolute Resignation to the Opinion of any Man, how great soever, without taking proper pains to judge, examine, and search into the Truth of it, is a slavish Submission, and very unbecoming a rational Creature. Let *great Authors* therefore (says the sagacious Lord *Bacon* *) have their due; but so as not to defraud Time, which is the *Author* of *Authors*, and the *Parent* of *Truth*.

211. After Dr. *Friend* has shewed the Antiquity and Safety of Bleeding in the Jugular Veins, in regard to the Operation, he tells

* Vide General Survey of Knowledge.

tells us *, “ They are opened for the sake
 “ of either making a *Derivation* or *Revul-*
 “ *sion*; that the Blood flows in a greater
 “ Quantity into the Parts affected, is oc-
 “ casioned by *Derivation*, and with a less,
 “ by *Revulsion*. Which Words, although
 “ they are ancient enough, yet no one will
 “ be able to understand them, nor conse-
 “ quently to determine justly the Laws of
 “ opening them in either kind, unless the
 “ Structure of the Vessels and the Motion
 “ of the Blood be accurately known.

“ Therefore in Diseases which affect these
 “ Parts, from whence the Branches of the
 “ external Jugular arise, *e.g.* in a Quin-
 “ cyma, and Tumours in the Face;
 “ when we cut the Trunk of this Vein, it
 “ is plain we do it to cause a *Derivation*,
 “ if we would be supposed to mean any
 “ thing by this Word, distinct from *Revul-*
 “ *sion*. For this Passage being opened,
 “ and the Resistance removed, which the
 “ Blood pent up in the extreme Veins sus-
 “ tained from that, which is contained in
 “ the Trunk of the Jugulars; the Blood
 “ flows with greater Liberty from the *Ca-*
 “ *rotid Artery*, which we have said to be
 “ joined

* Vide II. Comment. on Fevers.

“ joined with the Extremities of this Vein,
“ and circulates swifter through the Part
“ affected; so that there is a larger Quan-
“ tity of Blood derived into it, at the very
“ time of making the Incision, than when
“ the Vein was not opened. Therefore by
“ opening the Jugulars in such a Case as
“ this, the Blood acquires that Force by its
“ Celerity, as to be able to propel and carry
“ off any Matter remaining in the smallest
“ Branches, and obstructing the *Arteriolæ*:
“ almost after the same manner, as the o-
“ pening the *Saphæna* brings down the
“ *Menses*.

“ But this letting of Blood, from the *ex-*
“ *ternal Jugular*, not only removes the
“ Obstructions and Inflammations that a-
“ rise without the *Cranium*, but it greatly
“ relieves those also which seize the *Brain*
“ and its Membranes. For when the *Ju-*
“ *gulars* are emptied in Diseases of the
“ Brain, a *Revulsion* is made in the Part
“ affected: which, says he, I shall explain
“ a little more distinctly, because I hear
“ some Things objected against it; as if the
“ Brain could not be relieved by this Me-
“ thod of Evacuation, because the *external*
“ *Jugular* carries nothing from it, neither

“ has it any Communication with the *inter-*
“ *nal Carotid*, which moistens the Brain.
“ This indeed is a specious Argument: but I
“ shall easily prove to any experienced *Ana-*
“ *tomist*, that however true that Reason
“ may be which is drawn from the Structure
“ of the Vessels, yet what they gather from
“ thence is so very far from the Truth; that,
“ for that very Reason, the contrary Con-
“ clusion ought to be made.

“ That this may the more clearly appear,
“ we must recollect from what has been
“ said, that the *carotid* Artery is divided
“ into two Branches, the external and the
“ internal, of which this is joined at the
“ Extremity with the internal *Jugular*, and
“ that, in the like manner, with the exter-
“ nal. When therefore the Branches of
“ the internal *Carotid* are seized with an
“ Inflammation, the *Nisus* of the Blood,
“ and the elastic Power of the Vessels, re-
“ main in a State of *Equilibrium*, as if they
“ were tried with equal Weights; the one
“ being diminished, the other increases:
“ But if by opening a Vein we draw off
“ some Part of that Blood which is wont to
“ be carried into the Vessels of the Brain,
“ that Force, with which the Mass of
“ Blood

“ Blood presses the *Arteriolæ*, will be diminished, and consequently the Heat, and that Rarefaction which follows it, will decrease; so that the Coats of the Vessels having as it were recovered their Liberty, are able more strongly to contract themselves, and to force out whatever may remain in the very narrowest Passages.”

212. In short, the *Doctor* contends, *That Bleeding in the external Jugular diminishes the Quantity of Blood flowing to the Brain; and for that reason, he says, it is the most proper Evacuation in a Phrensy which follows upon a Fever.* In answer to which, I beg leave to observe,

I. What Effects the laying a Ligature on the *External Jugulars*, so as to distend them fit for opening, is likely to produce, when the ultimate Branches of the *internal Carotid* in the Brain, are so much distracted with gross, viscid Blood, as to bring on a *Phrensy*.

II. What immediate Effects the opening of the *external Jugular* is most likely to have on its corresponding Blood-Vessels, and those in the Brain.

III. What the Consequences will be in some little time after Bleeding.

213. I. If a Ligature be made round the Neck, or any Degree of Pressure is applied to the *external Jugular*, so as to obstruct the Descent of the Blood through them, the Resistance will be immediately communicated to the *external Carotid Arteries*, which are conjoined to these Veins: Hence, the Circulation of the Blood being as it were stopt in the *external Carotids*, the *internal Branches* thereof, which go to the Brain, will have a larger share of Blood propelled into them, than before this impediment was made in the *external Jugulars*; and what sad Consequences this may produce, when the *Arteriolæ* in the Brain are, perhaps, already obstructed, and distended to their utmost Stretch, is easy to guess at.

214. If it be objected, that this Obstruction to the Descent of the Blood through the Jugulars, does not last long, but immediately ceases upon opening the Vein; I answer, that unless the *Surgeon* be expert, and has been much used to this Operation, it is oftentimes longer before he opens the Vein, after the Ligature or Pressure is made, than *ten or twelve Ounces* of Blood is flowing out of the Orifice; especially if it be made large, as it ought to be.

215. But however, let the increased Impetus of the Blood, on the obstructed *Arteriolæ* of the Brain, remain ever so short a time, yet if the obstructing Matter be so viscous and tough, or the obstructed Vessels have so far lost their contractile Power, that the *Impedimenta* will not give way; it must necessarily follow, that more violent Impulse will greatly endanger bursting the obstructed capillary, sanguine and lymphatic Arteries, or rivetting the Obstructions, and rendering them more obstinate. I know that many Surgeons do open the Jugular in an Instant, and without making a Ligature round the Neck; but I am sure I have sometimes seen the Sick almost strangled before the Operation hath been performed: and where it requires so much time in bringing about, I am very apprehensive of the Mischief that may follow.

216. II. As soon as the *external Jugular* is opened, it is manifest the Blood will flow out of the Orifice with little Resistance in comparison to what it met with before, from the precedent Blood, and from the Friction against the Sides of a longer Tube: For the taking away the *Impedimentum* from one Side, is equivalent to the adding an

equal *Momentum* on the other. Hence, a greater Quantity of Blood will flow out of the *external Jugular*, when a large Orifice is made in it, than would have circulated through it before in the same given Time; and the Resistance being diminished in the *external Jugular*, the same will also happen in the *external Carotid*, and from thence even to the Heart itself; it being evident that one great Resistance to the Motion of the Blood, at the Heart, or in the Arteries, is the precedent Blood, which always hinders the succeeding, seeing before the one succeeds in its place, the other must be removed: and this Resistance is always proportional to the Quantity of Blood.

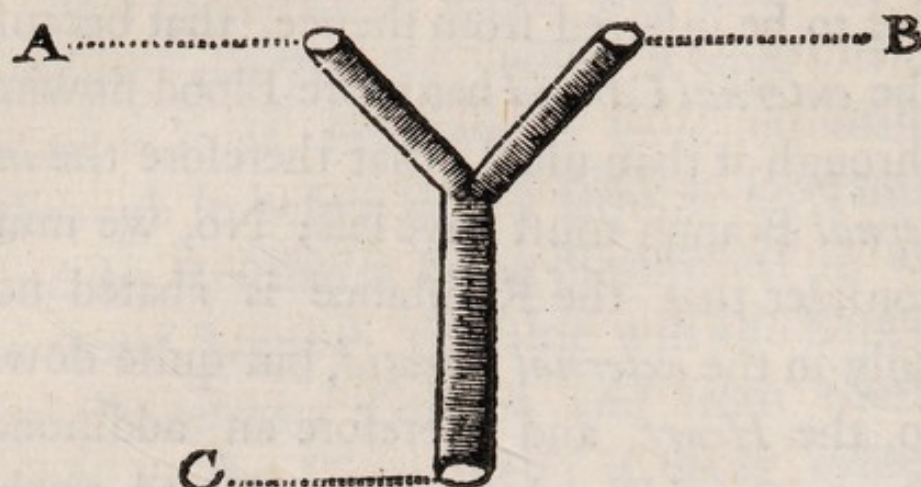
217. Now the Heart continuing to contract with its usual Force, and the *Impedimentum* being abated in the *Aorta ascendens*, because one of its principal Branches is cut; it will of course propel the Blood most freely towards the *Carotid Artery*, where the Volume of the Blood is shortned, and the Friction is made less. Hence the Velocity of the Blood will be augmented from the Heart to the Orifice in the Jugular Vein; and from thence a greater Quantity of Blood will be derived into the *external Carotid*
whilst

whilst the *external Jugular* is open, than there was before it was opened. But then it is not to be inferred from thence, that because the *external Carotid* has more Blood flowing through it than usual, that therefore the *internal* Branch must have less; No, we must consider that the Resistance is abated not only in the *external Carotid*, but quite down to the *Heart*, and therefore an additional Quantity of Blood may be allowed to the *external Carotid*, and yet the *internal* shall have as large a share, if not more, than before. For if we grant that *Bleeding* in the *external Jugular* increases the Velocity of the Blood in the *Aorta ascendens*, it is more than probable, that all its Branches are more generously supplied with Blood.

218. But that we may illustrate this in the most easy manner, give me leave to represent the *Carotid Artery*, both before and after its Division, by the following Figure.

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A. The



A. The *external* Branch of the *Carotid Artery*, which supplies the external Parts of the *Head, Face, &c.* with Blood ; and whose Extremities are conjoin'd with those of the *external Jugular Vein*.

B. The *internal* Branch of the *Carotid*, which goes to the *Brain*.

C. The main Stem of the *Carotid Artery* before its Division.

219. Hence it will appear that if the *external Jugular*, which is conjoined to A, be opened, the Blood will circulate more freely through A, than it did before ; but then we must not immediately conclude that the Blood which is added to A, is taken away from B, because the Resistance is also abated
in

in C; and consequently as long as a larger Quantity of Blood is derived to C, a greater Quantity may be allowed to A, without diminishing that which flows to B.

220. The *Doctor's* Argument would undoubtedly hold good, was there such a given Quantity of Blood to flow through the *Carotid Artery* in a given Time, and never no more; for then the taking away more Blood than usual from one of its Branches, would diminish the Quantity in the other. But since the Velocity of the Blood is always in proportion to the Impulse it receives from the Heart, and the Resistance it meets with in the Vessels; it follows, that the same impelling Force will be capable of circulating much more Blood through the *Carotid Artery*, in the same space of time, when the Resistance from the precedent Blood is diminished, as above mentioned; and consequently, both the internal and external Branches may receive a larger Quantity of Blood than they did before.

221. III. When the Orifice in the *Jugular Vein* is closed up, the Blood immediately takes to its old course again, and in some little time the Resistance in the *external Carotid* becomes equal to that in the *internal*,

ternal, and yet there are several Reasons to believe that the Velocity of the Blood continues to be greater in the *ascending* than in the *descending Trunk* of the *Aorta*, for some time after Bleeding; and if so, then the *internal Carotid* must necessarily have more Blood propelled into it, than there was before the Operation was performed.

222. The common Practice of *Bleeding* in the *Foot*, in order to provoke the *Mensium Fluxus*, is a very strong Argument in favour of what has been said; for when the *Vena Saphæna* is cut, it is not done with an Intent of deriving a greater Quantity of Blood into the *Crural Artery* only, but also into the *Hypogastrics*, which supply the *Uterus*, *Vagina*, &c. with Blood: and this comes to pass by abating the Resistance to the Blood's Motion in the whole *descending Trunk*, so that all its Vessels are more plentifully stored with Blood.

223. The Success of this Operation is every day confirmed; and if *Bleeding* in the *Foot* will draw a greater Flux of Blood into the Vessels of the *Uterus*, &c. I think we have all the reason in the World to conclude, that *Bleeding in the Jugular* will likewise

wife derive a greater Quantity of Blood into the Vessels of the Brain.

224. I am sensible that *Bleeding in the Jugular* has been oftentimes successfully practised in a *Phrensy* which followed upon a *Fever*, and even in *Maniacs* when all other Methods have failed; but then I have observed, it has not been so in the *first Stage* of the Distemper, nor 'till other plentiful Evacuations have preceded it. And in the very Case of Lieutenant *Pool*, which Dr. *Friend** instances, as a remarkable Recovery from a *Phrensy* by bleeding in the Jugular, it appears that the

1. Day, Twelve Ounces of Blood were taken from the Arm.

2. A Vomit was given, by which he also had a Stool.

3. A Vesicatory was applied to the Neck.

4. Large Blisters were applied to each Arm.

5. He was blooded in the Jugular.

6. A Clyster was injected, and a Vesicatory applied to the Head.

7. Another Clyster was injected.

8. Vesicatories were applied to both Thighs.

9.

* Vide Comment. II.

9. No Evacuation was made.

10. Twelve Ounces of Blood were again taken from the Jugular. From which time his *Delirium* almost wholly went off on a sudden, and the other Signs were gradually changed for the better ; so that at the last he perfectly recovered.

225. Now setting aside the Structure of the Parts, I am humbly of opinion, there is more reason to attribute this Success from Bleeding in the Jugular, to *Derivation* than to *Revulsion* ; for after so many Evacuations, and the Use of only temperate Medicines, it may reasonably be supposed that the Fibres began to flag, and the animal Spirits must be prodigiously wasted by the *tenth* Day of such a Fever. Indeed, if we observe the Doctor's Expression, *viz. his Pulse was still pretty strong* ; it seems to imply that he began to sink : and if so, the obstructed *Arteriolæ* in the Brain, stood in need of a fresh *Impetus* to break through and dislodge the *Lentor* ; which was no sooner done, by *Bleeding in the Jugular*, but his Senses returned, and he gradually recovered.

226. If we reflect on the *spontaneous Eruptions* of Blood from the *Nose*, which frequently happen in Fevers, and by which the
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Diseased are often healed, as Dr. Friend observes from *Hippocrates*, it will appear that this Evacuation is most likely to come from a Branch of the *internal Carotid*. Dr. Keil * tells us, *The Vessels of the Nose are Arteries from the Carotidals which pass with the olfactory Nerves; they are distributed in the internal Nose: The external Carotidal and Jugular give Arteries, and Veins to the external Nose.* And Mr. Cheselden † observes, *That the internal Carotids send two Branches to the back Part of the Nose.*

227. Now since it is commonly observed that a *spontaneous Hæmorrhage* from the *Nose* does not relieve the *Head* so much in the *Beginning* of a *Fever*, as when it happens towards the *stationary Period*; I think it is plain, that in a *Phrensy* which follows upon a *Fever*, the safest Practice is to begin with *Revellents*; and this is most effectually performed by *Bleeding* in the *Foot*, and not in the *Jugular*. In short, from what has been said, it evidently appears, that whatever Disorder in the *Head* is relieved by *Bleeding* in the *Jugular*, the Success is owing to *Derivation*, and not to *Revulsion*. Q. E. D.

228.

* Vide Anatomy.

† Vide Anatomy.

228. The Importance of this Subject is so great, that I hope the *Reader* will not think I have been too prolix upon it. Proceed we now to other Matters, relating to the Cure of this Disease.

229. Proper Evacuation being made by *Bleeding*, we are, in the next place, to have regard to the Viscidity, Glutinousness, or *Lentor* in the Blood and Lymph; which obstructing the free Course of the Circulation through the capillary, sanguine and lymphatic Arteries, accumulates the Blood and Lymph in the more pervious and patent Tubes, and increases the Motion, Heat, Inspissation, and Acridness of the Juices.

230. It must therefore be our chief Care to dilute, and concoct all viscous fizy Humours; to attenuate those, whose Parts are too bulky to pass freely through the decreasing Series of Vessels; and to correct, absorb, and alter all saline, sulphureous, bilious Particles, which are now become much more angular, acrid, and pungent than in a healthful State.

231. The Concoction of the febrile Matter is no more than a preparatory Alteration of it for a convenient and salutary Discharge, either by *Sweat, Urine, Stool, &c.* Or when a Portion of peccant Matter is brought to

Coction, it has acquired such a Disposition, as makes it fit to be separated from the founder Parts of the sanguineous Mass, or from the *Tubuli* to which it adhered, and to be afterwards expelled the Body. That is, the viscous, obstructing, febrile Matter is diluted, dissolved, attenuated, and ground fine enough to pass the minuteſt, and remoteſt *Tubuli* without Stagnation, or Obstruction.

232. Now whatever is able to attenuate or dissolve gross, viscid Matter in the animal Fluids, or adhering to the Sides of the Vessels, must affect it either by forcibly striking into, and cleaving it asunder, or else by gently insinuating it self into its Pores, and attracting its constituent Particles, so as to make them recede from one another, and embrace those of the *Dissolvent*. The *former* is the Work of *ponderous* and *pointed* Medicines, which increase the Velocity and *Momentum* of the Blood, add Strength, and Stiffness to the Vessels, and consequently rarefy and heat the whole Mass of Blood to a great degree. The *latter* is the Office of smooth, aqueous, demulcent Liquors, which being adapted to the Pores and Interstices of the morbid Matter, insinuate themselves
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between its Corpuscles, and by their strongly attracting Power, divide, dissolve, and dilute it.

233. Hence it is easy to apprehend which of these sort of Medicines is most eligible in *burning Fevers*; viz. such as by their Weight, Volatility, Restrictingency, or Stipticity increase the Motion and Heat of the Blood, and render the several Series of Vessels more rigid and tense; or such as thin, cool, and check the impetuous Motion of the Blood, moisten the dry, parched Fibres, and promote a free Passage for the Blood through the capillary, sanguine, and lymphatic Arteries.

234. Those Medicines therefore, which dilute the Blood, thin the Humours, separate and dissolve the Viscosities without increasing the Heat of the Body, are the Things indicated in this Disease; and these are universally allowed to be performed most safely by a liberal use of some smooth, cooling, diluting, absterfive Liquors.

235. But before we point out the most proper of these sort of Medicines, I would observe, that if the Patient has sick Fits with Vomitings, and upon Enquiry you find he has eat or drank any thing disagreeable,

able, or if a deal of bilious, pituitous Matter is brought up; it will be proper, first of all to exhibit a gentle *Emetic*, after a sufficient Quantity of Blood has been drawn off, in proportion to the Strength of the Body and Violence of the Disease.

236. What Advantages may be reaped from *Vomiting* in the *Beginning of acute Fevers*, will easily appear from the subsequent Reasoning.

I. It discharges any bilious, pituitous, or indigested Matter which might otherwise lie in the Stomach, and fret it into frequent Motions to vomit; and which, if it was not thrown off, would putrefy, corrupt, and grow acrid, and corrosive: Whence oftentimes arise dangerous *Diarrhæas*, towards the Height of the Fever, for want of Vomiting in the Beginning.

II. It opens the secretory and excretory Ducts of the Glands of the *Fauces*, *Oesophagus*, *Stomach*, *Intestines*, *Spleen*, *Liver*, *Pancreas*, *Omentum*, and *Mesentery*; and unloads them of a great Quantity of viscous Phlegm, and bilious Matter.

III. By the forcible Contractions of the Muscles in Vomiting, they shake, agitate, divide, and attenuate the *Lentor*, and thereby

promote the Secretions and Excretions, as is evident from the profuse Sweats will always break out after plentiful Fits of Vomiting.

237. Sydenham (who justly deserved the following *Encomium*, viz. *Artis nostræ Ornator & Ornamentum, qui sepositis Opinionum Commentis ad Observationes prorsus se dedit, & à prima Ætate ad extremum usque Senium cum Naturâ cohabitavit*) had so great a Notion of Vomiting in Fevers, that when he was called in late, and the Patient had not been Vomited before, he did not scruple to give one at any time of the Disease, if the Patient had Strength to bear the working of it. He tells us, he often gave one on the *twelfth* Day of the Fever, though the Sick had left off vomiting before, and so stopt a Looseness which prevented the Fever's coming to a *Crisis*.

238. In such a Case indeed, where a *Symptomatical* Looseness hinders a *Crisis*, no Medicines more powerfully reveal the Humours, than those which excite Vomiting; and therefore, upon such an account, they may be salutary at any time of the Disease: But when the *Crisis* is at hand, and Nature is just ready to throw off the morbidic Mat-

ter through some of the excretory Ducts, most *practical Writers* * forbid the Use of *Emetics*, because they are endued with so strong a Power of revelling, and by that means they may disturb that Method of Relief which *Nature*, the best Guide in Practice, attempts.

239. When, therefore, the Fever is far advanced, and there is no Looseness or other Symptom which immediately requires Vomiting, it may be the most secure way to let it alone; because when the Heat is most intense, and the Blood and Lymph inspissated by the Heat, the Agitations and Concussions, excited in the Fibres, in Fits of Vomiting, may possibly augment the Heat, and aggravate the bad Symptoms: But in the *Beginning* of Fevers, before the Humours are boiled up into a Size, and before any Obstructions are firmly fixed in the *Viscera*, nothing bids fairer to clear the *primæ Viæ*, and to promote the Secretions and Excretions, than a gentle *Emetic*.

240. The *Liquors* most approved of in *acute, ardent Fevers*, are the following, *viz.*

I. *Barley Water*, which by the Slipperiness of its Parts, and its Freedom from Viscidity

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* Vide *Friend's Comment on Fevers*.

idity and Tenacity, is a fit Vehicle to dilute gross, fizy Humours, to divide the more firm, earthy, or saline Parts of the Blood, and to abate the Heat thereof; for as it leaves no *Stimulus* behind it, it will contribute greatly towards relaxing the too tense and contracted Vessels; and the more watery a Body is, the less susceptible it is of Heat.

* We have good Reason to believe, that if pure Water were to pass through the Blood-Vessels, with a Velocity equal to that of the Blood, yet it would thereby acquire no Heat. Hence it appears that the more we dilute and divide the red Globules of the Blood, and prevent their Friction, by watery Drinks, the more we cool the Body.

II. Where the active, saline, and sulphureous Particles, abound too much in the animal Fluids, we must make use of Liquors consisting of the most passive Principles; upon which account it is, that *thin, clear Whey, Water-Gruel, Teas* made of *Sage, Balm, Elder-Flowers*, &c. are so serviceable. *Water* is the chief Principle to be depended upon; but the other Ingredients serve to render it more slippery, absterfive and agreeable. There is no real Diluent but Water; every Fluid is
diluent

* Vide *Hales's Statical Essays*, Vol. II.

diluent as it contains Water in it. Water dilutes the Blood and Humours, and at the same time relaxeth the Fibres : Whence, as long as there is *Thirst, a quick Pulse, Dryness and Stricture of the Vessels*, so long are smooth, watery Drinks safely exhibited. An emollient Drink of *Mallow-Leaves*, or *Roots*, a few *Figs*, and some *Raisins of the Sun*, may be fitly used to promote Dilution and Excretion.

III. When the Heat is extreme, and the other Symptoms demonstrate that the Humours are tending towards an acrid, alkaline Disposition, the above-mentioned Drinks should be acidulated with *Vinegar*, or the *Juice of Oranges or Lemons* ; or they should be such whose Natures are *acescent*. In this Case nothing appears to be more cooling than *Currants* ; two Ounces of their *Jelly*, dissolved in a Quart of warm Water, makes the most agreeable, sharp, acescent Drink in the World ; it quenches Thirst, checks the too great Velocity and Rarefaction of the Blood, abates the Redundancy and Acrimony of the Bile, by its acid Salts, it prevents the Humours from altering to an alkaline State, it is of a delicious Taste, and scarce ever palls the Stomach. A Decoc-

tion of *Stone-Pippins*; an Infusion of *Wood-Sorrel*; *Lemonade*; and *roasted Apples* dissolved in Water, are all of the same Nature, and exceedingly refreshing and cooling.

IV. *Clear, old, small Beer*, neither bitter nor sour, will agree very well with those who have no *Nausea, Sicknes at Stomach, nor Tendency to a Looseness*. Where the Symptoms are moderate, and where the Blood is not too much rarefied, to deny *small Beer*, to be taken now and then moderately, is a needless Severity, and very often hurtful, especially where it has always been used as the common Diluter of the Food. But in others, whose vital Powers are wound up to their highest Pitch, and whose Blood is in vast Agitation, *small Beer* will not agree; because, however small, it contains a Portion of Spirit, which, by its Briskness, will irritate the *Fibrillæ* into more frequent and strong Contractions; and as it contains a deal of very elastic Air, it is ever ready to ferment, by which means it will cause still greater Tumults in the Blood, and render the Patient delirious, if not so before.

V. If the Body be costive, an *Ounce* of *Tamarinds* boiled in a Quart of Barley-Wa-

ter, makes a very agreeable, delightful Liquor.

241. Hence all these sorts of Drinks produce wonderful, beneficial Effects, by mixing with, diluting, attenuating, and dissolving the Grossness and Cohesion of the Blood and *Moleculæ*, which foul the Glands, furr the Channels, and beget Obstructions in the minute, delicate *Tubuli* of the Body. They also sheath, dissolve, and break the sharp *Spiculæ* of the acrid, alkaline Salts, and promote and hasten their Discharge through some of the Emunctories. And *lastly*, by their Smoothness and Slipperiness they supple, relax, and take off the too great Tension and Stiffness of the Fibres; upon all which accounts they are excellently good.

242. *Hippocrates* *, from long Experience, has recommended to us several Kinds of Aliment proper in *ardent Fevers*, viz. *The entire Ptisan, the Cream of Ptisan, and Hydromel*; all which are well adapted to the Cure of Fevers, by reason they are light, smooth, cooling, and moderately absterfive, without the least Asperity or Astringency, which is very injurious to Persons in this

* Vide Lib. de Diæta in Morbis acutis.

Distemper: Hence those Persons who first introduced among us the temperate and diluting Regimen, as it is called, gathered it almost wholly from *Hippocrates*; and without doubt this Method of Cure is not only most safe, but of the greatest service.

243. But as the best Remedies may be falsely applied, or their Virtues destroyed by being administered in too large or too small Doses, so it has happened here: some few, unskilful, unexperienced People observing the great Benefits which accrued from a moderate Use of watery Liquors, in the *Beginning* of Fevers, falsely concluded from thence, that if *two, three, four or five Pints of cold Water* was to be drank all at once, or in a very little time, it would hasten Concoction, promote a Crisis, and cure the Sick immediately. Whereas Experience assures us, the swallowing down an unreasonable Quantity of Drink, in the *Beginning* of Fevers, is oftentimes attended with fatal Consequences; for the *perspirable Ducts* being too tense and contracted, or bunged up with Matter too viscous and tough to give way as yet, and the *urinary Passages* being too strict to be dilated or distended in proportion to the Deluge, they will strain it off
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but sparingly; so that a general Fulness will arise, with *Sickness at Stomach, Deliria, Coma, &c.* and the Disease will be prolonged, as well as rendered more dangerous.

244. *Hippocrates, Lib. de Arte*, tells us, whatsoever is beneficial, proves such by virtue of the right Use and Application: For the innumerable unlucky Accidents that fall out, are owing not so much to any ill Quality in the Remedy, as to false Indication, or the Defect of Cautions and Precepts relating to the Use of it. Agreeable to which, is the Case before us; our chief Dependance, in the *Cure of ardent Fevers*, is upon smooth, watery, absterfive Drinks, to dissolve and dilute the acrid, alkaline Salts, abounding in the Blood, and to waste, and wash away all viscous, glutinous Matter adhering to the Sides of the capillary Vessels, and obstructing the free Course of the Circulation. But as this cannot be done all at once, no more than we can remove Mountains, and as a violent Distension of the Vessels, and an increased Impetus of the Blood, from drinking too large Quantities of Liquors, would greatly endanger bursting the capillary, sanguine and lymphatic Arteries, producing Inflammations, and a whole Train of desperate

sperate Symptoms; it evidently follows, that the safest Practice is to use them moderately in the *Beginning* of this Disease, and towards the *Height*, or *stationary Period*, when the several *Phænomena* assure us that the morbid Matter is sufficiently attenuated, divided, and loosened, that it only wants an additional Impulse to dilate the Vessels, and cast it forth through some of the excretory Ducts; we may be more liberal, and allow our Patients Drink in larger Quantities.

245. I have sometimes disputed with myself whether it was most eligible to indulge my Patients in drinking any of the above-mentioned Liquors, quite cold; since the Desire of the Person, the extreme Heat, Thirst, parched Tongue, Throat, &c. seemed always to require it, and since the Coldness of the Liquor would also help to condense the rarefied Blood, and act in opposition to the intense heat of the Humours: But then, on the contrary, maturely considering the Danger that might arise from the *Stimulus* which would immediately be given to the *Mouth, Throat, and Stomach*, by large Draughts of cold Liquors; that this might probably constipate the excretory Ducts of the several Glands belonging to those Parts,
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and thereby increase rather than abate the Drought and Thirst so much complained of; and *lastly*, since the *Stomach* is most plentifully stored with Blood-Vessels, and is surrounded by the *Liver, Spleen, Aorta descendens*, &c. extreme cold Liquors might condense and incoarsen the Blood, and suddenly contract the capillary Vessels, so that only the finest and thinnest Parts would pass through them, whilst the gross are obstructed, fixt, and wedged in: Whence *Obstructions, Inflammations, Mortifications*, &c. I say, considering the Risque we might run in these Things, I, for my part, always chuse to let the Drink be a little warmed, and believe it answers the End much the best, both as a Diluter, and Slaker of Thirst, by reason it keeps the Vessels more pliable and lax, and thereby procures a freer Course for the Fluids to pass without Lett or Stoppage.

246. It is well known that *Heat* and *Cold* greatly dilate and contract our Vessels. Dr. Hales* has demonstrated by many curious Experiments, that the Vessels of an animal Body are manifestly contracted or relaxed, by different Degrees of Heat, or Cold.

* Vide Statical Essays, Vol. II.

Cold. He hath shewn us that cold Water is much longer in passing the minute, capillary Arteries, than when it is Blood-warm; and though it is not to be imagined that the Effects are so sudden and great in live Animals, as in those Experiments which he made; because in living Bodies, the several Fluids which are taken in, are more gradually, and in smaller Quantities imbibed and blended with the Blood; yet if we consider the easy Passage of so diluted a Fluid, as Water, from the *Stomach* and *Guts* immediately into the *meseraic Veins*, and the great Velocity of the Blood in circulating, it will appear that very cold Liquors, drank in large Quantities, may do much mischief, by constringing the Vessels, and increasing the Force of the arterial Blood.

247. Some, indeed, there are, who are bold enough to order cold Water to be drank in large Quantities, through the whole Course of a Fever; but if we will hearken to the Advice of a very learned and ingenious *Author**, he assures us, that those Things are more safe, which besides their effectually cooling, help towards concocting the Matter, by their inciding and absterfive
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* Vide *Lommius*, of the Cure of Fevers.

Faculties, both which are wanting in cold Water. Besides, says he, drinking cold Water through the whole Course of the Disease, not only obstructs the Maturation of the Matter, but becomes so familiar to Nature, that it acts with much less Efficacy in the Height of the Distemper, when it ought to be liberally drank, that it may impel the Humours to Excretion.

248. As to *Food* of any kind, the Sick, as hath been observed above, are generally averse to it, and take it with reluctance; for since Nature is wholly engaged in subduing, attenuating, dividing, and concocting the morbid Matter, it must consequently be very injurious to intrude upon her a viscid Chyle, which will require a great share of Strength to assimilate, or otherwise it will increase the *Lentor*, and aggravate all the Complaints.

249. But if the Patient should seem to crave for something to eat, as it sometimes happens, smooth *Water-Gruel*, *Panado*, or *Barley* boiled to a Softness, and pulped, and sweetned to the Taste, are the only Things to be allowed of.

250. Having now shewn the great Advantages of *Bleeding*, *Vomiting*, and *Dilution*

tion in the *Beginning* of this Distemper, I shall here take an Opportunity of pointing out some very destructive Medicines, though too commonly made use of in the Beginning of *acute Fevers*; and then proceed to direct you to those which long Experience, and a continual Series of Observations, have established their Reputation, and proved their Usefulness.

251. *First* then, we must by no means venture to exhibit strong *Diaphoretics* or *Alexipharmics*, such as the *Theriaca* & *Mithridatium*, *Rad. Serpent. Virg. Antim. Diaphoret. Crocus, Coccinel. Camphor. Sal. Vol. Succin. Corn. Cervi, Aq. Epidem. Pæoniæ, Theriacalis, &c.* This Custom, as it is exceeding common with those who are intirely ignorant of the *Laws and Motions of the animal Oeconomy*, so it is likewise extremely dangerous; for seeing such Medicaments as these, do rarefy the Blood, and increase its Motion, instead of cooling and abating its Velocity, they must necessarily weaken the vital Powers, by giving too great Resistance, and straining the animal Springs beyond what they are able to bear.

252. Where the innate Warmth is wanting, the *Vis Vitæ* decayed, and the native
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Force weakened, these sort of Medicines are of admirable Use; but in *acute Cases*, where the motive Powers, and vital Heat are raised much too high; where the oily and saline Principles of the Blood are already too much attenuated, or raised to a great Degree of Volatility; and where the Blood and Lymph are already too viscid and glutinous, through extreme Heat; such Medicines must needs be quite contrary to the *curative Indications*, and will certainly prove destructive, by adding to the Attrition of the Globules, and rendering the Blood more acrimonious, rancid, and alkaline: In consequence of which, the whole sanguineous Mass may be reduced to a State of Putrefaction, capable of producing *Pains, extreme Thirst, Inquietude, Watchings, Deliria, Distension of the Nerves, Hiccoughs, and other deadly Symptoms.*

253. The *Author* * of the *Discourse concerning Fevers*, is of opinion, that the *The-riaca* and *Mithridatium* are so far from deserving the Title of *Alexipharmics* in acute, inflammatory Fevers, that they may rather be termed *Pharmaca*, as implying, in the worst Sense of the Word, *Poisons*; and which, I am afraid,

* Dr. Turner.

afraid, says he, through their indiscriminate Use, have carried off more People than all the Plagues we ever had in *England*. And again, do we not generally find that all these hasty Sweats are symptomatical, seldom lessening the *Fomes* of the Disease, but increasing the same? Or what do we do hereby, but quicken the Motion and Heat of the Blood, and excite thereby *Coma*, *Vigil*, &c.

254. The learned *Willis* observes, that Medicines which too much exagitate the Blood, are to be shunned in a Fever, with the same Industry, as Blasts of Wind to burning Houses. And indeed if we consider the Mechanism of the Body, the Nature of the Disease, and the Properties of Medicines, we shall soon find it absolutely impossible for hot, acrid, spirituous, volatile Medicines to be of any service in the *Beginning* and *Increment* of this Disease; and seldom or never in the *Height*, unless the vital Powers begin to flag, and the Strength of the Body is not sufficient to bring on a *Crisis* without such Helps.

255. If Sweating could be raised without exagitating the Blood, and increasing its Heat, it would necessarily diminish the Quantity of Lymph, and consequently leave
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the Blood and Humours proportionably more thick and viscous; but since the secretory and excretory ducts of the *Glandulæ miliares* are either too tense and contracted, or the Lymph is too viscid and glutinous to be secreted; *Sudorifics* seldom answer the Intention; in the *Beginning* of Fevers; but augment the Complaints by increasing the Motion; Heat, and Inspissation of the Blood.

256. *Secondly*, There is another Madness also different from this *, which some are possessed with, who rely wholly upon *Acids* for a Cure; and place all their Hopes upon *Vinegar* and the *Juice of wild Apples*: as if because it is unreasonable to burn up the Patient, they should therefore quite kill him with Cold. It is not meant by this that *Acids* are always improper; and therefore to be condemned by the Lump; but on the contrary, when the Heat is vastly intense, when the *Salts* of the Blood are volatilized, and render'd as acrid as possible; and the *Oils* are dissolved, attenuated, and exalted, so as to become extremely pungent, and when the several Humours of the Body tend towards Putrefaction; *Vinegar*, or some other *Acid*, moderately administered, and sufficiently diluted, may be exceeding

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* Vide *Friend's Comment* on Fevers.

proper: For *Vinegar* * is an acid, volatile, penetrating, unctious Liquor, that makes an Effervescence with Alkalies, cools the human Body, prevents the Effects of Drunkenness therein, and prevents all manner of Putrefaction and Corruption. It is not of a coagulating nature, like all other Acids, but attenuates, incides, and resolves Obstructions.

257. Hence many excellent Authors recommend the Use thereof in several acute Cases, as particularly in the *Pleurisy*, *Peripneumony*, *Small-Pox*, *Plague*, and *burning Fevers*; where the Blood and Humours are too thick and viscid, or where the several Juices tend towards Putrefaction. And therefore all that we mean by this Caution is, not to depend intirely upon *Acids*, or to exhibit them in too large Doses, or to mistake the Nature of other Acids, from what has been said concerning *Vinegar*.

258. *Thirdly*, All *Narcotics* or *Soporifics*, of which *Opium*, and its several Preparations are the chief, are destructive Medicines in the *Beginning* of this Disease; there being no one Drug yet known, which in so small a Quantity, affects the Brain and Nerves like
Opium.

* Vide *Boerhaave's Chemistry*.

Opium. This is what I advise all young *Practitioners* to avoid giving their Patients, in the *Beginning* or *Increase* of *ardent Fevers*, let them be never so restless and uneasy; because the Membranes and nervous *Fibrillæ* of the Brain are, at such Times, too tense and contracted to give way to a Relaxation necessary for Sleep; so that instead of Rest, the Sick will be delirious and frantic. I have known several Persons die raving mad, by the unskilful Administration of an *Opiate*, in acute Disorders. *Sydenham* says, he once ordered it on the *twelfth* Day of this Disease to good Purpose, but he never knew it used sooner with any success; but if it be deferred to the 14th Day, it will succeed better, Separation then being more perfect: and indeed if the Patient be purged before the taking the Anodyne, it will prove more effectual.

259. *Fourthly*, I have known some raw and unexperienced *Practitioners* endeavour to repress the *bilious Vomitings*, which commonly happen in the Beginning of this Disease, with *Salt of Wormwood Draughts*; whereby they have precipitated the Destruction of their Patients. For not to mention the great Benefit *Nature* aims at in e-

jecting so much acrid, sharp, irritating Matter, which if absorbed or imbibed into the Blood, would vastly augment the Fever; the *Salt of Wormwood* being a caustic and fiery Salt, is exceeding improper at such times. All *alkaline Salts* are dangerous Medicines in this Disease; for as they have a Power of immediately rendering our native Salts of a sharp, pungent Nature, and acting upon them like so much volatile, alkaline Salt introduced into the Body;* thereby they turn our half-fixed Salts into such as are truly volatile; those that before were of a benign, gentle nature, into such as are fiery; those that were neutral and innocent, into such as are corrosive, &c. On which account they act like Poison in all such Distempers where the animal Salts and Oils are too much attenuated and exalted; as in *acute Fevers, inflammatory Cases, &c.*

260. Hence many Men not duely attending to *Nature's* Direction, or not knowing the Seat or Cause of the Distemper, attempt to ease the Symptoms instead of the Disease; and thereby oftentimes create new and unheard of Disorders. I lately met with an Instance of this kind, where a *hale, lusty, young*

* Vide *Berthollet's Chemistry*

young Man, in the full Vigour of his Age, being seized with an *acute continual Fever*, and incessant Vomitings of bilious Matter, had taken *two Drams* of *Salt of Wormwood*, by the Direction of his *Apothecary*; the next Morning I found him raving mad, and notwithstanding *Bleeding* thrice repeated, several Stools procured by *emollient Clysters*, and *Vesicatories* applied to his *Back, Arms, Thighs*, and lastly to his *Head*, the *Phrensy, Distension of the Nerves, Subsultus Tendinum*, &c. continued 'till the tenth Day, on which he died.

261. *Fifthly*, Great Care likewise is to be taken not to apply *Blistering Plaisters* too soon; that is, whilst the Fibres are too rigid and stiff, the Heat very intense, and the Pulse exceeding full, strong, and quick. This is a Caution to be observed notwithstanding the Head and Nerves should be affected in the Beginning of this Distemper; for those who are delirious with an acute Fever, and a parched Tongue, die quickly upon the Application of *Blistering Plaisters* (says *Baglivi* *,) and most of them are seized with Convulsions before they die. And besides, there is nothing that follows the Ap-
M 3 plication

* Vide de Ufu & Abusu Vesicantium.

plication of blistering Plaisters so soon as Thirst, with a Dryness of the Tongue; which sometimes is so great in Persons not delirious, that nothing will pacify it but continual gargling with Water.

262. If we reflect on the Nature of *Cantharides*, how can we expect, in the *Beginning* of this Disease, any other Consequences from the use of them, whose Composition is chiefly of the most subtil, pungent, caustic, fiery Particles? That they are small enough to enter the *Vasa inbalantia*, and pass along with the reflux Blood, is evident from the *Disury* so frequently complained of after the Application of Blistering Plaisters; and if the Particles of *Cantharides* continue to be so pungent and caustic after they are secreted and diluted with the Urine, as to stimulate and inflame the *urinary Passages*, what bad Effects may we not expect from them, when they pass through the minute capillary Vessels, which are already too tense and contracted? For since the Coats of the capillary Vessels bear a much greater Proportion to the contained, small, cylindrical Fluid, than in larger *Tubuli*, the Properties or Qualities of any Medicament will

will produce more considerable Effects in the former than in the latter.

263. I am not unacquainted that the learned Dr. Friend * recommends *Vesicatories* in *ardent acute Fevers*, and says, “any one
“ may very justly affirm, that more Persons
“ have been freed from Fevers by this Method of Cure than by any other; nay,
“ says he, one may solemnly averr, that
“ more People have been recovered by this,
“ than by all the rest.” To which I intirely agree, when they are properly applied towards the *stationary Period* of the Fever, when the *Solids* begin to flag, and stand in need of a *Stimulus*; or when the natural Operations are insufficient to discharge the morbid Matter through the excretive Glands without such Assistances. But on the contrary, whilst the vital Powers are too strong, whilst the Vessels and Fibres are too rigid and dry, whilst the Blood and Lymph are viscous and inspissated merely by the Intenfeness of the Heat, and whilst all the Efforts of Nature are sufficiently strong, the Application of blistering Plaisters must needs be improper.

264. The great Use of blistering Plaisters is where the Lymph abounds too much, and where the animal Vessels are too lax and feeble: In such a Case they do service by discharging part of the Lymph, and by exciting lively Motions, and brisk Vibrations or Oscillations in the Fibres; whereby the Heat is augmented, the Pulse are quicken'd, the Fluids are more intimately mixed, and the natural and healthy *Crafsis* of the Blood is restored. Daily Experience assures us that the Elasticity, Tension, and contractile Power of the Fibres are vastly increased by the Application of blistering Plaisters; whence the constituent *Fibrillæ* of the *Membranes*, *Muscles*, *Arteries*, *Veins*, *Nerves*, *Lymphatics*, &c. do contract more vigorously, and make more forcible Impressions upon the Fluids; the Fluids being propelled with greater Velocity than before, rebound upon the Solids; and by this mutual Action and Reaction, the sanguineous Mass is heated and inspissated.

265. Hence it evidently appears, that in the *Beginning* of *ardent Fevers*, where the Blood is already too dense and acrid, where the Velocity of the Circulation is too great, where the several Humours of the Body tend
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towards an alkaline Acrimony, and where all the Effays of Nature are made with the greatest Strength and Violence; here, I say to screw up the Tension and elastic Force of the Fibres to a greater height, and to provoke them into more frequent and stronger Contractions, is only to increase the Complaints. Whoever wants further Proof of these Effects of *Cantharides*, let him consult *Bellini de Stimulis*.

266. *Sixthly*, Innumerable Mischiefs arise from keeping the Air of the Room of a feverish Person too hot *, by depriving the Patient of the Benefit of Refrigeration by cool Air: for there is great Use to be made of temperating feverish Heat by outward Air, so that it be done with Safety; that is, so as not to disappoint the Intention of keeping up a due Quantity of Perspiration. Nothing is more earnestly desired by the Patient than the breathing cool and fresh Air; and that the Blood is cooled by the Action of Inspiration, is a Matter past doubt. Besides, the sulphureous, animal Steams, if they are pent up in the Room, will destroy the Elasticity and vital Spirit of the Air; whence Respiration becomes difficult, a general Uneasiness

* Vide *Arbuthnot* of Air.

ease arises, the Sick throw off the Clothes, toss about, and sometimes get out of Bed in quest of cool Air.

267. Dr. *Halley* * found by undoubted Experiment, that a Gallon of Air, included in a Bladder, and by a Pipe reciprocally inspired and expired by the Lungs of a Man, will become unfit for any further Respiration, in little more than one Minute of Time; and though its Elasticity be but little altered, yet in passing the Lungs, it loses its vivifying Spirit, and is rendered effete, and not unlike the *Medium* found in Damps, which is present Death to those that breathe in it; and which in an Instant extinguishes the brightest Flame, or the Shining of glowing Coals, or red-hot Iron, if put into it. By an Experiment also of Dr. *Hales* †, 74 cubical Inches of Air could not supply him half a Minute without Uneasiness, and not one Minute without danger of Suffocation; but if he had been shut up with a proportional Quantity of Air, which consequently must have been spoiled, not only by the Steams of the Lungs, but of the whole Body, the same Quantity would not have supplied him

* Vide Phil. Transf. N^o. 349.

† Vide Statical Essays, vol. II.

him so long a time. Hence it is evident, that renewing and cooling the Air, or perflating the Patient's Room, is absolutely necessary to support the Spirits, to abate the Heat and Rarefaction of the Blood, and to prevent an alkaline Disposition in the Humours.

268. *Seventhly, Heaping on too much Clothes*, under the Notion of encouraging Sweat, is a pernicious Custom; because it confines the Heat of the Body, and thereby increaseth it.

269. *Eighthly, Too little Covering*, especially in the Winter Season, may have as bad an Effect; for if cold Air has too free Access to the Surface of the Body, it acts as a *Stimulus*, constipates the excretory Ducts of the miliar Glands, and condenses the Fluids contained in them, into a greater State of Viscidity: Whence a Sweat may be interrupted, which might otherwise have broke out.

270. Proceed we now to those *Medicaments* which daily Experience testifies to be salutary and useful, in the *Beginning* and *Increment* of this Disease; but first of all give me leave to observe, that as a Fever is only an Effort of Nature, arising from the mere
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Mechanism of the Body, to solve the Obstructions, and cast out of the Body whatever is offensive to it; so whilst the Symptoms are but moderate, there does not seem occasion for many Medicines; it being the Duty of a Physician to follow the Guidance of Nature, and not be too officious, lest he should interrupt her Proceedings instead of assisting her.

271. *Hippocrates* * used but very few Remedies in the Cure of acute Fevers; for abating a gentle *Vomit*, *Clysters*, or the like in the *Beginning*, he depended chiefly upon cooling, diluting, absterfive *Ptisans*, variously contrived, according to the Genius of the Disease; and leaving the rest to *Nature*, expected a *Crisis* with Patience and Watchfulness.

272. *Sydenham*, that diligent Observer of Nature, assures us that when the Fermentation (that is, the Heat) was neither too high nor too low, he left it in that State, and used no Remedies, unless he was obliged to do something by the Importunity of the Sick, or his Friends about him, that might please them without hindering his Design.

273. Hence the Physician is sometimes under a necessity of prescribing *Non-significants* merely to preserve his Character, and not be thought negligent or ignorant of the Cause of the Disease. The officious busy Tempers of some Men have greatly prevented their observing, as they ought, the Tendencies of Nature; they think to force a *Crisis* when they please, by boldly administering strong and powerful Medicines; whereas it may be, the greatest Benefit is to be done by the most simple, easy, and gentle Means, or, perhaps, by leaving it intirely to the Management of Nature. Many Instances might be alledged to shew what vast Advantages have accrued by a strict Attendance to the Demands of Nature, without pouring in a Load of Physic. Nature is oftentimes conquered by obeying and humouring her; for by diligently watching and observing the Ways and Means she makes use of, in order to free her self from the Disease, and then joining with her in the same Undertaking, when she needs our Assistance, we compleat the Cure which otherwise might have been very uncertain.

274. It is a Precept to be held by all (says *Willis*) that you diligently watch and wait
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upon the Footsteps of Nature: which if it works wrongfully, its Disorder is to be reduced; if rightly, yet too vehemently, to be bridled: If she works rightly, yet too slowly, or more weakly than she should, the Business will be, that her Endeavour may be incited, and assisted by the Help of Medicine. A great Secret therefore, in curing Diseases, is to distinguish rightly between the Efforts of Nature, which are to be assisted, and those of the Distemper, which are to be destroyed.

275. Hence it manifestly appears, that all our *curative Indications* are to be taken from the present *Phænomena* of the Disease, and a diligent Observance of Nature, which way moving to help her self; that is, if Nature makes but faint or weak Overtures, or if the incumbent Weight is likely to be too great for the utmost of her Strength, it is then our Business to assist her in such a way as she seemed of herself to direct.

276. Thus in the Cure of this Distemper, if *Bleeding, Vomiting, and diluting Medicines* have been properly prescribed, and yet the Pulse continue to be too full and quick, and every Organ seems to labour and struggle to get rid of some offensive Matter; our next Step is, if the Body be costive, to inject *lenient,*

cooling Clysters pro Re nata: for a smooth emollient Clyster not only brings away the intestinal Load without any Violence or Disturbance to the Body, but it is a warm Bath to the Bowels, whereby it supples and relaxes their Fibres, and abates the too great Constriction of the excretory Ducts which open into them. Many of the most fluid and subtile Particles also of the Clyster, may be conveyed into the Blood through the *Vasa inbalantia*, and mix with and attenuate the Fluids, and thereby render the excrementitious and morbidic Humours minute enough to pass through the Glandules and Ducts situated in the Membranes of the Intestines.

277. Hence *Clysters* do oftentimes discharge a deal of Matter from the Blood, as well as bring away the harden'd, fetid Excrements. And let me add, that if the *Fæces* were suffered to remain in the Intestines too long, they might do much mischief, and that for the following Reasons; *viz.*

I. When the Belly has been long shut up, and immoderately charged, some part of the *Fæces* may be percolated into the Blood, contrary to the common Design of Nature, and thereby not only augment the
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Quantity of the Fluids; but mix with them some vitiated Matter.

II. The excessive Heat of the Body must necessarily produce an Abundance of nasty, stinking Fumes from the *Fæces*, if retained longer than usual; and such putrid, corrupted Vapours may possibly get into the Blood, and prove very noxious and hurtful to the Constitution.

III. The hardened *Fæces* may dilate and distend the Intestines in such a manner, as to press upon and obstruct the excretory Ducts of some of the *intestinal* and *mesenterial* Glands, and by that means prevent the flowing in of the Juices: For we are assured by Experiment, that the thinner part of the Blood will ouze through every part of the mucous Coat of the Intestines; and that when large Quantities are secreted into the Cavity of the *Viscera*, it is not only from the *Ductus Pancreaticus*, *Cholodochus*, or other large and visible Ducts; but also through an infinite Number of extremely minute, secretory Vessels, dispersed throughout the intestinal Tube.

IV. If the Intestines are very replete with harden'd Excrements, it may so happen that they may press upon, and hinder the
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free Descent of the Blood through the *Iliac Arteries*; or they may retard the Motion of the Blood in the Coats of the much distended Bowels: Hence the Heat may be increased by accumulating the Blood in the other Vessels, and the Head may be affected by reason a larger share of Blood will be propelled into the *ascending* Trunk of the *Aorta*, from the *Impedimentum* it meets with in the *descending*.

278. *Clysters* therefore may be useful, if the Belly does not answer, 'till the *tenth*; nay sometimes to the *twelfth* Day of this Disease, especially if Bleeding has been neglected in the beginning; but they are not to be continued afterwards, lest they drain too much from the Blood, and thereby interrupt a *Crisis*.

279. Another Caution is, that the *Ingredients* with which they are made ought to be quite mild, so that they produce but one or two Stools; for should they exagitate the Blood, and occasion many Stools, they would protract the Disease, by thickening the Juices, and retarding Nature's Work in concocting the morbid Matter.

280. This also is to be observed, that *Clysters* are not so successful, neither should

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they be repeated so often, in old People as in young. To conclude this Head, Experience teaches us that great Advantages are received when a moderate, fetid Discharge is procured either by Art or Nature.

281. Proper Evacuations being considered, our next Dependence in the *Beginning* and *Increment* of this Disease, is upon such Medicines as will blunt, absorb, and sweeten all acrid, sharp, irritating Juices, which stimulate the Fibres, increase their Tension, and quicken their Vibrations; from whence the Blood is too impetuously moved, the Heat is increased, and the Blood inspissated.

282. *The testaceous Powders*, and particularly the *Pulv. è Chel. Canc. comp.* are generally prescribed for this purpose; though some among us deny the Possibility of these Medicines entering the Circulation, let them be ever so finely levigated; but not to enter into this frivolous Argument, we constantly observe the best, and most experienced *Physicians* prescribe some Preparation or other of the testaceous Drugs, in the *Beginning*, and *Increase* of *acute Fevers*, and believe them to be very beneficial in correcting and subjugating the sharp, acrid, corrosive Humours, both in the *Primæ Viæ*, and in the Blood
and

and Lymph, and also by gently disposing the Sick to a more plentiful Perspiration, and sometimes to little breathing Sweats, without augmenting the Heat of the Body, or endangering Inflammations, &c.

283. *Nitre*, or some Preparation or other of it, is most times joined with the *testaceous Powders*, or dissolved in the *Drinks*, in the *Beginning* and *Increment* of *ardent Fevers*, in order to cool and abate the Rarefaction of the Blood and Humours, which it does in the most effectual manner; it being of a very refrigerating Nature, and allaying the Heat of the Body better than any other Medicine whatever: On which account this *Salt* is highly esteemed, and constantly used in all Distempers where the Blood boils with fervent Heat.

284. For my part, I prefer pure *Nitre* before any Preparation of it, which instead of improving, may really alter its nature, or render it impure. Thus the *Sulphur* which is thrown upon *Nitre*, whilst in Fusion, in order to make *Sal Prunellæ*, may leave such Matter behind it, as may render it hot, acrid, and alkaline, or not so good a Medicine as before; for it is certain that purified *Nitre*

may be turned into a fixed *Alkali* *, as violent as *Salt of Tartar* it self, merely by putting a small Portion of *live Charcoal* into the Crucible, whilst the *Nitre* is fusing: Whence I should think the *Lapis Prunellæ* is to be suspected, as being a sort of *Sal Polychrestus*, or at least pure *Nitre* is preferable to it, as containing nothing suspicious, and being the most effectual Cooler of the Blood in all Nature. Some, says *Geoffroy* †, have without ground suspected *Nitre* to be of a fiery and caustic Quality; for which they have had no other Foundation but the Authority of the Antients, who called their *Nitre* caustic, and the Deflagration of our *Nitre* with *Charcoal*. To correct this imaginary igneous Quality, they order it to be burnt with *Brimstone*, or some such Substance. But, in the first place, all these Operations have proceeded from a Mistake; and, in the next place, these Concretions rather destroy than improve the natural Qualities of *Nitre*; and accordingly, the best Chemists agree that *Salt-petre* well purified and crystallized, or melted and formed into little Tablets, by the Name of Crystal

* Vide *Boerhaave's* Chemistry.

† Vide his Treatise of fossil, vegetable and animal Substances.

Crystal Mineral, is to be preferred to all the other Preparations of it.

285. When the Head is vastly affected with racking Pains, or when an obstinate Watching threatens a *Delirium*, *Epithema's* are profitable, of the warm Flesh, or Inwards of Animals, applied to the Soles of the Feet; or I have known good Success from bathing the Feet in warm Water, which relaxing the Vessels, and encouraging the Blood to descend more freely into the Feet, has, by that means, caused a *Revulsion* from the Head, and laid the Sick placid and easy, and sometimes inclined him to sleep.

286. Setting the Patient upright, if he be strong enough to bear it, or bolstering him up with Pillows, may also be serviceable, by retarding the Motion of the Blood to the Head, and abating its Impulse on the *Meninges*, and nervous *Tubuli* of the Brain.

287. We have already taken notice of the great Advantages of letting in, or perfuming the Patient's Room with fresh cool Air; to which we may add, if the Floor be sprinkled with *Oxycrate*, or *Rose-Water* mixed with *Vinegar*, and a little *Nitre*, it might be highly useful; For though it may be suspected that gross Air cannot get into

the Blood either through the Pores of the pulmonary Membranes, or those of the *Epidermis*; yet it is certain that the *Effluvia* wherewith the Air is impregnated, do pass the absorbent Vessels; and consequently an Air, wherein sub-acid, nitrous Matter is plentifully diffused, may be of great importance in reducing the Rarefaction, Motion, and Heat of the Blood.

288. It is well known, that when Air has been confined for some time in a hot, close Room, and is disqualified as it were for Respiration; or when it is grown offensive by the Vapours arising from the Bodies of many People, *Vinegar* will purify it. * And it has been proved by Experiment, that Air which passes through Cloths dipped in *Vinegar*, may be breathed to and fro as long again as the like Quantity of Air which is not thus purified. *Vinegar* has long been looked on as Anti-pestilential; whence it is probable, that there may be a Ferment between this Acid, and the then too alkaline Air, which may thereby be reduced in some degree from its alkaline, to a neutral, more wholesome State; for many acid and alkaline Mixtures produce neutral Liquors.

289. The Rigidity and Dryness of the Vessels also may be abated, by rendering the Air of the Chamber moist, especially in hot and dry Weather. The Lord *Bacon* * observes, that there are Vapours that moisten, refresh, and are proper in burning Fevers, Consumptions, and Want of Sleep; such for instance as *Rose-Water*, *Vinegar*, *Violets*, *Vine-Leaves*, &c. And again, says the same great Man, there are two Things which internally cool and condense the Spirits; and I recommend the same to be tried externally in Vapour. The one is *Nitre*; which I would have dissolved in *Malmsey*, or *Greek Wine*, and the Smell of the Wine received; or, to make it more forcible, pour some of it upon a heated Fire-shovel, as they do *Rose-Water*, and *Vinegar*. The other is distilled Water of *Wild-Poppy*, which may be mixed in equal Parts with *Rose-Water*, and so received, with the addition of a few *Cloves*, in a perfuming Pan.

290. *Lommius* † advises the Room and Bed to be strewed with the Branches of *Willow* or *Vine*. And I once remember (says *Boerhaave* ‡) that having a Patient

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who

* Vide Sylva Sylvarum.

† Vide Cure of Fevers.

‡ Vide his Chemistry.

who was exceeding restless and delirious in a Fever ; I brought a Bough of *Elder*, with the Flowers on it, into his Chamber, and putting them into some warm Water, they breathed out their native Spirit into the Room, after such a manner, that the Man was soon composed, and fell into a quiet Sleep ; out of which he awaked greatly refreshed, and afterwards recovered. Something like this I lately met with. Being called to a young Man in a violent Fever, I found him almost suffocated under a great Heap of Bed-Clothes, and in a very close, small Chamber. When I first open'd the Door, I never smelt any thing more disagreeable, and indeed I refus'd staying in the Room 'till the Door and Window had been open'd some time ; I also order'd the Room to be sprinkled all over with Vinegar. When I returned, my Patient told me I had cured him already, for he could now breathe with great Ease, and found his Spirits vastly revived. Indeed, he seem'd to recover from that Time, having a very good Night's Rest afterwards.

291. In short, the Administration of Steams or Vapours has not, as yet, been adverted so much as it seems to deserve ; there being

being nothing to contra-indicate their Use, nor hardly any Distemper but what they may be suited to. Dry and tense Fibres may be softened and malaxed, by their Humidity and Smoothness; moist, flabby, and loose Vessels may be rendered more elastic by such Steams as contain acrid, pungent, stimulating Particles; alkaline Humours may be altered into a neutral State, by acid Vapours; and *vice versa*.

292. *An immoderate Looseness* sometimes happens towards the Height of this Disease, especially if necessary Vomits were omitted in the Beginning; and this sort of Looseness is dangerous, because the Sick is enervated thereby, and a *Crisis*, or Depuration of the febrile Matter is retarded many Days longer than it would otherwise have been. In such a Case, a gentle *Emetic* may still be proper, and afterwards moderate *Astringents*, and *Opiates*, must be complied with, in small Quantities.

293. When *Spots* appear in Fevers, take care how you make any Efforts upon the *first Passages*; because if they should repel the Matter back again into the Blood, *Anguish*, *Difficulty of Breathing*, *extreme Prostration of Spirits*, *Delirium*, and *Convulsions* commonly

commonly follow. The later the Spots appear, and the nearer to the *Status* or Height of the Distemper, they are so much the better; for then the Disease tends to a *Crisis*, or Concoction; and therefore the Eruption ought to be promoted by gentle *diaphoretic Medicines*.

294. Having given full Directions for the Management of the Sick in the *Beginning* and *Increment* of this Disease, we come now to the *stationary Period*, where we are to expect the Symptoms to be most violent, by reason a *Crisis* seldom or never happens without an Exacerbation of them. Every Power exerts it self at this time, to subdue and concoct the febrile Matter; the Arteries vibrate with the greatest Swiftneſs, each Veſſel is more than ordinary tenſe and contracted, the Heat of the Body is raiſed to the higheſt degree, the Humours are attenuated and divided by the violent Impulſe of the Solids; and all this is done in order to correct, alter, ſeparate, and diſpoſe the morbid Matter to ſecrete, and be excreted.

295. *Criſis's*, therefore, are only the Effects or Conſequents of the wonderful Fabric and Mechanism of the Body; for in conſequence of the Conſtruction of the ſe-

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veral motive Organs, and of the Affinity and Consent of Parts, when some of the *Viscera* are distended or vellicated, by the Abundance, or Acrimony of the noxious Matter, the whole Machine, by such Irritation, is made to contract more vigorously; and it is surprising to see what vast Commotions or Conflicts arise, how every vital Power exerts it self, and how much the *poor Patient* is distressed, in order to get rid, perhaps, of a very inconsiderable Quantity of morbid Matter.

296. As *Crudity* arises from too strict a Union, or too close a Cohesion of the component Particles of the Fluids; so by *Concoction* of the Humours is to be understood, that they have acquired such a Disposition as makes them more fit than before, to be separated from the founder Portion of the sanguineous Mass, or from the consistent Parts to which they, perhaps, adhered, and to be afterwards expelled out of the Body.

297. This then being the Case, we ought at this time, to be more than ordinary diligent and watchful, and to observe by what means *Nature* attempts to throw off the febrile Matter; for as a *Crisis* is uncertain when it will happen, so also by what Passages

sages or Outlets the morbid Matter will be excreted, is, *à priori*, to us impenetrable. This depends upon the different Degrees of Concoction; that is, if the Matter be properly digested or attenuated, and ground fine enough to pass the secretory and excretory Ducts of the *subcutaneous Glandules*, the Fever is solved chiefly by *Sweat*; in others, where the morbid Matter suits only the *Tubuli* of the *mesenterial* Glands, it goes off by *loose and fetid Stools*; in others, by *turbid Urine*; in some, by *violent Spitting* or *Vomiting*, or by a *spontaneous Eruption of Blood*; and in others, the morbid Matter is cast off from the Blood into the *Interstices* of the *Muscles*, and there forms an Abscess. But by whatever Outlet *Nature* endeavours to throw off the noxious Matter, this may be laid down as a perpetual Rule, *viz.* That she ought to be encouraged and assisted, unless it should happen to fall upon some of the inner *Viscera*, or seize upon some most noble Part, or run off in such Quantities as would inevitably destroy the Patient.

298. Hence it appears that when the Fever has attained its Height, and the offending Matter is concocted, fluctuating, and ready to be evacuated; that is, when the
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Texture, Figuration, and Bulk of the febrile Particles are so altered and commuted, as to be capable of passing the minutest *Foramina* of the Body, and yet *Nature* is not able to direct it to its proper *Exit*; it is then consistent with right Reason to give her some Assistance: but if she seems to be capable of duely finishing every thing her self, we are not to interrupt her by strong Medicaments, or other Irritations, but suffer her to take her own Course in excreting the morbid Matter.

299. Mr. *Boyle* observes, that several *Phænomena* of Diseases may be illustrated by supposing Dirt thrown into a Vial of fair Water, and then the Vial to be shaken; whereby the Water will lose its Transparency, upon a double account; that of the Dirt, whose opake Particles are confounded with it, and that of the Bubbles, which swim at the top of it: yet to purify this Water, and make it recover its former Transparency, there needs no particular Care or Design of Nature; but according to the common Course of Things, after some time the Bubbles will break and vanish at the top, and the earthy Particles which compose the Mud, will, by their Gravity, subside to the
bottom,

bottom, and settle there, whence the Water becomes clear again.

300. Thus in a Fever; when the morbid Matter, or *Lentor*, is attenuated, dissolved, and dislodged from the Capillaries, and set afloat in the Blood, the Blood may be compared to dirty Water, full of heterogeneous or unaccustomed Particles; but according to the common Course of Nature, in virtue of the mere Mechanism of our Bodies, these morbid Particles, being ground fine enough, are oftentimes discharged out of the Body, through some of the excretory Ducts, and the Blood left in a pure State.

301. The first Appearance of Concoction is generally observed in the *Urine*; which, if it hath a white *Hypostasis* smooth and equal, prognosticates a Solution of the Disease; by reason that seems to consist of Part of the peccant Matter, which beginning to be separated from the Blood, or dislodged from the capillary Vessels, mixes with the Urine, and is not usually distinguished from it, whilst this Liquor is warm; but when grown cold, appears in a distinct Form, and on account of its Weight, subsides to the bottom.

302. Hence it follows, that when the febrile,

brile, saline, and sulphureous Particles are rendered small enough to pass the *renal Tubuli*; a little further Diminution will make them fit to be exterminated through the *subcutaneous Glands* by Sweat; and as that is the largest Evacuation which can possibly be made from the Blood, in the same space of time, it is most capable of excreting the morbid Particles, and consequently of giving the most immediate Relief.

303. If, therefore, any Medicines are thought proper, it is consistent with the *Conatus* of Nature to exhibit, at this time, *mild Diaphoretics*, joined with large Draughts of *emollient, diluting Liquors*, in order to promote and forward the *Crisis*; it being most natural to conceive, that a Disease which proceeds from, or is supported by a Stoppage of the Pores, should, when Nature, or a proper Use of Medicines, has prepared the Humours in order thereunto, be carried off by the same Passages; especially if the Work can be accomplished by Means which do not disturb or over-heat the Blood, and is attempted at such times, as Nature herself does indicate.

304. This, says *Lommius*, is the only time when *cold Water* may be given with success;

not

not in order to promote the Concoction, which is now compleated, or suppose it be not, yet it cannot receive any Assistance from the Use of cold Water; but as this cold Water may begin some critical Evacuation either by *Sweat, Urine, Stool, &c.* It has been observed *, on drinking a great quantity of Water, as *three* or *four* Pints at a time, that all the Parts of the Body, and even the Fingers, have been dilated: The drinking of Waters should seem therefore to be of use at this time, by enlarging the *Areas* of the transverse Sections of the Vessels; whence the secretory *Tubuli* may be set to work, and the excretory Ducts kept in full employ to carry off the febrile Matter.

305. As to the *Quantity* of cold Water to be taken in, and what Observations are necessary to be made in drinking it, the above mentioned *Author* † has fully explained in his *Treatise of continual Fevers*, to which I refer the *Reader* for further Satisfaction in this point.

306. We come now to consider what is to be done, when a *Diaphoresis* cannot be raised either by the Strength of Nature or Art; that is, when the capillary Vessels which constitute the *miliary* Glands, are so tense

* Vide *Hales's Statical Essays*, Vol. II.

† *Loënius*.

tense and contracted, or the Texture and Cohesion of the febrile Matter is so strong as to overcome the natural Powers, and render them too weak to alter its Figuration and Bulk sufficient for a critical Discharge by *Sweat*.

307. In such a Case, the most experienced Physicians advise us to make an Attempt upon the *Bowels*, since the intestinal Glands are adapted to throw off corrupted Humours from the Blood, which are too gross to be expelled by any other Canals; and since there seems to be so much Consent between the excretory Ducts situated in the Bowels, and those of the Skin, that when the usual Discharge by one is obstructed, the other is generally increased, and *vice versa*.

308. But in prescribing *cathartic Medicines* we ought constantly to have in view the state of the Patient, to observe each Symptom, and from thence to deduce our Reasons for Purging. To be over-hasty may endanger the Welfare of the Sick; for to measure the Necessity of Evacuation by the Vehemence of the Symptoms, is a Precept not always to be regarded; since we may thereby weaken the Powers of the Body, struggling with those very Symptoms, and disturb

Nature who is working her own Deliverance. And to be negligent and careless, and not to purge at all, or too late, when there is Occasion for it, may be equally dangerous.

309. *Helvetius* * has laid down the following Symptoms, denoting the Humours fit for Expulsion by Stool.

1. The Heat and Dryness of the Skin and Tongue are considerably abated, and those Parts become moist.

2. The Pulse are not so hard and contracted.

3. The Beats of the Arteries are not so dry, and are more distinct.

4. The Parts are less firm to the Touch.

5. The Tendons of the Wrist are more supple, and not so tense as before.

6. The Muscles of the Belly less rigid and more flexible.

7. The Belly, though inflated, yields to the Touch, especially about the *Hypochondria*.

8. The Patient has Grumblings in his Belly, and an Inclination to go to Stool.

9. The Excrements discharged that way, have acquired their proper Coction and Colour. They are not crude, but thick, yellow, or brown.

* Vide his Essay on the Animal Oeconomy.

10. The Urine loses its former Qualities: It becomes less red and ardent, or less crude, and better coloured.

11. The Patient's Thirst is abated.

12. The Violence of the Symptoms, which arose along with the Fever, is mitigated and diminished.

310. Now if these most excellent Rules had always been attended to, and thoroughly understood, the *Cure of Fevers* would have been reduced to greater Certainty than I fear it is at present. *Concocta purgare & movere oportet, non cruda*, says *Hippocrates* *, who very often instituted Purging in *acute Fevers*; and more particularly when they arose from a Redundancy of Bile.

311. If we purge before the Humours are sufficiently concocted, and whilst the whole vascular System is much too tense, there will be only some clear, serous Liquor squeezed out of the intestinal Glands, whereby the *Lentor*, or febrile Matter, will become more gross and viscid, and consequently more likely to fix upon, and be riveted in some of the glandulous Bodies: and if we neglect this Evacuation when the Humours are duely prepared for Excretion; when

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they

* Vide Aphor. 22. Sect. I.

they float about, and are translated from Part to Part, and *Nature* only wants an additional Impulse to discharge them; the Danger will be very great on that side, lest they should seize upon some *Viscus*, and excite a fatal Inflammation.

312. The whole History of Physic does not afford, that I know of, any Instance of Recovery from this Disease, without some Discharge from the Blood; but on the contrary, we meet with innumerable Instances where even a *few Stools* have averted a whole Train of Evils, and delivered the Patient from the very Jaws of Death. We are not therefore to be afraid of raising the Heat of the Body by this Method of Purging; since those Things which are advised at this time, are the most *lenient, mild, and moderate*: and Experience teaches us, that if they discharge their Office kindly, by purging off the cruder Humours, the Urine, at the same time, generally lets fall a thick Sediment, and grows better coloured; the Pulse sink, and beat more even; the Concoction is hastened, and the Cure perfected by repeating the same kind of Medicines at proper Intervals.

313. They trifle egregiously therefore *, who wait an universal Declension of the Fever before

* Vide *Lemnius* on Fevers.

before they purge. For they, by suspending all necessary Assistance, permit a violent Distemper to prey upon the Life of the Patient, and prescribe *Physic* at that very time, which, if the Disease is really decreased, is, according to *Galen*, intirely void of Danger, and when the Body is almost wholly freed from the morbid Matter.

314. From what has been said it plainly appears, that though *Hippocrates's* Rule is perpetually to be observed, *to wit, not to purge in the Beginning of acute continual Fevers*; yet after the morbid Matter is in some measure subdued, when it is attenuated, loosened, and made fit to pass the mesenterial Glands, we may purge with safety, without any danger of increasing the Fever or producing Inflammations. But one Caution may be necessary; and that is, not to give the full Dose at once, but rather at two or three times, at proper Distances; drinking between each, a large Draught of *Gruel* or *Posset-Drink*, by which means an *Hypercatarsis* may be prevented, and the Sick secured from being purged beyond his Strength.

315. As to other *critical* Evacuations, *viz. by Spitting, Vomiting, Hæmorrhage, Abscess, &c.* great care is to be taken not

to suppress them; for as they are oftentimes very important and beneficial Evacuations, they ought by all proper means to be industriously promoted, and by no means suppressed, unless they should prove excessive, and productive of ill Symptoms.

316. Not long since I was called to a young Man, on the ninth Day of an acute Fever, which he caught by working hard in extreme hot Weather, and drinking large Draughts of cold small Beer whilst he was very hot. I found him vomiting up vast quantities of *bilious Matter*, and discharging so much by *Seige*, that *Lypothymies* came frequently upon him; his Pulse were so low and quick as scarce to be felt or distinguished; the extreme Parts were cold; and clammy Sweats broke forth, with Hiccoughs, *Subsultus's*, &c. In short, he was the sickest Man I ever saw that did not die. Upon Enquiry his Friends told me (for he was not able to speak) that his Fever had been exceeding high, with great Thirst, Restlessness, Pains in the Head and Back, *Delirium*, &c. 'till the Vomiting and Looseness came upon him, which, at first, gave him great Ease; but as he had had above a hundred Stools in 48 Hours, and had vomited up several Quarts

of

of such Matter as I there saw, the vital Powers were now reduced so exceeding low, that unless this superabundant Flux could be immediately stopt, Death must inevitably be the Consequence of it, and that very soon. Indeed the extreme, quick, low Pulse, cold, clammy Sweats, *Subsultus Tendinum*, &c. exactly resembled those of an Animal bleeding to death; so that though the Discharge was manifestly *critical*, yet as *Nature* vastly exceeded her Bounds, it behoved me to check and repress her exorbitant Motions, as soon as possible; which, with the assistance of *Opiates*, *Cordial Astringents*, and *Blistering Plaisters*, was happily effected.

317. This brings to my mind the Character which the excellent Mr. Boyle gives of a *Physician*. I look upon a good Physician, says he, not properly as a Servant to Nature, but a Counsellor and a friendly Assistant; who, in his Patient's Body, furthers these Motions, and other things, that he judges conducive to the Welfare and Recovery of it: But as to those that he perceives likely to be hurtful, either by increasing the Disease, or otherwise endangering the Patient, he thinks it his part to oppose or hinder, though *Nature* manifestly seems to endeavour to exercise or carry on those hurtful Motions.

318. Hence we are to follow the Guidance of Nature wheresoever she appears to move right, and within bounds; and if her Efforts are too weak to eject her Enemy, or insufficient to relieve the Symptoms, we are to assist her: But when she over-acts her Part, and endangers Life, by violent Motions, and excessive Excretions, it is our Duty to oppose her; and certainly all Evacuations which result from a Colliquation of the animal Fluids, or which depress the Spirits, and diminish the Strength, beyond a reasonable Degree, are hurtful, and ought by all proper Methods and Medicines to be restrained.

319. We are now arrived to the last and most dismal Stage of this Disease; and that is, when no *Crisis* can be obtained either by the Strength of Nature, or the Power of Art. In this most deplorable Circumstance we can have but little hopes; the Sick must necessarily begin to sink under the too great Weight of the Distemper; the *Plethora* will increase to such a degree of Plenitude, that the Vessels will not be able to push on their contained Juices as usual; and for want of sufficient Motion, the viscid Parts of the Blood will coalesce and form Grumes or Clots; the Humours will stagnate, and become

come more putrid; the quantity of animal Spirits will greatly decay; the Solids will be more and more relaxed; the Pulse will grow low and slow; and a *Stupor*, *Subsultus Tendinum*, cold and clammy Sweats, &c. will now appear, which are remarked above to be the Forerunners of Death.

320. In this Case, the *curative Indications* are quite different from those already mentioned; all cooling, and refrigerating Medicines will now be detrimental, instead of which, sharp, acrid, volatile, pungent, stimulating Things take place. *Blisters* here are of the greatest service, to excite Motion, and to rouse up the drooping Spirits. The languishing Pulse dictates now, and oppressed Nature calls for the most agile Remedies; such as the *volatile Salts*, *Camphor*, *Castor*, *Saffron*, *Rad. Serp. Virg.* *Rad. Contrayerv.* *Theriac. Ven. Pulv. ad Guttetam*, *Confect. Raleighan.* *Alchermes*, *Spt. Corn. Cervi*, *Spt. Sal. Armoniac.* *Lavendul. Sal. Vol. ol. Aq. Pæon. & Epidem. &c.* Some of these sort of Medicines, washed down with large Draughts of comfortable diluting Drinks, are most likely to restore the Power of the Solids, and to thin, divide, and produce intestine Motions among the Fluids; and if Nature

is not too far spent, if the vital Powers, or the Faculties of the Body are not so far weaken'd or depraved, as to be utterly unable to perform the Functions necessary to Life, or at least to actuate and assist the Remedies employed; some such like Medicaments as these may restore a proper Motion to the Blood, and produce a *Crisis*: But should they not be successful, there can be no Objection made against their Use, since, according to the foregoing Theory, they are the only Anchor we have left to depend upon; and it is much more eligible to try a doubtful Remedy than none at all.

321. I have known a Fever baffle all these, and many more Medicines; and when the Patient has lain seemingly in the utmost Agonies of Death, *Nature* has surprisingly brought on a *Crisis*, and those Symptoms which, just before, threatned immediate Death, ceased as it were in an Instant, after the noxious febrile Matter was excluded. I advise, therefore, *young Practitioners*, not to abandon their Patients, or leave them for dead before they are actually so: for should any *old Woman* come in afterwards, and give but two or three Spoonfuls of the most *simple, distilled Water*, and a *Crisis* should happen, merely

merely by the Strength of Nature, I need not say how much such a thing would be reported to their disadvantage.

322. *Hippocrates, de Locis in Homine*, 36. says, When the Disease is extremely dangerous, Experiments ought to be tried: For if they should succeed, you recover the Patient; and if not, he only suffers what would otherwise have happened. To pronounce Diseases incurable (according to the Lord *Bacon**) is to establish Negligence, and Carelessness, as it were by a Law; and to screen Ignorance from Reproach.

323. Let our Care, therefore †, be to comfort and refresh our Patients, in the very Agonies of Death; for 'tis the most scandalous thing in the world for a Physician to turn his back upon a Disease as incurable, and bid adieu to his Patient, two or three days before he dies. We ought still to try new Remedies, and shift about upon several forts, to the very last Gasps: For while the *Soul* hovers within the Body, there is still Hopes to be placed in our admirable Art.

324. Dr. *Turner*, in his *Discourse concerning Fevers*, gives us a surprizing Instance of this kind; and indeed it were doing no
small

* Vide de Augm. Scient.

† Vide *Baglivi's* Practice of Physic.

small service to Mankind *, to make a Collection of the Cures of such Persons as have recovered after being pronounced incurable by the *Doctors*, to prevent them for the future, from fathering their own Ignorance upon the Weakness of Nature; and pretending to the World that the Art of Physic must fail with their Skill. Nor should the Cures of Nature be omitted in such a Catalogue, because they shew what may, possibly, be done by natural Means, to evacuate the morbid Matter, or change its Nature; or else how far the Tone of a Part, or Strength of the Body may be vitiated or impaired, whilst it remains capable of some Restitution.

325. That in acute Diseases, Persons given over by Physicians have recover'd, none will deny. *Celsus* says, it ought to be observed, in acute Cases, that the Signs of Life and Death are very fallacious. And *Hippocrates*, that Master in *Prognostics*, allows them to be very uncertain. Whence we may see the Truth of the *French Proverb*, viz. *It is better to be sentenced by the Doctor, than the Judge.*

326. I shall conclude this Chapter with taking some short notice of the Rules to be observed

* Vide *Boyle* on the Usefulness of Philosophy.

observed after the *Crisis* is compleated, and the Fever gone off.

327. *First, Quæ relinquuntur in Morbis post Crisim, recidivas facere solent**: Whence it has been a general Custom, and surely for good Reasons, to exhibit a *lenient Purge* or two, lest any of the febrile Matter should remain in the Blood, and be liable to assimilate the Humours again, and to generate Obstructions.

328. *Secondly*, When the Blood is perfectly defecated, and purged of all its Recrements, our greatest Care ought to be to recover the Tone of the *Viscera* which may be weakened, either from Obstructions which happened in them during the Violence of the Fever, or from the *Crisis* falling upon them at the latter end. For this Intention the *Bath, Tunbridge, Spaw, Pyrmont*, or other *chalybeat Waters*, with *Bitters*, are generally prescribed.

329. *Thirdly*, Great care ought to be taken in regard to the *Food*; which ought to be slender, light and easy of Digestion: for since the *Viscera* are weak, and the Tone of the whole vascular System is in a great measure abated of its natural Vigour, the Vessels cannot digest or assimilate much, or
strong

* Vide Hippocrates Aphor. 12. Sect. 11.

strong Food. The *Drink* should be smooth, demulcent, nutritious.

330. *Lastly, Moderate Exercise*, in a clear Air, should be used for some time ; by which the Body will be made relatively as well as absolutely lighter ; the Fluids will be ground finer ; the Secretions and Excretions will be properly performed ; the Joints, Ligaments and Muscles will be freed from any excrementitious Matter which may happen to be lodged in them, or hang about them : whence the Strength will return much sooner than it otherwise would, and all the animal Functions will be performed with their usual Force and Vigour.

C H A P. IV.

Of the Antecedents to an intermitting FEVER.

331. **F**ROM what has been said in the preceding Chapters it appears that an *animal Body* is a delicate Machine, consisting of *Solids* and *Fluids* ; and that perfect Health depends upon a just Ballance between the elastic, contractile, impulsive Force of the several Series of Vessels, and a proper
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and

and equable Resistance from the several Orders of Fluids, circulating through their respective Vessels.

332. From this general, though imperfect Sketch of the *animal Oeconomy*, it is easy to apprehend, that Diseases may be brought on by almost innumerable Causes: For whatever will render the Fibres too dry, elastic, and tense, or too moist, supple, and flaccid; whatever will make the Blood too viscid, glutinous and fizy, or too thin, limpid, and serous; whatever will impregnate the Blood with too many active, saline, sulphureous, bilious Corpuscles, or with too many poor, insipid, polite, smooth, watery Particles; whatever will procure in the Humours, a Tendency towards an acid, or an alkaline Disposition; whatever will over and above promote, or retard any of the Secretions or Excretions; and *lastly*, whatever will increase, or diminish the Velocity of the Circulation, or augment, or rebate the vital Heat and Vigour of the Body, beyond such a degree, will be the primary and immediate Cause of some Disease or other.

333. Now which are the *productive Causes* of *intermittent Fevers*, or *Agues*, and from what Sources they spring, is the Business of this Chapter.

334. *First* then, the most common *Procatartic*, or external Cause of this Disease, is *a moist Constitution of the Air*. An observing Person may perceive his Fibres to grow strict or lax; or, in other Words, he may find himself more chearful, brisk, and gay, or more depressed and melancholy, according to the State of the Air; and many who live healthy in a dry Air, soon fall into all the Diseases that depend upon a Laxity of the Fibres, by removing into one that is moist.

335. It is agreeable to common Observation, that the *Inhabitants* of *damp, wet, moist Countries* are generally bloated, leucophlegmatic, and dull; subject to Catarrhs, and Serofities of all kinds, from the Relaxation of their whole vascular System, occasioned by the Moisture imbibed from the Air through the Pores of the Skin.

336. Hence it is, that *Intermittents*, or *Agues*, are so rife in moist, damp Places, near the *Sea-side*, or in low, marshy Grounds; as in the *Fens of Cambridge-Shire*, or in the *Hundreds of Essex*, &c.

337. A very moist Air insinuates it self into the Pores of the most compact Bodies, and consequently it must affect human Bodies to a surprising degree, by relaxing the
Fibres

Fibres, and weakening their contractile Force. If we consider that the external Surfaces of the Body is beset with an infinite Number of *Vasa imbalantia*, which strongly imbibe and absorb the Vapours diffused in the Air, it will be easy to apprehend, that Air abounding too much with watery Particles, must be pernicious to our Constitutions; and that for the following Reasons.

I. When the Fibres are sobbed and soaked in too much Moisture, their most active, strongly-attracting, compounding Particles will be disjoined, and removed further from each other; whereby the constituent *Fibrillæ* of all the Vessels, will swell and grow soft, spongy, flaccid, and relaxed.

II. From a Laxity, Weakness, and want of due Tone and Elasticity in the Fibres, the Pulse will grow weak and slow, and the vital Vigour of the Body will be rebated, in proportion as the *Vis inertiae* prevails; it being a well-known Law in *Mechanics*, that the weakening the motive Powers of any Body, is the same as increasing its Resistances, with regard to its Percussion, and *vice versa*.

III. The Velocity and Force of the Circulation being diminished, the Blood will not be duely attenuated, and the several Or-

ders of Globules will coalesce; whereby the Humours will become viscid and glutinous, or Corpuscles will be formed too bulky to pass freely through the minutest *Tubuli* of the Body: For it is evident from repeated Experiments and Observations, that the Blood may acquire a Viscidity or Foulness, (though of a contrary Nature) either from too languid, or too quick a Circulation. By too slow a Motion, the earthy, saline, and oleaginous Parts of the Blood may aggregate and unite themselves together, for want of proper Power in the Vessels to prevent their obeying their own proper Laws of Attraction, especially in the remotest capillary Tubes, where the Circulation is always slowest; whilst the most serous, watery Parts are squeezed forwards by the weakest Efforts of the Vessels.

IV. Hence the *Secretions* and *Excretions* may be rendered imperfect, and many morbidic Particles retained in the Habit, for want of due Force and Vigour in the vascular System to comminute the Humours, and prevent the Blood-Globules from running into unnatural Grumes and Clots.

V. The watery Particles floating in the Air, may pass directly into the Blood, through the *Vasa absorbentia*, and recurrent Vessels;

and such an Admission of mere Water into the animal Fluids, in large Quantities, may render the Blood and Humours too inert and unactive, by dissolving and breaking the *Spiculæ* of the saline, oleaginous, and bilious Particles: On which account also, the Fibres will be more and more relaxed, and the vital Vigour debilitated.

338. We are assured by Dr. Keil *, that he gained *eighteen* Ounces in one Night, from the moist Air; which is enough to produce surprizing Effects; and, if continued long, to destroy the natural Heat, and vital Force of the several Powers of the Body.

339. Warm-Bathing increasesthe Weight of the Body for the present, though it causes a plentiful Perspiration afterwards.

340. It is not to be inferred from hence, that since Water diffused in the Air, in moist Weather, or damp Places, may produce Diseases in human Bodies, that therefore it cannot be wholesome to drink Water, or to go into the Cold-Bath: † For this Inference will not follow, as will appear if a few things are considered; viz. 1st. That the Water received into the Stomach by Drinking, mixes with the Contents of the Stomach,

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* Vide Medicina Statica Birtannica.

† Vide Lobb's Rational Methods of Curing Fevers.

mach, with the Chyle, with the bilious and pancreatic Liquids, before it passes through the Lacteals into the Blood; and so cannot this way act on the animal Fluids, and Solids, as simple Water; or that Water may do, which is imbibed through the Superficies of our Bodies directly from the Air into the Blood, and Lymph: But yet Persons may drink too much Water, and thereby weaken their Fibres, and too much dilute their Fluids, and bring on, or increase some Diseases. Watery Drinks, in large Quantities, not only sobb the Fibres, and loosen the *Crafsis* of the Blood, but they wash off the saline and oleaginous Particles from the Blood and Lymph, in great Abundance; and consequently can be proper only for those who live freely upon animal Food, and high-seasoned Sauces. 2_{ly}. That the Water in a Cold-Bath, by its Coldness and Gravity, shuts the Pores, contracts all the subcutaneous Vessels, so that but little Water can pass through them into the Body; which is very inconsiderable in comparison with the Water that is imbibed through the *Vasa inhalantia* many Days together in very moist Weather of long Continuance: But though the Cold-Bath is very safe, and need-

ful in many Cafes, yet People ſhould be more cautious in the Uſe of Bathing in warm Water, and of continuing long in it; eſpecially if their Fibres and Veſſels are lax; and their Fluids too thin.

341. From what has been obſerved in the foregoing Sections, we may infer, that it is as requiſite for Perſons to have Fires in their Rooms, when the Weather is too moiſt, for leſſening the Humidity of the circumambient Air, and guarding againſt the ill Effects of it, as it is to have Fires when the Air is very cold.

342. *A moiſt Air*, by being freely admitted into the *Vaſa inſalantia*, may leſſen the Diameters of the perſpiratory Duſts, and hinder Tranſpiration: For as theſe are diſtinct Series of Veſſels, and are reaſonably ſuppoſed to lie parallel to, and cloſe by each other, it may eaſily be apprehended that when the *inhaling* Veſſels are dilated and diſtended by a free Influx of aqueous Particles from the Air, they muſt neceſſarily compress the *tranſpiratory* Tubes, and abate the Efflux of perſpirable Matter; & ſic vice verſa.

343. Hence it is evident how very uſeful and advantageous Exerciſe, and proper Means to promote Perſpiration, are to thoſe who live in a moiſt Air; ſince whiſt they keep

up a due quantity of Perspiration, they are in no danger of the inhaling Vessels attracting and receiving too much Moisture. But the Influence which the *Vasa inbalantia* may have on the transpiratory *Tubuli*, and the Advantages and Disadvantages which may be received by Matter passing into the Body through the absorbent Vessels, have not as yet been animadverted, so much as they seem to deserve.

344. From what has been said it is manifest, that *foul Weather*, and a *cloudy Day* is a Disease alone. It is within the compass of every one's Observation, how languid, dull, and heavy we are in foggy, moist Weather, when the aqueous Vapours hang upon the Surfaces of our Bodies, and insinuate themselves into the animal Fluids, whereby they relax the Vessels, and obstruct Perspiration; and how lively and agile we are in a clear, fine, serene Air, where the perspirable Matter flies freely off, and the Vessels are properly emptied, and restored to their due Tone and Elasticity.

345. The Body therefore may properly be said to be sometimes in a State of imbibing, and sometimes in a State of casting out; or, in other Words, the Body will grow
heavier

heavier or lighter, in proportion to the Moisture or Dryness of the Air, and the quantity of perspirable Matter thrown out of the Body: * For the quantity of perspired Matter found by Ponderation, is only the Difference between that and the watery Particles imbibed from the Air; so that after great Labour and Abstinence, which produces a Vacuity, and a great Diminution of Perspiration, it is possible that the Quantity absorbed, may exceed the perspired Matter.

346. Secondly, *A Diminution of the atmospheric Pressure* may be an *Antecedent* to the Distemper we are treating of: For when the Gravity of the Air is too little, or its Pressure on the external Superficies of our Bodies, is too much abated, the internal Air, or that which is contained in the Vessels, will, by its constant *Nisus* to unbend it self, expand *quaquaversum*, and thereby greatly dilate the Vessels, so as to create general Uneasinesses, as *Yawning, Stretching,* and the like.

347. Hence it is easy to apprehend why your *Valetudinarians* complain of a Lassitude and great Weariness before Rain, or windy Weather, viz. because their Vessels

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are

* Vide *Arbuthnot* of Air.

are relaxed and dilated for want of the usual Pressure from the circumambient Air; and their Fluids are rarefied and expanded more than ordinary, by the Spring of the included Air; and this, in very weak People, is sometimes carried so far, as to give great resistance to the Circulation, and to stretch the nervous *Fibrillæ* to that degree, as to cause the Sensation of Pain.

348. It is well known that Air is a very elastic Body, always exerting it self in proportion to the Abatement of the incumbent Weight which compresses it; so that Mr. Boyle, as we have remarked above, found by undoubted Experiments, that the same quantity of Air, by only having the Pressure of the Atmosphere taken off, in the Pneumatic Engine, and without any adventitious Heat to increase its Spring, would possess above *thirteen Thousand* times its natural Space or Dimensions.

349. Hence we may plainly perceive that a Diminution of the atmospherical Pressure may retard the Celerity of the Circulation; the Lungs will be more weakly inflated; the Chyle will not be properly assimilated; the Globules of Blood and Lymph will coalesce, so as to pass with difficulty through

through the remotest and minuteſt Veſſels; and conſequently the Secretions and Excretions will be deficient at ſuch times: Hence the quantity of animal Fluids will be augmented, and many morbiſic Particles retained in the Habit, which ought to have been excreted.

350. *Thirdly, Hot, ſultry Air* may cauſe a Laxity of the Veſſels: For though we have remarked, §. 15. that if the Air be hot and dry, and continues ſo long, it will render the Fibres rigid and ſtiff, by exhaling the watery, humid Particles from the external Superficies of the Body, and the internal Superficies of the Lungs; yet it muſt be confeſſed, that all Bodies, even the moſt ſolid, are dilated and rarefied by Heat, the conſtituent Particles acquiring a ſort of repellent Force by the Action of Fire, in virtue whereof, they endeavour to recede from each other, with a Tendency contrary to that of Attraction. Hence it is, that every Fibre in an animal Body is ſoftened and expanded, and conſequently its Elasticity is diminished by Heat, unleſs it be very extreme, and continues ſo long, as to deprive the Fibres of a ſufficient Quantity of Moiſture.

351. If we reflect on the Alterations which may happen in the Blood and Humours,

mours, by means of warm Weather, it will appear that the finest, most subtile, fluid Parts may be evaporated in too great Quantities, whereby the remaining Mass may become more dense, viscid, and glutinous; and Corpuscles may be formed too bulky to pass freely through the decreasing Series of Vessels.

352. *Fourthly, Cold Weather* immediately succeeding hot, will hinder Perspiration, and bring on *intermitting Fevers*, or *Agues*; as is evident from their being so common about *Autumn*; and from an old Observation, *viz.* That whenever these Fevers are *epidemical*, the Wind is *East*, or *North-East*, a good part of that time.

353. *Cold Air* is replete with nitrous Salts, which may stop or hinder Perspiration, either by condensing the perspirable Matter, and rendering it too gross to fly off through the excretory Ducts of the miliary Glands; or else by stimulating the Vessels, and overcontracting the Pores. Or, if we suppose the nitrous Particles to be imbibed too plentifully by the *Vasa inbalantia*, it is easy to apprehend that they may abate the vital Heat, retard the Circulation, dispose the Blood to be thick and grumous, and consequently they may diminish the *Secretions* and *Excretions*.

354. Hence we may plainly perceive, that though there is such vast Difference between the Action and Influence of *Heat* and *Cold*, yet it may possibly happen that the same Disease may result from either of them. By the *former*, the Fibres may be relaxed, and in consequence of that, the Fluids may become gross and viscous, and Obstructions may be generated in the minutest *Tubuli*. By the *latter*, the several Orders of Globules in the Blood and Lymph may be condensed, and compacted; in consequence of which, the Secretions are diminished, and the Solids depressed beneath their natural Balance: Both which tantamount to the same thing, and will produce the same *Phænomena*, though brought on by different Causes, and began by different Means.

355. *Fifthly, Too much Rest or Inactivity* must not be omitted in enumerating the *Antecedents* to this Disease; on account of its rendering the Fibres supple and flaccid, and permitting them, and their Interstices to be loaded and stufed with gross, viscid Matter.

356. The vast Difference to be observed between the Strength of active, stirring Persons, and those whose Inclinations and Conditions indulge them in Ease and Slothfulness,

ness, is enough to convince the most unskilful of the great Use and Necessity of muscular Action; in order to clear, and keep the animal Machine free from Incumbrances. The excessive Strength some Men gradually acquire by a constant Practice of vehement Exercise, began whilst they were young, is illustrated sufficiently by the brawny Muscles of *Porters, Plowmen, &c.*

357. Hence, though the Contexture of an animal Fibre be very delicate and tender, yet it improves by Exercise; and by Motion and Agitation becomes stronger, healthier, and more durable. Moderate Exercise not only prevents any slimy, mucous Matter from lodging in the Interstices, or adhering to the internal Surfaces of the Vessels, and casts forth the superabundant phlegmy, watery Parts, which only serve to sob and relax the Fibres; but it makes room for the Apposition of new, solid, nutritive Matter, into the Ruptures, or open vacant Places which may happen in the Fibres; whereby they gain fresh Strength and Springiness.

358. If to these Considerations we add, that by Exercise, the Circulation of the Blood and Lymph is promoted, Perspiration and all the Secretions are forwarded, the Blood
and

and Juices are preserved in a due State of Fluidity, their Viscidity broken and dissolved, and all Obstructions hindered or removed; we may readily conceive the bad Effects of a supine, luxurious Course of Life, whereby the Habit is stult with gross Humours, the Body oftentimes grows to an enormous Size, the Fibres are enervated, and the Juices are thickened, and disposed to deposite a slimy *Lentor* on the sides of the capillary, sanguine, and lymphatic Arteries, and the Orifices of the secretory and excretory Ducts.

359. *Sixthly*, The Solids may be relaxed, the Juices impoverished, and a *Lentor* produced in the Blood, by *living too low, or upon Food of too little Nourishment, or too hard of Digestion*; wherein may be included all *acid, or unripe Fruits, Melons, Cucumbers, &c.* on one side; and all *viscid, tough, glutinous Aliment* on the other. These things, if continued long, or eat in too great quantities, will vitiate the animal Fluids, by supplying them with Particles unfit to be assimilated into Nourishment, or such as are too gross and bulky to pass freely through the capillary Vessels.

360. A Laxity and Weakness of the Fibres and Vessels may proceed from too great

a quantity of *oleaginous* or *pinguedinous* Particles adhering to them: which weaken the Cohesion of their constitutive Parts, and abate their contractile Force: Hence eating too much *Fat, Butter, Oil, &c.* may sob, incumber, and relax the whole vascular System.

361. *Seventhly, Profuse Hæmorrhagies, Diarrhæas,* or any large Evacuations from the Blood and Lymph, will drain the Vessels, relax the Fibres, and dispose the remaining Juices to be viscid and ill-conditioned.

362. Hence frequent *Bleeding* and *Purging*, by way of Prevention, are most absurd Customs, and oftentimes bring on Diseases, instead of confirming Health. And it seems as unreasonable to me, that a Man who is perfectly well, should bleed and purge every *Spring* and *Fall*, to prevent Diseases, as one who should alter the chief Springs and Movements of his Watch, in order to make it go better, or continue to go right, which went perfectly so before.

363. *Preventive Physic*, therefore, is not to be tampered with, since all Evacuations make too great a Change and Alteration in the Constitution to be used indifferently. If there be no real *Plethora*, they must necessarily rebate the vital Vigour of the Body,
by

by decreasing the quantity of Fluids which were not in too great proportion before ; by retarding the Celerity of the Circulation ; by abating the Heat ; by relaxing the Vessels ; by inducing a Viscidity and Thickness in the Humours ; and by diminishing the several Secretions.

364. It is well known, that *Bleeding* and *Purging* are very apt to occasion the Return of *Intermittents*, after they have been cured by the *Cortex*, &c. so that consequently, we may with good reason reckon them, if unadvisedly order'd, where there is no real *Pletthora*, where the *Primæ Viæ* are free and clear, and where all the *Viscera* are sound, as *predisposing Causes*.

365. *Eighthly*, and to conclude this Chapter ; From what has been said, and from the most diligent Observation of the *Phænomena* of *Intermittents*, I think it evident that the constant and common Cause of this Disease, is a Diminution of the due Force and Elasticity of the Solids, whereby the several Humours of the Body are less agitated ; and upon this Retardation of their Motion, some of their component Globules aggregate and unite into *Moleculæ* too big to pass freely through the decreasing Series
of

of Vessels; viscid *Striæ* are left upon the sides of the capillary Tubes; many of the secretory and excretory Ducts are bunged up; Perspiration is obstructed; and the Blood is accumulated in the larger and more pervious Vessels; from whence, as we shall shew in the next Chapter, arises a *Paroxysm* of a Fever:

C H A P. V.

Of the Rise of the most usual Symptoms incident to an Intermitting
F E V E R.

366. **U**PON a Review of what has been said in the preceding Chapter, it manifestly appears, that all the *Antecedents* to this Disease are disposed to unbend the Spring of the Fibres, to create a viscid Blood and Lymph, to retard the Circulation through the capillary, sanguine, and lymphatic Arteries, and to foul or obstruct the secretory and excretory Ducts.

367. Hence the first *Phænomena* that appear, are a *Blueness* or *Lividness* of the *Hands* and *Nails*, attended with a *Rigor* or *cold Chills*, which sometimes are so violent as to
shake

shake the whole Body. The *Pulse* are *low* and *slow*; the *Flesh* feels *cold* and *flaggy*; the *Countenance* is *pale*; *sick Fits* arise, and *Vomiting*; there is a general *Lassitude* and *Uneasiness* all over the Body, with *Yawning*, *Stretching*, and, most times, exquisite *Pains*, either in the *Limbs*, *Head*, or *Back*.

368. That all these Symptoms do arise from a gross, viscid State of the Blood and Lymph, whereby their Motion is greatly retarded, the Tension and Elasticity of the Fibres are relaxed and weakened, and the ultimate Branches of the *Arteriolæ* are clogged and loaded with glutinous Matter; may easily be apprehended by those who consider the Body as a Machine composed of an infinite Number of Organs, through which some Fluid or other is continually flowing; and that the vital Vigour, natural Heat, regular Pulse, healthy Complexion, and Ease of the Body, intirely depend upon a certain Degree of protrusive Force in the several Series of Vessels, and an equable Resistance from the Fluids; whereby the *Crafsis* of the Blood is preserved from being too thick or too thin, the secretory and excretory Vessels are kept patent and pervious, and the

Tone of the Fibres is neither above nor below a healthful Standard.

369. But when the *Vis Vitæ* is decayed and weakened, by an Abuse of some of the *Non-Naturals*, &c. when the Velocity of the Circulation is greatly rebated, the several Orders of Globules both in the Blood and Lymph will coalesce and form Corpufcles too bulky to pafs freely through the capillary Veffels; especially in the Extremities and external Superficies of the Body, where the progrefive Motion of the Blood is slowest, as being farthest from the Heart. Hence,

370. I. The *Hands* and *Nails* look *black* and *blue*, by reason the Circulation of the Blood is slower there, than in any other Part of the Body nearer the Heart.

371. II. *Cold Chills* feize the Body for want of fufficient Agitation in the Fluids to excite the ufual Degree of Heat.

372. III. The *Pulse* are *low* and *slow* from a Laxity of the whole vascular Syftem, and a Glewiness of the Blood and Lymph; whereby the impulfive Force of the Fibres is too weak, and the Friction, or *Vis inertiae* of the Fluids is too great, to be circulated with the fame Rapidity as ufual.

373. IV. The *Flabbiness of the Flesh*, *pale Looks*, and *Languor*, all manifestly proceed from a deficiency of animal Spirits, and want of due Force in the Vessels to attenuate the Blood sufficiently for a free Course through the minutest *Tubuli*.

374. V. *Uneasinesses* and *Pains* arise from the capillary Vessels being stuffed with viscid, glutinous Matter, which retards the Circulation of the Blood and Lymph through them; in consequence of which, the *Arteriolæ* are expanded beyond their usual Stretch, and Pains or Uneasinesses are excited, in proportion to the Distension of the nervous *Fibrillæ*, which help to constitute the arterial Tubes.

375. VI. *Sick-Fits* and *Vomitings* proceed from too great a quantity of *Bile*, and heavy, glutinous *Pituit* being thrown into the *first Passages*, by reason of the Relaxation of the *bilious* and *pancreatic* Ducts, and the Glands of the *Stomach*. The cold, viscid Phlegm, which is cast into the Stomach, first of all occasions Sicknes, that brings on Retchings to vomit, and those invert the Motion of the *Duodenum*; whence the Bile and Pituit are oftentimes brought up in vast quantities.

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376. Thus the Symptoms continue 'till the Obstructions are multiplied in the Capillaries, so as to accumulate the Blood in the larger Vessels, and to shorten its Circle; in consequence of which, a new Set of Symptoms will make their appearance: For on the ceasing of the *cold Chills*, &c. immediately succeeds a *great Heat* diffusing it self all over the Body, with a *full, strong, quick Pulse*, a *difficult Respiration*, *violent Head-ach*, *Thirst*, *Watchings*, *Deliria*, and all the usual *Phænomena* of a *Continuent*. But as there is all the Reason in the World to conclude, from Appearances, that these Symptoms proceed from much the same Causes with those of a *Continuent*; and as they have already been accounted for in their proper Chapter, it would be imposing on the *Reader* to explain them here again. Proceed we therefore in the next place, to a *Statical Examination of the Blood in inter-mitting, quotidian, tertian, and quartan Fevers*, in order to illustrate their Causes, and to examine whether their different Periods may not depend upon a preceding, greater Viscosity of the Blood in one, than in the other.

A Statical Examination of the Blood in an intermitting Quotidian Fever.

<i>The Age of the Person.</i>	<i>The Day of the Disease.</i>	<i>The Quantity of Blood taken away.</i>	<i>The Quantity of Serum.</i>	<i>The Colour and Taste of the Serum.</i>	<i>The Colour and Consistence of the Cruor.</i>
A Man aged 25.	4th.	℥xij, 3j.	℥ij, 3ij.	Bilious and more pungent than usual.	Of a vivid red. Degrees of Cohesion 32.
A young Man aged 19.	6th.	℥viii, 3j.	℥ij, 3iiij.	Pale and insipid.	Of a healthy Colour. Deg. of Cohesion 18.
A Man aged 36.	3d.	℥x, 3ij, gr. xv.	℥ij, 3v.	A bright yellow, and pungent.	Exceeding florid. Deg. of Cohesion 38.
A Woman aged 28.	3d.	℥ix, 3iiij, 3j.	℥ij, 3vj, gr. xij.	Of a good Colour and Taste.	A vivid red. Deg. of Cohesion 24.
A Man aged 42.	5th.	℥xiiij, 3j, 3ij.	℥ij, 3iiij, gr. xvij.	Very yellow, and pungent.	Florid, with a little Film upon it. Deg. of Cohesion 33.
A Man aged 22.	2d.	℥xj, gr. xxxvj.	℥ij, 3j, 3ij.	Pale, limpid, and but little Taste.	A coarse red. Deg. of Cohesion 21.
A Man aged 38.	6th.	℥x, 3j.	℥ij, 3iiij, 3ij.	Flammous, and pungent.	Of a delicate red. Deg. of Cohesion 42.
A Woman aged 34.	2d.	℥viii, 3iiij, gr. xiiij.	℥ij, 3iiij, gr. xviiij.	Thick, chylous, and sweetish.	Pretty florid. Deg. of Cohesion 23.
A Man aged 36.	1st.	℥x, 3j, gr. ix.	℥ij, 3j.	Limpid, pale, and insipid.	Of a lively red. Deg. of Cohesion 17.
A Woman aged 23.	4th.	℥viii, 3iiij.	℥ij, 3v, 3j.	Pale, and insipid.	Coarse and bluish. Deg. of Cohesion 20.
A Man aged 29.	3d.	℥ix, 3vj, 3j.	℥ij.	A bright yellow, and very saline.	A good Colour. Deg. of Cohesion 19.
A Man aged 24.	2d.	℥x, 3ij, 3ij.	℥ij, 3j, gr. xlvj.	Straw-coloured, and pungent.	Of a beautiful red. Deg. of Cohesion 36.

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A Statical Examination of the Blood in an intermitting Tertian Fever.

<i>The Age of the Per- son.</i>	<i>The Day of the Disease.</i>	<i>The Quantity of Blood taken a- way.</i>	<i>The Quantity of Serum.</i>	<i>The Colour and Taste of the Serum.</i>	<i>The Colour and Consistence of the Crur.</i>
A Youth aged 16.	3d.	℥vj, ℔ij.	℥ij, gr. xv.	Pale and insipid.	Very bright red. Deg. of Cohesion 16.
A Woman aged 34.	6th	℥xij, ℥j.	℥iiij, ℔ij, ℔j	Bilious and pungent.	Of a good Colour. Deg. of Cohesion 23.
A Man aged 26.	4th	℥x, ℥ij, gr. xxxv.	℥iiij, ℥j, gr. xxvj.	Straw-co- loured, and well-tasted	Very florid. Deg. of Cohe- sion 32.
A Woman aged 32.	2d.	℥viiij, ℥iiij, gr. xvj.	℥ij, ℥iiij.	Pale and insipid.	A coarse red. Deg. of Cohe- sion 25.
A Man aged 28.	3d.	℥ix, ℥vj, ℔ij	℥ij, ℥ij, gr. xxxvj.	Very yel- low, and pun- gent.	A thin, blu- ish Coat a-top. Deg. of Cohe- sion 34.
A Man aged 46.	6th	℥x, ℥iiij, gr. xij.	℥iiij, ℥iiij, ℔ij.	Of a Straw- colour, and pretty saline.	A delicate red. Deg. of Cohesion 26.
A Man aged 24.	5th	℥x, ℥j, ℔j.	℥ij, ℥vj, gr. xxviiij.	Yellow, and pungent.	Healthy Co- lour. Deg. of Cohesion 17.
A Man aged 38.	4th.	℥xij, gr. xviiij.	℥iiij, gr. xxvj.	Pale, vis- cous, and in- sipid.	A pale red. Deg. of Cohe- sion 19.
A Woman aged 25.	1st.	℥viiij, ℥ij.	℥ij, ℥v, ℔ij.	Milky, and sweetish.	A weak red. Deg. of Cohe- sion 24.
A Woman aged 29.	3d.	℥ix, ℔ij.	℥iiij, ℥j, gr. xiiij.	Pale, and insipid.	A dusky red. Deg. of Cohe- sion 16.
A Man aged 25.	2d.	℥x, gr. xxv.	℥iiij, ℥ij, ℔j.	Bilious and pungent.	Very florid. Deg. of Cohe- sion 26.
A Man aged 37.	4th	℥xj, ℥iiij, ℔j.	℥iiij, ℥j, gr. xxxviiij.	Limpid, pale, and but little Taste.	A vivid red. Deg. of Cohe- sion 28.

A Statical Examination of the Blood in an intermitting Quartan Fever.

<i>The Age of the Person.</i>	<i>The Day of the Disease.</i>	<i>The Quantity of Blood taken away.</i>	<i>The Quantity of Serum.</i>	<i>The Colour and Taste of the Serum.</i>	<i>The Colour and Consistence of the Cruor.</i>
A Woman aged 28.	4th.	℥viiij, 5ij.	℥iiij, 9j.	Pale, viscidous, and insipid.	Of a faint red Degrees of Cohesion 19.
A Man aged 26.	9th.	℥vj, gr.xviiij.	℥ij, gr.xxxviiij.	Of a weak yellow, and brackish.	A coarse red. Deg. of Cohesion 14.
A Man aged 23.	6th.	℥viiij, 3iij, 9j.	℥iiij, 3ij, gr.xxx.	Whey-coloured, and insipid.	A pale red. Deg. of Cohesion 11.
A Man aged 37.	1st.	℥x, 9ij.	℥iiij, 3j, 9ij.	Straw-coloured, and pretty brackish.	Of a good Colour. Deg. of Cohesion 16.
A Man aged 28.	12th.	℥viiij, 3iij, gr.xv.	℥v, gr.xviiij.	Pale, viscidous, and insipid.	A very pale red. Deg. of Cohesion 9.
A Woman aged 22.	5th.	℥viiij, 3j, 9j.	℥iiij, gr.xlviiij.	Limpid, clear, and insipid.	A coarse red. Deg. of Cohesion 22.
A young Woman aged 17.	1st.	℥vij, gr.xxv.	℥ij, 3vj, gr.xvj.	Straw-coloured, and brackish.	A vivid red. Deg. of Cohesion 25.
A Man aged 24.	1st.	℥x, 3j, gr.xv.	℥iiij, 3iij, gr.xxxviiij.	A good Colour, and common Taste.	A pale red. Deg. of Cohesion 18.
A Man aged 36.	18th.	℥vj, 9j.	℥iiij, 3ij, gr.xij.	Pale and insipid.	A very pale red. Deg. of Cohesion 12.
A Man aged 25.	1st.	℥viiij, 3ij, gr.x.	℥ij, 3v, 9ij.	Yellow, and brackish.	Pretty florid. Deg. of Cohesion 26.

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377. Hence we have evident Demonstration of the Viscidity and Glewiness of the Blood in *Intermittents*; and that the red Globules bear a greater proportion than is consistent with Health: Whence we may reasonably conclude, that what has been said concerning the capillary, sanguine, and lymphatic Arteries being fouled, loaded, and many of them quite bunged up, by the adhesion of some fizy, viscid, glutinous Matter to their Sides, is perfectly true, and is the immediate Cause of every *Fit* or *Paroxysm*.

378. From these Experiments we may observe, that the *Crassamentum* is not so viscid and tenacious, neither is the *Serum* so bilious, saline, and acrid, as in *acute continual Fevers*; and also that the red Globules abound more, and the *Cruor* is more viscid or tough in *Quotidians* than in *Tertians*, and in *Tertians* than in *Quartans*: And may not this, therefore, be the chief Reason why the *Paroxysm* of the Fever is generally more severe in *Quotidians*, than in *Tertians*, and in *Tertians* than in *Quartans*?

379. Experience hath sufficiently taught us, that exhibiting hot, acrid, volatile, saline, and sulphureous Medicines, in the *Beginning* of *Quotidians*, or *Tertians*, has oftentimes altered

tered them into *Continuents*; by augmenting the Heat, bracing up the Solids too hastily, and thereby increasing the *Lentor*, and confirming the Obstructions.

380. The *Symptoms*, as we have remarked above, are much the same during the *Paroxysm* of an *Intermittent*, as in a *Continuent*; and the only Reason that I can assign why the *Fever-Fit* of an *Intermittent* does not continue longer, or last for many Days, is because the *Lentor*, or morbid Matter which abounds in the Blood and Lymph, and which lodges in, or adheres to the ultimate Branches of the sanguine and lymphatic Vessels, so as to obstruct the Circulation through them, and to cause a Redundancy of Blood in the larger Arteries, is not so compact, nor coheres so strongly to the Vessels, as it doth in *ardent continual Fevers*: for which reason the additional *Momentum* of the Blood, by means of a *Fever-Fit*, does soon dislodge, dissolve, and attenuate the morbid Matter fit for Excretion, by *Sweat, Urine, &c.*

381. That the Obstructions are perfectly removed, and the febrile Matter excreted, or at least ground and comminuted fine enough to pass freely through the minutest

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Tubuli, without Stagnation or Obstruction, is evident from the Abatement of all the feverish Symptoms, and the Ease which the Patient feels immediatly after a *profuse Sweat*, and discharging a deal of *turbid Urine*.

382. I have several times *analysed* the *Urine* which was made just before, and immediately after the *Paroxysm* of an *Intermittent*; and always found that the *Urine* which was made at the *Crisis*, was vastly more loaded with *saline* and *sulphureous* Contents, than that which was made before, or in the *Fit*: Whence it seems to me that the *Crisis* of every *Paroxysm* of an *Intermittent*, is as perfect, as that of a *Continuent*.

383. Thus much may be sufficient to account for a single *Paroxysm* or *Fit* of an *Intermittent*; but that which is most perplexing is, to give a rational Account of the Cause of its *Periods*, and why it returns at such and such stated Times.

384. In order therefore to enquire into this most intricate Affair, we must look back, and consider the *primary* Cause of this Disease; which, as we have proved above, is a *Laxity* of the several Series of Vessels, whereby the Circulation of the Blood and Lymph
be-

becomes too slow, the Humours grow viscid and glutinous, the Secretions and Excretions are imperfectly performed, and Matter is retained in the Habit, which ought to have been evacuated. Hence Obstructions are generated in the capillary Vessels, the pent-up Matter grows acrid and sharp, the Blood is accumulated in the more pervious and patent Vessels, its Circle is shortned, and consequently its Return to the Heart will be more quick, the Pulse will be more frequent, the Heat of the Body will be augmented, and a Fever will succeed.

385. If we diligently and accurately examine a Patient after the Fit is off, we shall find his Pulse lower and slower than in a healthful State; he is rather cold and chilly than otherwise; and his Muscles and Skin feel flabby and relaxed: so that though the immediate Cause of the Fever is removed, yet the primary or remote one still remains, *viz. A Laxity of the whole vascular System.* Hence the Digestion must necessarily be imperfect, the Chyle is sent into the Blood very gross and crude, Perspiration is obstructed, and morbid Matter, or Corpuscles too bulky to pass freely through the *Arteriolæ*, are generated; and they, by their
Power

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Power of Attraction, do assimilate more and more, 'till the *Lentor* is sufficient to bring on another *Paroxysm*, and that in a determinate time, either *every Day*, or *every other Day*, or *every third Day*, according to the different Degrees of Laxity in the *Solids*, and the assimilating Power in the *Fluids*.

386. From the *Statical Experiments* above, it appears that in *Quartan Agues*, the Blood is most of all depauperated, and the red Globules are broken down; whence it seems reasonable to conclude, that it requires a longer time to assimilate the Particles of the animal Fluids, and to produce a *Lentor* sufficient to bring on a *Fit of a Fever*, when the Vessels are most lax, and the Circulation is slowest: and that the Fibres are most lax, and that the Motion of the Blood is slower between the Fits of a *Quartan Ague*, than it is between those of *Tertian* or *Quotidian*, is manifest to every experienced Person.

387. That this, plain as it is, is the true Reason of the Difference of the *Periods* in *Quotidian*, *Tertian*, and *Quartan Fevers*, may more obviously appear by observing how common it is for a *Quotidian* to decline into a *Tertian*, and a *Tertian* into a *Quartan*, after they have lasted some time, and the

Ves-

Vessels grow more lax, and the Humours are more and more depauperated.

388. If we consider the Consequences of suffering *intermitting Fevers* or *Agues* to remain long, they may also serve to illustrate what has been said: For Experience sufficiently testifies, that the *Liver, Spleen, meseraick Vessels, Glandules of the Intestines*, and many other Passages, are liable to be fouled and obstructed by the morbidic Remainers of *Quartan Agues*, which commonly leave *Obstructions* of the *lower Belly* behind them, with *hard, knotty, scirrhus Glands*. Hence the *Jaundice, Cachexy, Dropsy*, &c. are no unusual Consequents of an *Intermittent* of long continuance: which further shews how far the Tone, Vigour, and Elasticity of the Fibres are decayed, and how much the Temperature of the Humours, and the *Crisis* of the Blood, are spoiled and destroyed.

389. I shall conclude this Chapter with observing, that if the Fever returns every Day, it is called an *intermitting Quotidian*; if every other Day, a *Tertian*; and if every third Day, a *Quartan*. When the Fit returns at regular and stated Times, it is called a *periodical Intermittent*; but when the

Returns are not regular, or at certain Periods, but happen sooner or later, before or after the Time expected, it is called, an *erratic Intermittent*. There are many other Divisions and Subdivisions of this Disease made by some Authors; but as they serve chiefly to confuse the Minds, and to burthen the Memories of *young Students*, I chuse to avoid them.

C H A P. VI.

Of the Cure of an intermitting
F E V E R.

390. **I**N treating of the *Cure* of this, or any other Distemper, the best Guides we can take are a close Attention to the *antecedent* Causes, and a diligent Observation of the *Phænomena*, in the same Order they make their Appearances. I shall begin therefore,

391. *First*, with the *cold Fit*, which always, more or less, precedes the *hot Fit* of an *intermitting Fever* or *Ague*. Now though there is seldom Occasion for exhibiting

biting any thing for the Removal of this Symptom, because as the Obstructions increase in the Capillaries, and the Blood is accumulated in the larger Vessels, the Heat of the Body will necessarily be augmented in some short time ; yet it sometimes happens, in confirmed and inveterate *Agues*, and in *old People*, where the *Vis Vitæ* is much decayed, where the Strength, Tone, and Elasticity of the Fibres are weakened, and where the Fluids are much too grumous and clotty, that the *cold Fit* continues some Hours, and sometimes proves fatal : For it has constantly been observed, that if a Person dies with an *Ague*, he always dies in the *cold Fit*.

392. If the *Cold Fit* therefore be bad, and threatens Danger, either through the Severity of the Disease, or the Weakness of the Patient, we must have immediate Recourse to warm, cordial, volatile, alexipharmic Medicines, *viz.* *Rad. Contrayerv. Serpent. Virg. Antim. Diaphor. Sal. Vol. Succin. Camphor. Crocus, Confect. Raleighan. Spt. Corn. Cerv. &c.* mixed, and washed down with appropriated Liquors, or Juleps ; such as will rouse the drooping Spirits, stimulate the Fibres, excite, quicken and strengthen

strengthen their Vibrations, and consequently accelerate the Motion of the Fluids, attenuate the Humours, and thereby prevent a mortal Coagulation. But as these sort of Medicines are never to be administered, but where the vital Powers are exceedingly decayed, and where the Blood scarce moves on in its Channels for want of sufficient Impulse; we may easily apprehend the bad Effects they will produce, if given to young People, or to those whose vital Vigour is but little rebated; we may set it down for granted, that they will double the Fit, augment the Heat, and render the Sick delirious and frantic, if not change the Fever into a *Continuent*.

393. A *Draught* or two, therefore, of warm *Sack-Whey* may be all that is necessary during the Continuance of the *Cold Fit*; or if there be a Tendency towards Vomiting, let it be encouraged with large Draughts of *Chamomile Tea*.

394. *Secondly*, During the *Exacerbation* or *Hot Fit*, the chief Indications are to attenuate the *Lentor* obstructing in the capillary Vessels; to break, divide, dissolve the Cohesion of its Parts, and to make the Blood and Lymph more fluxil.

395. If we consider with what Power every part of the animal Machine exerts itself during the Continuance of a *Fever-Fit*, in order to comminute the Humours, and to discharge the morbid Matter out of the Habit; and that all this is merely the Result of the stupendous Frame and Texture of the Body: I say, if we consider that the several Organs of the Body are so constituted that in many Cases they are able of themselves to discharge the Burthen, and to get rid of the Incumbrances; it will surely prevent our being too officious, or acting, perhaps, inconsistent with the *Conatus* of Nature.

396. Thus in *Intermittents*, where the *Paroxysms* are light, and where they go off by the Strength of Nature, in *profuse Sweats* and *turbid Urine*, there seems to be little or no Occasion for the *Physician* during the Fit; but if any of the Symptoms are violent, and threaten to last long, it is then our Duty to assist Nature, and to endeavour to abstract from the *Materies Morbi*.

397. And in the *first place*, if the *Patient* be delirious; if the Pulse are very full and quick; if sharp, pungent Pains are fixed in any part of the Body; and if, by the man-

ner of Living, or from an undue use of any of the *Non-Naturals*, we have good reason to suspect a plethoric Habit, *Bleeding* may be proper to abate the Redundancy of Blood in the larger Vessels, to prevent Inflammations from fixing upon any of the *Viscera*, and to promote a *Crisis*. But where the Symptoms are not desperate, where the Pains are neither fixed, nor acute, and where you have no reason to suspect a plethoric State; there drawing away Blood may be detrimental, as it will reduce the vital Strength of the Body, by abstracting from the quantity of Blood, which was not too great before, and by leaving the Fibres in a greater degree of Laxity.

398. *Cooling, diluting Liquors*, however agreeable to the *thirsty Patient*, do not seem to be so useful here as in *continual Fevers*: for since the febrile Matter does not adhere so firmly to the capillary Vessels, nor is the Cohesion of its Parts so strong, but what the additional *Momentum* of the Blood, by means of a *Fever-Fit*, is sufficient to shake, agitate, dissolve, and remove in the space of a few Hours; it seems unnecessary to pour in large quantities of Liquors, which, however smooth, and innocent, will require
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some Force to assimilate them, and by further distending and dilating the larger pervious Vessels, they will aggravate the Symptoms, and prolong the Fit.

399. Whoever will consult the learned *Lommius* *, will be abundantly satisfied in this matter; who tells us, that during the Continuance of an *intermitting Fever*, all Liquids must be as much as possible excluded, the Patient however droughthy, must abstain from them, and be informed that when the Fever goes off, the Thirst will go likewise; and that by drinking, the Fit will run out a greater length; so that he who does not drink, will soonest cease to be thirsty. For much Extenuation is necessary, that the putrefied and impacted Matter, which ought to go off, may be thrown out; which Extenuation is retarded by a large quantity of Liquor.

400. *Blistering Plaisters* are very beneficent in *intermitting Fevers*, especially if the Head or Nerves be affected; for since the Fibres are too lax, and the Fluids gross and glutinous, from too slow a Motion, their Application can never be attended with Danger.

* Vide Treatise of Fevers.

401. *Lenient Clysters* may be proper where the Body is costive; but they should by no means be repeated often, because a constant Drain this way would retard the *Crisis*, by rendering the Blood more viscous, and reducing the Power of the Solids.

402. *Mild, diaphoretic Medicines*, such as the *Pulv. e Chel. Canc. comp. Pulv. Purpureus*, or *Lapis Contrayerv.* washed down with some weak *Sack-Whay*, or a Draught of *Barley-Water*, may be very useful where the Symptoms are violent, in order to promote a *breathing Sweat*, and to forward a *Crisis*.

403. Thus much may suffice for Directions during the *Paroxysm* of a regular *Intermittent*: But if one Fit returns before the last is perfectly gone off, if there be only a short and slight *Remission*, if the Pulse continue to be too quick and full, and if the Urine does not grow foul, or let fall a laudable Settlement, we are to suspect the Sweats as only symptomatical, and that the Fever is what *Bellini* calls a *periodical Continuent*. In such a Case we are to continue the use of *mild Diaphoretics* 'till the febrile Matter is attenuated and made less viscid and glutinous; and as the Fever is near a-kin to a *Continuent*, we may be more free with cool-
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ing, diluting Drinks, than in a regular *Intermittent*; and indeed, in most respects, we are to behave as though it was an *acute continual Fever*, and above all things take care how we exhibit the *Bark* 'till the Intermifion is regular, and lafts some Hours, with an even, fteady Pulse, and a thick lateritious *Hypoftafis* in the Urine.

404. I have feldom had occafion to repent of treating my Patients after this manner; but I have often known fatal Effects from exhibiting the *Bark* too foon, or where there has been only a *Remiffion* of the Fever for a few Hours, without an Abatement of the bad Symptoms. And indeed, if we confider that the *Viscera* are loaded with a heavy, pituitous, glutinous Matter; that the capillary, fanguine, and lymphatic Arteries are ftuff with fizy Blood and Lymph; and that neither of thefe Impediments are perfectly removed when there is only a Remiffion of the Fever; it will evidently appear that the Adminiftration of the *Bark* muft neceffarily be attended with the utmoft Danger: For to conftinge the Veffels, and to leffen the Diameters of the fecretory and excretory Ducts, whilft a *Lentor* is exifting in the Blood and Lymph, can feldom be attended

with success. Add to this, that if there be the least Suspicion of an *inflammatory State* of the Blood, the *Cortex* is direct Poison. Proceed we now to the *curative Indications* during a regular *Intermission* of a *Fever* or *Ague*.

405. *First*, If we consider the Laxity of the Fibres, and the Glewiness of the animal Fluids; that the Stomach is generally loaded with a heavy *Pituit*, and the *Primæ Viæ* clogged with a viscid *Saburra*, it will appear that *Vomits* claim the first place, where there is no inward Injury, or great Weakness to forbid them. For as they wonderfully excite strong Vibrations, and contractile Motions in the Solids, they must consequently shake, agitate and divide the Fluids, and dissolve the Band of Union between the several Orders of Globules which constitute a viscid State of the animal Juices.

406. Experience sufficiently teaches us, that an *Emetic* given two or three Hours before the Fit, is of singular service, by discharging a deal of pituitous, bilious Matter from the first Passages, and by adding to the *Momentum* of the Blood, so as to attenuate the Juices, and to provoke a plentiful Breathing by Perspiration and Sweat.

407. Hence the judicious *Pitcairn* * highly commends the Use of *Vomits*, and prefers them to *Purges*, because the Viscidity, from whence the Fever has its Origin, for the most part, has its Rise from what is taken in by way of Diet, and the *Lentor* is derived from the first Passages: And because Vomits more effectually remove such *Lentor* than Purges, and by the necessarily greater and more frequent Contraction of the Stomach and *Abdomen*, press out that *Lentor* which adheres to the small Vessels, in a short time, which Purges would hardly reach in an Age; and because Delays are dangerous in a Fever, therefore a Vomit ought always to be timely enough given, for its Operation to be over before the Return of the Fit; and may be repeated once, and sometimes twice, at a due distance, if there be a Propensity, or Urging to Vomit, and if the Make of the Person is such, that he can vomit without much difficulty, and is not subject to cast up, or spit Blood.

408. *Secondly*, Though the Preference be here given to *emetic* Medicines, in most *intermitting Fevers*, yet we are not to discard the *cathartic Tribe*: for where the *Primæ*

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* Vide Elements of Physic.

Via are foul, or where we have reason to suspect glandular Obstructions in the *Mesentery*, and *Viscera* of the lower Belly, as it oftentimes happens in obstinate and inveterate *Agues*; great Care must be taken to make proper Evacuations, both by *Vomiting* and *Stool*, and to dislodge those Obstructions, before we think of administering the *Bark*: because if any of the *Viscera* are unsound, or their complicated Vessels obstructed, or the Glandules grown scirrhus, so that the Fibres have not room to vibrate or contract with a sufficient Impulse; if we endeavour to enforce their Springs before the obstructing Matter is dissolved or loosened, the Fibres will only be strained to no purpose, and consequently weakened: for whenever an Effort is made to remove any thing by an elastic Body, if the first Exertion fails, every *Impetus* afterwards languishes, and the Spring is spoiled.

409. We are not indeed to make choice of the most active, strong Medicines, because if too much Lymph be drawn from the Blood, the remaining Juices will become more viscid and glutinous, and consequently the Disease will be increased; but it seems most consonant with Reason and
good

good Practice, to pitch upon such as act rather as *Alteratives*, than strong *Cathartics*, by attenuating the Humours, dissolving their Cohesions, and dislodging Obstructions. Thus the *Pil. Rufi*, *Pil. Stomach. cum Gummi*, *Aloe rosat. with Rhubarb*, *Calomel*, &c. suited to the Strength of the Patient, so as to purge but little, are of singular advantage, as they are adapted to scour the *mesenterial* Glands, and to remove Obstructions, when they are not immediately ejected by Stool.

410. This, perhaps, may seem a *Paradox* to some People, *viz.* That when these sort of Medicines purge but little, they scour the *meseraick* Vessels most; But the Truth of it may easily be apprehended, if we reflect on the infinite Number of absorbent Vessels which are situated all along the intestinal Tube; in consequence of which, these Medicines do pass from the Intestines into the Blood, and when they are secreted by the *Liver*, *Spleen*, *Pancreas*, or *mesenterial* Glands, and brought back again into the intestinal Tube, they may, for the same Reason, if they are not hurried along by a vast Flow of Humours, enter the *Vasa absorbentia* a second time, and so on a third, and fourth, before they happen to be discharged from

from the Body. Whereas the most active and strongest purging Medicines occasion such a vast Flux of Humours into the Bowels, that they are immediately, as it were, discharged; and consequently cannot be supposed to be serviceable in the present Case, by reason they have not the Opportunity of attenuating the morbid Matter, lodged in the *Viscera*; but on the contrary, they leave it more tenacious and adhesive, by draining away the most fluid Parts of the Lymph.

411. But as a happy Success in the Cure of Diseases, is the best Testimony of the Truth of the Theory we ground our Method of Practice upon; I can truly affirm, that in long continued *Agues*, or *intermitting Fevers*, which have baffled the *Bark*, and many other Medicines, I have met with more advantage from *Rhubarb* and *Calomel*, exhibited in small Doses, than from any other Medicines I ever tried. But to proceed;

412. *Thirdly*, Proper Evacuations being made, according to the Urgency of the Case, the next general *Indication of Cure* is to grind, dilute and dissolve the whole Mass of Fluids to a proper Degree of Softness, Smoothness, and Fluidity; to resolve the Obstructions generated by Viscidity and Glewiness;

Glewiness; to render the Circulation free and easy; and to make all the Secretions and Excretions flow in their due Proportion and Order, by restoring a proper Tone and Force to the whole vascular System.

413. Now whatsoever is to be effected by bracing the Fibres, and invigorating their Vibrations, is with certainty to be had from the *Cortex*, which now-a-days is boldly administered; and were its Effects as durable as they are sudden and surprizing, it would doubtless deserve the first place among all Medicines yet known: But there seems to be wanting, in obstinate and confirmed *Intermittents*, something that is more strongly endued with a Property of attenuating and dissolving the viscid Cohesions in the Blood and Lymph: for though it is certain that such things as constrict the Vessels, in any degree, do also proportionally increase the Force of the arterial Blood, and thereby invigorate the Animal; and when the Blood is more forcibly impelled through the smaller capillary Vessels, it will thereby acquire a greater Degree of Heat, and be also more attenuated and digested; yet daily Experience informs us, that the *Cortex* is not self-

self-sufficient to cure many inveterate and confirmed *Intermittents* or *Agues*.

414. The *Modern Practice* therefore, of joining *Rhubarb* with the *Bark*, is an excellent Method, in gross and plethoric Habits, or where there is the least Suspicion of the *Liver*, *Spleen*, *meseraick Vessels*, &c. being fouled or obstructed.

415. The *alkaline Salts* also are, in many Cases, advantageously prescribed either by themselves, or in conjunction with the *Bark*: for as they gently stimulate the Solids, attenuate the Juices, and resolve the coagulated Humours; they consequently must be useful, as proving deobstruent and aperitive. *Boerhaave* * assures us, that this *Salt* is a very powerful Medicine in stubborn *Fevers* or *Tertian Agues*. The quantity of *three Drams* thereof, says he, being dissolved in Water, and taken at several times, in the Interval of two *Paroxysms*, will seldom fail to cure an obstinate *Tertian* or *Quartan Ague*. For by its penetrating and active Virtue, it breaks away all Obstructions in the Capillaries, and opens a Passage for the impacted Matter to escape at, through the Glands of the Skin; whereby all the febrile *Lentor* is
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* Vide New Method of Chemistry.

at length dissolved, and carried clean out of the Body. But, then we must be careful to what Persons we use our Remedy; and be well assured they are able to undergo the Operation thereof: for it might prove of ill consequence to give it to such as are *Ptifical*, *Hectical*, or labour under any *inflammatory* Disorder.

416. *Chamomile Flowers, Diaphoretic Antimony, Myrrh, Gentian, Alum and Nutmeg, &c.* have sometimes been successfully administered; and indeed, in slight *Intermittents*, there are a thousand things, which have, at one time or other, cured them: But in obstinate *Quartan Agues*, when they have been of long continuance, and threaten to degenerate into some *chronic* Disease, we must have recourse to more powerful Medicines to assist the *Bark*, and to prevent the Return of the Fever.

417. Here all *volatile, detergent, and ponderous Medicines* are useful, especially after the Fever is put off by the *Cortex*, to dissolve the fizy Humours, to scour the Glands, to add to the *Momentum* of the Blood, to brace up the Fibres, and to amend and restore a healthful *Crafsis* to all the Humours. I have met with vast Success by joining *Camphor*,

phor, Rad. Helleb. nig. Rubig. Ferri, Cinnab. Antim. Æthiops Mineral. &c. with the *Cortex*, in order to prevent the Return of *Agues*. The whole vascular System is agreeably agitated by the Impulse of these Medicines against the Sides of the capillary Vessels; and the minute Passages are forced open by their Subtilty, Weight, and the increased Velocity of the circulating Fluids.

418. But in such a Case as this, and with such Medicines, it is absolutely necessary to have recourse to the use of constant and proper *Exercise*, which will concur and give energy to them, and be a means of producing their desired Effects much sooner: For whenever the Tone of the Solids is almost spoiled, when the whole nervous System is flaccid and relaxed, the most wonderful Relief is to be found by a constant Course of riding on horseback; whereby so many little, gentle Concussions are given to the Body, and particularly to the lower Belly, that the several Strainers of the Body, as well as the Juices to be strained, are very much affected by it.

419. Hence *Riding* is to be preferred to all other Exercises, where the Patient is able to bear it, because you have sufficient
Motion

Motion given to the Body at the least Expence of Spirits; but then it never should be violent, or continued so long as to tire; for that would do more Hurt than Good, by waisting the animal Spirits, and leaving the Fibres more lax than they were before.

420. The *Cold-Bath*, where Age, or no inward Weakness forbid it, is exceeding proper, especially in the *Summer Season*, to recover the lost Tone of the Fibres, and to grind and comminute the viscid, ill-conditioned Juices, and to prevent *catching Cold*.

421. Being curried well with a *Flesh-Brush* opens the Pores, promotes Perspiration, quickens the torpid Motion of the Blood in the capillary Vessels, enlivens the Circulation of its whole Mass, attenuates the lymphatic Juice, and restores the weak, relaxed Fibres to their proper Tone and Elasticity.

422. A *Removal* from a *cold Air* into a *warm* one, or from a *damp, moist Place* into one that is *dry*, may be of vast advantage; for a good Air, alone, does frequently perform what was, in vain, expected from *Physic*. He that duely considers what has been said above, concerning the *antecedent Causes* of
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of this Disease, will be at no loss to apprehend the Truth of this.

423. The *Aliment* proper for Persons of weak, relaxed Fibres, is such as requires the least Force to digest, and convert it into animal Substances. *Milk, Eggs, Broth, Chickens, Veal, Lamb, Mutton, &c.* are generally easy of Digestion and Assimilation; but all *salted, acid, viscid, glutinous Food* is to be avoided, because it will produce a coarse Chyle, Particles may get into the Blood too bulky to pass freely through the minutest *Tubuli*, Nutrition will be imperfect, the most fluid Secretions may be diminished, the Fibres more and more relaxed, and Obstructions may be generated in the ultimate Series of Vessels for want of Power to comminute, and push forward their contained Juices.

424. *Drinks* proper for People subject to this Disease, are *strong, austere, red Wines*, diluted with *Spaw, Pyrmont*, or some other *chalybeat Water*; or if these are thought too forcible for some weak and delicate Constitutions, *fine Spring-Water* may be used in their stead. All *Malt-Liquor* is pernicious, as it is of a viscous and glutinous Quality, and requires great Strength to assimilate into Nourishment, or convey it out of the Body.

425. Thus it appears of what singular advantage an exact Observance of the *Non-Naturals* is towards the Cure of this Disorder; and I dare pronounce, that more People fail in their Cure, and more Fevers return after they have been put off by the *Bark*, &c. for want of due Care in these things, than from any other means whatsoever.

C H A P. VII.

Of the Antecedents to a Hætic FEVER.

426. **T**HE *predisposing* or *procatartic* Causes of *Hætic Fevers*, are *first*, more than ordinary Evacuations by *Sweat, Urine, Stool, immoderate Fluxes of the Menses, Fluor albus, Hæmorrhagies, Ulcers, or any profuse Discharges from the Blood*; whereby the nutritious Parts run off more abundantly than they can possibly be supplied by Aliment.

427. It is a received Opinion that People of thin, spare Habits, long Necks, of a delicate

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cate Make, whose Veins look blue, and almost diaphanous, from the Thinness of their Coats, whose Flesh feels soft, and whose Nerves are susceptible of the least Impressions, are most subject to this Disease: for as the Make and Contexture of their Fibres is extremely neat and fine, so they are exceeding weak and tender, and consequently more liable to be ruffled and put out of order by any Alteration, or a Misuse of the *Non-Naturals*.

428. Hence the Vicissitudes of Seasons, an Alteration of Climate, a Change of Diet, more than ordinary Sleep, or Watching; too much Exercise, or Inactivity, a Retention of any Matter in the Habit which ought to be excreted, or an inordinate Discharge from the Blood, and the Passions of the Mind, have the greatest Influence over those whose Nerves are weak and tender; and if any of these things are extreme, or continue long, they must necessarily rebate the vital Vigour of the Body, retard the Circulation, and produce viscid, sharp, and ill-conditioned Juices, which in the end may seize upon some of the *Viscera*, generate Obstructions, and lay the Foundation of *Hætic Fevers*, as we shall shew hereafter.

429. Experience teaches us, that immoderate Excretions, by any of the Emunctories, are the Effects of lax Fibres, either in general, or in the Part particularly affected. Thus habitual and profuse Discharges by *Sweat, Urine, Stool, Menses, Fluor albus, &c.* are most certainly the Consequents of a Relaxation of the secretory and excretory Ducts of the *miliary, renal, and intestinal Glands*, and of the *uterine Vessels, &c.* Whence we may reasonably conclude, that though the strongest Persons may, by an Abuse of the *Non-Naturals*, or by some accidental Cause, be sometimes troubled with the above mentioned excessive Discharges; yet before they become habitual, or constant, the Tone, Vigour, and contractile Force of the Fibres must be greatly decayed, either in part, or all over the Body. Proceed we therefore, to enquire after the most general, *procatartic* Causes, whereby the Vigour of the Fibres, even of the strongest Persons, may be reduced, and particular, or general Weaknesses brought on.

430. *First* then, *Too free a Use of strong, spirituous Liquors*, will inevitably destroy the Tone of the Solids, and the *Crasis* of the Fluids, by the stimulating, and strongly attracting

tracting Power of acrid, fiery, caustic, saline, and sulphureous Particles wherewith they abound. We are assured by many obvious and undoubted Experiments, that strong, spirituous Liquors will coagulate the Blood and Lymph; and though, for a time, they may seem to contract and shorten the Fibres, and to give fresh Force and Vigour to them, yet, in the end, they will most certainly corrode, abrade, and wear away some of their constituent Particles, and render them thinner and weaker.

431. Hence the Chearfulness and sudden glowing Heat which distilled spirituous Liquors give to the poor, unhappy, habitual Drinkers thereof, soon cease, and end in a cold, relaxed, and languid State; whereby the Sufferings of these People become very grievous, because nothing will give them immediate Relief, but the same baneful Liquors which were the Foundation of all their Miseries. This, it must be confessed, is a most deplorable Condition, and requires the utmost Resolution and Courage to conquer: They must forego their only Comfort and Delight; they must labour under incessant sick Fits, and Vomitings, with the utmost Horror and Despair; and all these,

these, perhaps, for a long time, before they can recover the due Tone and Vigour of their Fibres.

432. The first Organ that generally is affected, by an habitual Drinking of distilled spirituous Liquors, is the *Stomach*; whose inner, villous Membrane is abraded and worn off by them, and thereby its nervous Coat is exposed to the rude Insults of the most sharp, acrid, fiery Particles; by which means the Springiness or Elasticity of the Fibres is enfeebled, and the whole Stomach becomes soft, flabby, and relaxed. Hence,

I. Arises a *Want of Appetite*, and an Inability of digesting the little that is taken in.

II. From a Weakness of the Stomach, and alimentary Tubes, will ensue *Crudities, Vomitings, Purgings*, and a coarse, viscid Chyle; which will consequently depauperate the Blood, and fill it with Particles too bulky to pass freely through all the decreasing Series of the Vessels.

III. The Glands of the Stomach being greatly relaxed, and their excretory Ducts widened, a deal of gross, phlegmy, pituitous Matter will fall into its Cavity; which will further create *Sicknesses and Vomitings*.

IV. The Laxity of the Glands continuing, they may, in the end, be totally obstructed with viscid, fizy Matter, and rendered hard, knotty, and scirrhus: whence continual Retchings to vomit, and terrible, cruciating Pains in the Stomach.

433. From what has been said, we may easily apprehend the bad Effects which distilled, spirituous Liquors will have on the other *Viscera* of the Body: for since they are disposed to weaken the whole vascular Frame, and to produce a *Lentor* in the Fluids, by fettering and entangling the Globules of Blood, and proving a powerful *Copula* between the most fluid Parts thereof; we may reasonably expect *Obstructions, Tumours, Hectic Fevers, Imposthumes, Abscesses, Ulcers, &c.* to follow a constant use of them, as we shall demonstrate in the subsequent Chapter.

434. *Secondly, Excessive Venery*, without dispute, depauperates the Blood, wastes the Spirits, and very much debilitates the Tone and Vigour of the Fibres, by the violent and intense Contractions they are under at such times, and by draining from the Blood the most volatile, subtile, active, stimulating Particles thereof. Those who are experienced in these Affairs can well tell us, how active, lively,

lively, and agile they are upon refraining some time from venereal Exercise, and how dull, flaggy, and relaxed they seem to be after excessive Debaucheries. Since therefore, a right Discharge of all the animal Functions depends upon a due Tension and Springiness of the Solids, it is plain that whatever disorders and weakens this Disposition of the Fibres, must necessarily prejudice the whole Constitution; and since *Coition*, perhaps, may be the most violent Action the Fibres are capable of, it cannot be doubted, but if it be too often repeated, it will injure their Contextures, and debilitate their Springs: Hence particular Weaknesses may ensue, which oftentimes lay the Foundation of *consumptive Cases*.

435. *Thirdly, Immoderate Grief* is well known to weaken the Nerves, and unbend the Spring of the Solids; to depress the vital Heat, and to hinder the due Communion of the animal Fluids; whence the Appetite is weakened, the Digestion is rendered imperfect, and gross Chyle is sent into the Blood, too viscous to be assimilated as it ought, and consequently unfit for Nutrition, and Excretion: Hence the Circulation is retarded through the minutest Vessels, the

Fluids become foul and grumous, and Obstructions are oftentimes generated, which lay the Foundation of *Hætic Fevers*. *Morton** observes, that all that are upon the Confines of a Consumption are subject to Passion, to Sadness, Hypochondriacal Oppressions, Hysteric Fits, and to a want of Appetite: all which are evident Tokens of weak and relaxed Fibres.

436. *Fourthly, Intense Study* may be prejudicial, by sitting still too much, by hindering Digestion, by wasting the Spirits, by contracting and lessening the Capacity of the Vessels, especially those of the Brain, by too great an Intenseness of Thought, and by rendering Respiration less frequent and strong. Whoever maturely considers these things, and that the Blood receives a very material Alteration in its Texture, from the Action of the Lungs, will readily conceive the bad Effects of a sedentary, studious Life, particularly to Persons of delicate Constitutions, who have naturally a Disposition to form Obstructions in the Glandules, from a viscid, indigested Chyle, and for want of sufficient Power in their several Organs, to attenuate and assimilate the Fluids.

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* Vide Phthisiologia.

437. *Fifthly*, *Living continually in a moist Air*, or upon *viscous, glutinous, oleaginous Food*, may relax the Vessels, unbend the Spring of the Fibres, and dispose the Blood and Lymph to generate Obstructions; as we have demonstrated already.

438. *Sixthly*, In enumerating these things we must not forget a simple, ridiculous Custom of wearing *Flannel* next the Skin; which, as it relaxes the subcutaneous Glands, and their excretory Ducts, will consequently promote Perspiration and Sweat; and since it is generally advised to weakly People, whose Vessels are already too lax, and who sweat too much, it must needs be a very pernicious Custom. The common Excuse for it is, that it dries up the Sweat, and prevents their catching cold; but this is a great Deceit, and so inconsistent with the *Laws of the animal Oeconomy*, that any one, who is in the least versed in them, may easily discover the Fallacy. A *Cold-Bath* will more effectually prevent catching Cold, than a *Flannel Shirt*.

439. But not to carry this Enquiry any further, it appears that whatever will relax, unbend, and destroy the Spring of the Fibres, may be the Cause of profuse Excretions,

tions, and consequently dispose the Blood and Humours to be gross, viscid, and glutinous. And this brings me to consider some other *antecedent Causes of Hætic Fevers*, which though they may seem of a different Nature from those already mentioned, yet they are all sure to spoil the *Crafsis* of the Blood, and to weaken the Vessels.

440. These are, *too hastily suppressing any natural or accustomed Evacuations*; such as the *Catamenia* in Women, the *Hæmorrhoids* in Men, *insensible Perspiration*, *Sweating in the Hands or Feet*, *Fistula's*, *Ulcers*, *Issues*, &c.

441. I. If any *natural Evacuation* is suppressed, and continues so for some time, it is evident that much Matter will be retained in the Habit, which ought in a healthful State to have been excreted: Hence a greater Weight will be laid on the Vessels, and the Blood and Lymph will not only pass through the capillary Arteries more difficultly, but be apt to deposit a slimy Mucus upon any Part that is disposed to receive it. Add to this, that daily Experience, and the established Laws of the animal Oeconomy, sufficiently inform us, that when superfluous Blood, or any of the Humours secreted
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from it, however innocent they may be at first, are pent up in the Body much longer than usual, they will necessarily grow hot, sharp, acrid, and irritating; in consequence of which, they may produce an inflammatory Disposition, which if it should fix upon any of the internal *Viscera*, might probably end in *Tubercles*, *Tumours*, *Abscesses*, *Ulcers*, and deep, incurable *Consumptions*.

442. II. *Accustomed Evacuations* of long standing, oftentimes become, at last, very useful and advantageous, to the animal Oeconomy, by draining from the Blood some superfluous, useless, excrementitious Matter, which otherwise might incumber the delicate fine Vessels, and lay too great stress upon them; or they excrete some putrid, acrid, corrosive Particles, which, if retained in the Mass of Blood, might corrupt the Fluids, and debilitate the Solids.

443. Hence it appears how dangerous it may be to shut up *Issues*, *Ulcers*, *Fistula's*, or to stop *periodical Hæmorrhagies*, *Sweating in the Hands, and Feet*, &c. without proper Advice. An eminent Instance of this, we meet with in the *Philosophical Transactions* N° 272. where a Man by stopping a *periodical Hæmorrhage* in one of his *Thumbs*,
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which he had been accustomed to from his Infancy to the *twenty fourth* Year of his Age, brought on a *Sputum Sanguinis*; which had like to have cost him his Life. I have more than once met with incurable Consumptions, which were brought on by suppressing the Excretion of Sweat in the *Feet, Hands, and Arm-pits*; and others I have known who have impaired their Healths, and rendered themselves weakly and sickly ever afterwards, by the like unadvised Practices: For when *Nature* has chosen, and, for some length of time, exercised new and extraordinary Methods of Oeconomy, she seems to be as fond of their Continuance, as at other times, and in her most regular State, she is of that which is her most usual and ordinary Course.

444. From what has been said it is obvious to every one, how irrational it is to stop any natural or accustomed Evacuation, at least without previously disposing the Humours to pass freely through the minutest *Tubuli*, and strengthening the whole vascular Frame, so as to be able to assimilate the Matter which is retained in the Habit, into wholesome Juice, and to prevent its tending either to an acid or an alkaline Acrimony.

445. *Lastly*, By diligent Observation it appears that there are few Instances of this Disease, which are not some way or other *symptomatical*, or that take not their Rise from some preceding Illnesses*; so that it may be made a question, whether we have any Consumptions *Original*, unless the *Hereditary*, or those which from the Parent are impress'd on the *prima Stamina Vitæ*, in the *Offspring Fætus*.

446. Hence *acute, intermitting, and scarlet Fevers, Measles, Small-Pox, Peripneumony, Pleurisy, Hoarseness, Cough, King's-Evil, Asthma, Green-Sickness, Cachexy, Scurvy, Hypochondriacal and Hysterical Affections*, and many other Distempers oftentimes terminate in a *Hectic Fever*, by leaving the Fibres in a lax, weak Condition, and the Fluids gross, viscous, and fizy; in consequence of which, Obstructions are generated in the *Viscera*: For when some Parts of the Blood are aggregated or united into Corpuscles too bulky to pass freely through the decreasing Series of Vessels, those Canals are most likely to be obstructed, whose Texture is weakest, and where, by their different Windings, and Turnings, the greatest Resistance is given.

Now

* Vide Discourse concerning Fevers.

Now since the Glands are only so many Convolutions of minute Vessels wound up together, it is inconceivable what an infinite Number of Angles and Turnings the sanguine and lymphatic Arteries must necessarily make ; and as the Resistance to any circulating Fluid is according to the *Angle of Incidence*, so consequently the *Lungs, Liver, Spleen, Pancreas, Kidneys, mesenterial Glands, &c.* are the most likely Parts to be obstructed by viscid Humours, as being the greatest Bundles of Vessels wrapt up together.

447. Experience sufficiently testifies, that some of these are the Parts principally affected by the *Antecedents* to this Disease ; and from what has been said, we may reasonably conclude, that the Cause of Obstructions in any of the glandulous Bodies, is a viscid Blood and Lymph damming up the sanguine and lymphatic Arteries ; in consequence of which, the Juices grow acrid, and irritating, and many direful *Phænomena* are excited, as we shall shew in the following Chapter.

C H A P. VIII.

Of the Rise of the most usual Symptoms incident to a Hectic FEVER.

448. **F**ROM the Doctrine of the foregoing Chapter we may observe that the *Antecedents* to this Distemper are disposed to weaken the Tone, Vigour, and Elasticity of the animal Fibres; to enlarge or suppress the natural or accustomed Evacu-ations; and to render the Blood and Lymph viscous and acrid; in consequence of which, Obstructions are generated in the *Viscera*, and the following most usual *diagnostic Phænomena* are produced.

449. I. *A quick, low, weak Pulse* is the first Appearance of a Tendency towards a *Hectic Fever*.

450. To illustrate this in the clearest manner, it may be proper to observe, that the Quickness of the Pulse seems, in a great measure, to be owing to the quantity of re-fluent Blood derived to the Heart, in a given time: for was not the Heart to receive, and cast out the Blood as fast as it returns, it
would

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would presently pen back, and be accumulated in the larger Veins, and produce polypose Concretions, so as to put a stop to all Motion.

451. Now the Quickness of the Pulse in the present Case, is undoubtedly owing to the Laxity, and Dilatation of the several Series of Vessels, whereby the Blood passes with less Resistance through the ultimate, minutest *Tubuli*, and that for these Reasons *.

I. The Vessels being dilated, the Cylinder, whose Base is the perpendicular Section through the Axe of the narrowest Passage of the Canal, will thereby be augmented, and consequently many more Particles than otherwise, get free, without striking against the sides of the Canal.

II. Those Particles which do not strike, are removed to a greater Distance from the sides of the Canal, *i. e.* their Motion is quicker; for in this Case, the sides of the Vessels are as *Fulcra*, and the greater Distances, as longer *Vectes*, and consequently the Celerity as these *Vectes*.

III. The Surfaces of little things have a greater Proportion to their Bulks or Solidities,

* Vide *Cheyne's New Theory of Fevers*.

ties, than those of greater things to theirs; and therefore the internal Surface of a smaller Vessel, will be greater in respect of its contained Fluid, than those of a greater Vessel in respect of its; and consequently against the internal Surface of this dilated Canal, fewer Particles of Blood will strike, than against the same when it was narrower.

452. To demonstrate the Verity of our Theory we need only take notice of the Pulses of young Children, which are always found to beat quicker than those of grown Persons, by reason the tender Fibres of the Coats of their Blood-Vessels, give less Resistance to the flowing Blood. And if we add, that the Pulses of grown Persons are observed to beat faster during Sleep, than at other times, (the ordinary Number of Pulsations in a Minute, being from 70 to 80 under a State of waking and moderate Heat; and from 80 to 96 during the time of Sleep;) it is enough to convince those who are most propense to the contrary, that the Quickness of the Pulse may be increased merely by a Relaxation, or an Enlargement of the Diameters of the Vessels.

453. Another Cause of the Quickness of the Pulse, in the *Increase of Hætic Fevers*,
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may be the profuse Discharges which are oftentimes made from the Blood; whereby the *Impedimentum* from the precedent Blood is in some measure removed, and less Resistance is given to the Motion of the Heart and Arteries. Whoever doubts this, may be perfectly satisfied of the Truth of it, by examining those accurate and ingenious Experiments which Dr. *Hales** hath lately communicated to the World. In Exp. II. he tells us, he took a Horse and tied him down, and opened the *Crural Artery*. The Horse's Pulse beat forty Strokes in a Minute, before he was disturbed or tied down; but when the *crural Artery* was opened, and the Blood let out to the quantity of 10 or 12 Quarts, the Pulse was more and more accelerated, as the Horse grew fainter, so as to beat a *hundred* times, or more in a Minute.

454. Hence it is evident, that though the *Vis Vitæ* was vastly decayed, and the projectile Force of the Blood was exceeding weak, yet the Pulses were extreme quick: And the very same thing we sometimes meet with in consumptive Cases, where the Habit is prodigiously drained by excessive *Sweats*, *Diarrhæas*, &c.

* Vide Statical Essays, Vol. II.

455. A third Cause of the Quickness of the Pulse, in this Disease, may be some Obstructions in the *Viscera*, which, as they shorten the Circle of the Blood, will make its Return to the Heart more frequent, and consequently accelerate the Pulse, as hath been sufficiently demonstrated above, Chap. II.

456. From what has been said, we may deduce the following *Corollaries*.

I. If the Quantity of Blood be suddenly diminished, without any previous Relaxation of the Vessels, the Pulse may be accelerated merely by abating the Resistance of the precedent Blood, or by lessening the *Vis inertiae* of the Fluids.

II. If the Vessels are dilated, though the Quantity of the Blood continues the same, the Velocity of the Pulse may be increased, by abating the Friction from the internal Surfaces of the Canals.

III. If Obstructions are fixt in the *Viscera*, the Pulse will be quick, by reason of a more plentiful Flow of Blood to the Heart; and they will continue to be so, 'till the Obstructions are removed.

IV. The Force of the Blood, and the Quickness of the Pulse are continually vary-

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ing, according to the more or less plethoric State of the Blood-Vessels, and according to a greater or lesser Degree of Tension in their component Fibres.

457. The *Weakness* and *Lowness* of the Pulse are generally owing to a Diminution of the Quantity of Blood, and to an Enlargement of the arterial Tubes; for when the Quantity of Blood is lessened, and the Diameters of the Arteries are grown bigger, the Resistance from the precedent Blood will be less, and therefore the Expulsion of the Arteries outwards will be less also.

458. II. *Heat* is a constant *Concomitant* of *Hectic Fevers*, in a greater or lesser degree. At the beginning it is very moderate, giving no other Uneasiness than Flushings in the Face, or more than ordinary Warmth in the Hands: For though the Pulse may be exceeding quick, the progressive Force of the Blood may not be proportionate thereto; and since the Blood-Vessels of Hectic Persons are remarkable for being large, it is certain that the Friction and Collision of the Blood-Globules, against the sides of the Vessels, and against each other, is much less than when the Fibres are tense and contracted, and the transverse Sections of the several Series

ries of Vessels are diminished. Hence though the Heat may be something above the healthful Standard, yet it falls vastly short of that of an *acute Fever*.

459. *Hectic* People always complain of more than ordinary Heat after a full Meal.

I. Because the distended Stomach may press upon the descending Trunk of the *Aorta*, and resist the Motion of the Blood downwards: Whence a greater Share may be propelled into the ascending Trunk, and consequently the *Arteriolæ* in the *Cheeks* and *Hands* will be more plentifully stored with Blood than usual.

II. A large quantity of Chyle being thrown into the Blood, when the Vessels are weak and lank, will occasion a Faintness, Listlessness, and a glowing Heat; especially in the Face, Hands, and Feet, they being more plentifully supplied with Blood-Vessels than any other external Parts of the Body. The Fullness of the Vessels, and the Friction, Collision, and intestine fermentative Motion which always necessarily happen between the component Particles of the Blood, and those of the newly received Chyle, does give some Uneasiness to the strongest Men, when they eat too much; and consequently, in

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very weak Persons, where the Vigour of the Vessels is not sufficient to assimilate the Chyle as usual, the strongly attracting Power between the constituent Particles of two such heterogeneous Liquors, as the Blood and Chyle, will occasion a greater Degree of Fermentation, a Quickness of the Pulse, and a greater Degree of Heat.

460. III. In the *Increase* of this Distemper, when the Vessels grow more and more lax, the Globules both of the Blood and Lymph may be compacted and united into little Grumes or Clots, through the Slowness of their progressive Motion, especially in the decreasing Series of Vessels, and the Power of their own Attraction; whence their Superficies being increased, and their spherical Form destroyed, they become less capable of passing the minutest Meanders. Hence Obstructions are fixed in the *Viscera*, the Blood is accumulated in the larger Arteries, the Agitation and Friction of its Globules are greatly increased, the Blood becomes more acrid and irritating, and the Heat grows more intense; so that the *Fever*, at this time, seems to border upon the *inflammatory* kind, and is commonly attended with darting, pungent Pains in several Parts
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of the Body, but more particularly where the Obstructions are seated.

461. IV. In the *Height* of this Disease, when *Tubercles, Tumours, or Swellings of the Glands* tend towards Suppuration; when there is any *Collection of purulent Matter*, or any *internal Ulcers*, the *Heat* is increased, not only by Pain and Obstructions, but by some acrid, sharp, and ill-condition'd Particles which are continually received into the Mass of Blood from the putrid, purulent Matter; and which, by their Acrimony, irritate and waste the Solids, and by their corrosive, dissolvent Quality, corrupt the Juices, and render them hot, acrid, and alkaline. The *Fever*, at this time, commonly puts on the face of an *Intermittent*.

462. Hence *Imposthumations, Abscesses, putrid internal Ulcers* (and the very same thing would happen from *external* ones, if the purulent Matter was not to be wiped away) quicken the Pulse, accelerate the Motion of the Blood, and render the Juices sharp, acrid, and ill-conditioned.

463. Thus in regard to the *Heat*, or *Fever*, it matters not in what Part of the Body the Obstructions are fixt; for whether it be in the *Lungs, Liver, Spleen, Kidneys, Mesen-*
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tery,

tery, or in any other *Viscus*, the Pulse will be quickned, and a Fever will ensue.

464. As to the other Symptoms indeed, they must necessarily vary, according to the Situation of the Disease: Thus for Instance, if the Obstructions are in the *Lungs*, the chief *Pathognomonic* Signs will be as follows, *viz.* *A Difficulty of Breathing, with a Sense of Weight, and a slight obtuse Pain, and Uneasiness in the Breast, which is most perceivable in a full Inspiration; a Hoarseness, dry Cough at first, frequent Vomitings, spitting of viscid, purulent, sanious Matter towards the latter end, spitting of Blood, a Vomica Pulmonum, &c.*

465. I. If we consider the Mechanism of the Lungs, and that as much Blood passes through them in the same Space of Time, as through all the other Parts of the Body, it will evidently appear that when numerous Obstructions, or Tubercles, are formed in their Glands, which either partially, or totally obstruct the Course of the Blood through an infinite number of capillary Blood-Vessels, a greater quantity of Blood must necessarily be accumulated in the more pervious Tubes; in consequence of which, they will be more than ordinarily distended
and

and thereby they will press harder than usual upon the little Air-Bladders, or Vesicles which receive the Air at every Inspiration: Hence a *Difficulty of Breathing*; or there is a stronger Force required to inflate the Vesicles.

466. II. The Perception of a greater Weight than usual upon the Breast, may arise either from the Quantity of morbid Matter lodged in the Lungs, or from a Relaxation or Weakness of the Muscles serving Respiration; whence there may be a false Appearance of Weight.

467. III. Though *Tubercles* in the Lungs are not very troublesome in the Beginning, yet when they are confirmed, and the obstructed Parts begin to suppurate, it may easily be apprehended that the capillary Arteries will be violently distracted, and slight Inflammations, with darting Pains, will arise; which sometimes imitate a *Peripneumonia*; and, if the Lungs adhere to the *Pleura*, a *Pleuritis*.

468. IV. When the Glands of the Lungs whose Office it is to secrete some smooth, mucous, oleaginous Matter, in order to soften and malax the nervous Membranes which line the *Larynx*, and other Parts
serving

serving the Modulation of the Voice, and to defend them from the Injuries of the Air, are obstructed, a *Hoarseness* will necessarily arise from the Rigidity of the Membranes, and an Inability to proper Contractions for forming the Voice.

469. V. A *Cough* is the most perplexing *Concomitant* belonging to a *Consumption of the Lungs*. At first it is dry, and arises from an Irritation of the Matter pent up in the obstructed Glands, as also from the Stiffness of the nervous Membrane lining the *Bronchial Pipes*, and from the *Stimulus* of the Air, which has now too free an Access to the nervous *Fibrillæ*, for want of mucous Matter to defend them. But in the Progress of the Disease, when the obstructed Matter begins to digest and corrupt, the serous, watery, or thinnest Parts will of course be squeezed out first, through the excretory Ducts, into the Cavity of the *Bronchial Vessels*; and being very acrid, saline, and sharp, it further irritates the Nerves, and excites most grievous Fits of Coughing. And in the *Height* of the Disease, when the Matter is farther digested, and the excretory Ducts are widened, or when Abscesses or Ulcers are formed in the Lungs, the *Cough* is aggravated

vated by a vast quantity of viscous, putrid Matter, which is discharged into the *Bronchial* Pipes. The Matter which is spit up, is sometimes sweet, and at other times very fetid, fanious, and offensive; according as it has lain a longer or shorter time out of the Verge of Circulation.

470. If the Tubercles are placed on one side of the Lungs, more than on the other; or if one side of the Breast is more affected than the other, the *Cough* is excited by lying on one side, more than on the other.

471. The *Cough* is also aggravated by a full Meal, which, as it presses upon the *Diaphragm*, and thereby lessens the Cavity of the *Thorax*, excites Fits of Coughing, and by the Consent of Parts, neither the Stomach nor Cough are easy 'till the Aliment is vomited up.

472. VI. *Spitting of Blood* is very common when Obstructions are fixt in the Lungs; for as every Impulse from the Heart is an Effort of Nature to dislodge and remove the *Impedimenta*, and as the obstructing Matter is too viscous to give way, it must necessarily happen that some of the fine, tender, delicate *Arteriolæ* will burst, by the long continued and repeated Impulses of the circulating

culating Blood. Hence we may apprehend how dangerous it is for those of weak Lungs to use violent Exercise or Motion; for when a Man strains to lift a great Weight, or to run hard, &c. the Blood will be more forcibly propelled into the Lungs, and the Heart will oftentimes beat, instead of 70, 120 times in a Minute.

473. VII. When the *Tubercles* are large and inflamed, and several of them run together, they form *Tumours*, or large Swellings which will necessarily aposthemate, and burst: for the obstructing Matter, by lying out of the Verge of Circulation, will, in time, according to the *established Laws of Nature*, corrupt, putrefy, and degenerate into *Pus*; and this purulent Matter being contained in a *Cystis*, formed out of the vesicular Substance of the Lungs, and the quantity of it continually increasing, from the Mouths of the ruptured sanguine and lymphatic Arteries, the Membranes must, in the end, give way, and the *Pus* will fall either into the *Bronchial Pipes*, or into the *Cavity* of the *Thorax*. When it bursts into the Bronchial Vessels, it produces a true *Vomica Pulmonum*; and when it discharges it
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self into the Cavity of the Breast, it occasions an *Empyema*.

474. These are the *Phænomena* which most usually attend a *Phthisis*, or *Consumption of the Lungs*; but when a Consumption arises from *Tumours* and *scirrhus Swellings* in the Glands of the *Mesentery*, or in any of the *Viscera* of the *lower Belly*, the Symptoms are according to the Parts affected, and the Pains generally direct us to them. Thus, if the *intestinal Glands* are obstructed, *gripping Pains*, a *costive Habit*, and all the Symptoms of a *Chlorosis*, and *Cachexia*, generally begin the Complaint. If the *renal Glands* are affected, the Symptoms resemble those of the *Stone*. And if the *Liver* or *Spleen* be the diseased Parts, the *Phænomena* are agreeable to those of the *Jaundice*, *Hypochondriacal Affections*, &c.

475. But in the last *Stadium* of this Disease, whether it proceeds from *Tumours* in the *upper* or *lower Belly*, there are some Symptoms which equally attend it; *viz.* *profuse, colliquative Sweats*, a *Diarrhœa*, *making large quantities of Urine*, and *swelled Legs*.

476. These are the Consequents of the greatest Decay of vital Vigour in the Fibres, whereby

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whereby the excretory Ducts of the *miliary*, *intestinal*, and *renal* Glands are vastly dilated and widened; and of an acrid, corrosive, dissolvent Quality in the Fluids, from the long continued Heat, which renders the animal *Salts* and *Oils* of an *alkaline* Disposition, whereby they strongly attract and dissolve the Band of Union between the several Orders of Blood-Globules, and reduce the red ones back again into Lymph.

477. It is impossible to have an Opportunity of examining the Blood at this time of the Disease, because *Bleeding* would inevitably hasten Death; but I am persuaded by the Symptoms, that the red Globules bear but a small proportion to the serous Parts of the Blood: so that considering how long, and how much the serous Parts of the Blood have been wasted, by profuse Excretions at several Emunctories, it manifestly appears, that the remaining Mass of Blood would be all *Gore*, at this time, and could not afford such quantities of Lymph, as run off by *Sweat*, *Urine*, and *Stool*, if the Vessels had a Power of assimilating the Aliment into red Globules as they ought, and if the saline and oleaginous Particles did not acquire by the long continued Heat, a dissolvent

solvent Quality. In the *Beginning* of *Hectic Fevers*, the Blood is oftentimes smooth, mild, balsamic, and offends only by being too viscid and thick ; but in the *Progress* of the Distemper, a putrid, alkaline Acrimony is certainly the Consequence of it, and colliquates the Humours.

478. The *Sweats* are mostly at *Nights*, because the Heat of the Bed, and Sleep, both increase the Motion of the Blood, and relax the excretory Ducts, terminating in the external Superficies of the Body.

479. The *Looseness*, and *profuse Discharge by Urine*, on the contrary, are chiefly in the *Day-time*, by reason the excretory Ducts of the Skin are then contracted and shut up, and the serous Matter is reverted upon the Bowels and Kidneys.

480. When all these Excretions are in some measure suppressed, the detained Matter will fall upon those Parts where its Motion is slowest, and the Resistance to its Pressure is least. * Now the Legs being at the greatest distance from the Heart and Brain, and in the Day-time in a depending Posture, the Motion of the Blood will be there the slowest, and the Tensify of the Fibres

* Vide *Wainwright's* Non-Naturals.

Fibres the weakest ; and consequently the Legs will swell sooner than any other Part of the Body.

C H A P. IX.

Of the Cure of a Hectic FEVER.

481. **F**ROM the Reasons adduced in the precedent Chapters, it is pretty manifest, that before we can arrive at a plenary Knowledge in curing Diseases, we must be able to account for the principal and efficient Causes which give rise to them, and the *Phænomena* that accompany them.

482. Now the Symptoms above recited, do indiscriminately shew a *Laxity* in the several Series of Vessels, a *Lentor* in the Fluids, and *Obstructions* fixt in some of the *Viscera* ; in consequence of which, *Tubercles* arise in the *Lungs*, or *Tumours* in the *lower Belly*, which oftentimes end in *Imposthumes*, *Abscesses*, *Ulcers*, &c.

483. For these Reasons therefore, we have thought it most proper to divide our *Method of Cure* into three Parts ; viz.

I. We shall shew the most rational Practice where the Symptoms arise merely from lax Fibres, and excessive Evacuations by *Sweat, Urine, Stool, immoderate Fluxes of the Menses, Fluor albus, &c.* without any Obstructions being actually fixt in the *Viscera*, either of the *upper* or *lower* Belly.

II. We shall point out the best Medicines where the *Phænomena* proceed from *Obstructions* or *Tumours* either in the *Cavity* of the *Thorax*, or in that of the *Abdomen*.

III. We shall lay down the most probable Method of relieving *internal Ulcers*, both in the *Lungs*, and in the *Viscera* of the *lower* Belly.

484. *First*, In the *Beginning* of this Disease, where the Fever is not confirmed; where no Obstructions are settled in the capillary Vessels, and where the *Phænomena* proceed merely from lax Fibres, and profuse Excretions, without any *Impedimenta* to the Circulation through the glandular System; it is evident that the chief Business is to restore the natural Vigour and Elasticity to the Vessels, and to amend and preserve the *Cra- sis* of the Blood and Humours, whereby the several Secretions and Excretions may be performed in a regular and healthy Manner.

Now it is well known, that whatever will recover a due Tone in the Fibres, will greatly assist in rendering the Blood of a proper Consistence, and duely fluxil; and whatever will amend the *Crafsis* of the Blood, will help also to recover the Spring of the Fibres.

485. But before we proceed to the Use of those Medicaments which free the Blood from Acrimony, and Viscidity, and render the Fibres in general more elastic and tense; we must consider that some Parts of the animal Machine are more affected by the *Antecedents* than others are; and therefore it may be perfectly necessary to make some *Revulsion* from the offended Parts, or to ease them of a superfluous Load of Humours flowing to them, whereby they may be able to contract more readily, and recover their former natural Dimensions with more ease.

486. Thus for instance, if the Complaints are *excessive Excretions* by *Sweat, Urine, Fluor albus*, &c. it is always thought necessary to cleanse the *Primæ Viæ*, and to drain the Humours from the affected Parts, by *gentle, lenient Cathartics*: for though these may abate the vital Vigour of the rest of the Body, yet since they are supposed to give ease to the Parts aggrieved, by making a
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Revulsion from them, they are constantly to be exhibited before the Use of *Alteratives* and *astringent Medicines*.

487. If the Complaint be an immoderate Flux of the *Menses*, it is the general Practice, if the Patient be not extremely weak, both to *bleed* in the Arm, and to *purge*, before the Administration of *Stiptic Remedies*.

488. And when the Disorder is a *Diarrhœa*, *Vomits* are most useful to make a Revulsion, and *Purges* are then given only to carry off the excrementitious Matter lodged in the Bowels, and intestinal Glands; which, if suffered to lie there, would become more acrid, sharp, and irritating, and would consequently excite more frequent Discharges.

489. We have already taken notice that the *purging Medicines* ought to be very *mild* and *lenient*; such for instance, as *Rhubarb*, *Manna*, *Senna*, &c. and for an *Emetic*, the Rad. *Ipecacuanha* has undoubtedly the preference to all other Medicines in *intestinal Fluxes*.

490. *Revulsion* being made according to the Strength of the Patient; our next Step is to brace up the Fibres, and to render the Blood smooth, mild, and balsamic. But since the most general Cause of the Laxity

of the Vessels, and the Depravity of the Fluids, is an Abuse of some of the *Non-Naturals*, it seems most rational to begin with a Regulation of them; for the best Medicines in the World will avail but little, if the same indiscreet Practices are continued, which gave being to the Disease.

I. The *Air* most suitable to Persons of weak, flaccid Fibres, is that which is thin, clear, and freest from Moisture; neither too heavy, nor too light, nor too hot, nor too sharp: So that if our Patient lives in an Air whose Qualities are different from any of these mentioned, we ought to advise a Removal into one more agreeable to his Constitution.

II. The *Food* ought to be such as is easily digested, and assimilated into Blood and nutritious Particles, without laying such Stress upon the Vessels, or requiring such Force as will weaken their Springs. To those Persons who are not very lean, and where the Pulse are not very quick, moderately *acrid*, and *aromatic Aliment* may be proper; but to lean, spare Habits, *smooth, emollient, viscous Food* may be most convenient.

III. As to *Drinks*, they should be *sub-astringent, mild, and nourishing*; *Bristol Water*

ter mixed with *red Wine*, or *Milk-Water*, *Snail-Water*, &c. ſeem exceeding proper where the Blood is acrid and hot.

IV. *Much Sleep*, or *lying in Bed* above *eight Hours* in *twenty four*, is a pernicious Cuſtom, and ought not to be indulged to thoſe of weak Nerves; ſince more than this is well known to ſob and relax the Fibres, and to weaken the Habit by profuſe *Perſpiration* and *Sweat*.

V. *Watching too much* may have as bad an Effect, by hindering the Secretion of animal Spirits, and by waſting thoſe already ſecerned, in too plentiful a manner.

VI. *Moderate Exerciſe*, eſpecially *riding on horſe-back*, is above all things to be inſiſted upon, as giving the greateſt Life and Vigour to the Fibres, and attenuating and comminuting the groſſer Parts of the Blood, ſo as to make them paſs freely through the minuteſt Meanders, and to clear the Fibres and capillary Veſſels of all foreign, heterogeneous Matter, which may happen to adhere to them. I have ſo often ſeen People recover from moſt deſperate Caſes, by a continued Courſe of Riding, in a clear, dry Air, that I am induced to believe there is ſcarce any Tendency to a Diſeaſe, that may not

be corrected by some appropriated Exercise.

491. Full Directions being given in regard to the *Non-Naturals*, and to the *Idiosyncrasy* of the Patient, we are to proceed to the Use of those Medicines which Experience hath taught us to be most serviceable in recovering weak, relaxed Fibres, and in preventing profuse Excretions from the Blood. Now the Strength and Elasticity of the Fibres is well known to be increased by any sort of Matter whose constituent Particles are rough, angular, and sharp-pointed; by which means they stick into, and irritate the Nerves, excite more lively Contractions in the Fibres, shorten their Length, and consequently lessen the Diameters of the several Series of Vessels. Or, where the Fibres are wasted, and the Coats of the Vessels are exceeding thin, we must not trust to the Force of a *Stimulus*, but it depends more upon the Apposition of soft, subtile, strongly attracting, nutritious Particles to the sides of the Fibres, to recover their lost Union, and to solder their broken Parts: for the thicker the Fibres are, provided they are sound, the stronger and more elastic they are, it requiring more force to bend them; and when they

they are so bent, they vibrate back again with a greater Velocity.

492. For the *first* Intention, the *Cortex Peruvianus* is most famous, and, with proper Management, is capable of doing Wonders, where the Fibres are only relaxed, and where no Obstructions are actually fixed in the Course of the Circulation. *Terra Japan. Bol. armen. Sang. Dracon. Coral. rub. Gum. Lacc. Cort. Granator. Flor. Balaust. Rosar. rub. Rad. Rhabarb. tost. Tinct. Stiptic. Helvet.* and all the Tribe of *Astringents* are calculated for the same Purpose.

493. The *Cold-Bath* also, in some Cases, may be exceeding proper to stimulate and contract the vascular System, and to give Strength and Energy to the Fibres.

494. A proper Use of the *Flesh-Brush* may likewise have its Advantages, in stimulating and contracting the subcutaneous Glandules, and thereby preventing profuse Excretions by Sweat.

495. For the *second* Intention, *Vipers*, in Broth, in Wine, or in Substance, are excellent; as also the *Rad. Eryng. Consolid. maj. Gum. Arabic. Mastic. Oliban. Succin. alb. Bals. è Meccâ, Copivi, Album. Ovi, Ichthyocol. Vermicelli, Sago, &c.* are Medicines

which give Consistence to the Blood, and are capable of adhering to the sides of the Vessels, and filling up their Vacuities. *Milk, Calves Feet, Jellies, &c.* are convenient Food, and ought always to be prescribed. Proceed we now to the *second* Thing proposed, *viz.*

496. *Secondly, To point out the best Medicines when Hectic Fevers arise from Tubercles in the Lungs, or scirrhus Swellings in the Viscera of the lower Belly.*

497. If the Account above given of this Distemper be just, there will be no difficulty in forming the true Indications, and the most effectual Method of Cure; for since the most common and usual *Phænomena* of this Disease proceed from viscid, glutinous Blood adhering to, and sticking in the ultimate Branches of the *Arteriolæ*; or from thick, foul Humours obstructing the secretory and excretory Ducts of the Glands; I think it pretty evident, that the first and general Indication is to dislodge the obstructed morbid Matter, and to attenuate it fine enough to pass out of the Body through some of the *Emunctories*. And seeing the Obstructions arise from some clotted, viscous Matter bunging up the capillary, sanguine, and lymphatic Arteries, and excretory Ducts
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of the Glands, it is reasonable to conclude that the most probable Means of resolving the Obstructions are,

I. To abate the Tension of the obstructed Vessels, or those leading from them, if at any time they appear to be more than ordinarily contracted.

II. To attenuate, comminute, dilute, and dissolve the glutinous, viscous, fizy Matter lodged in, and adhering to the Vessels.

498. If therefore an Obstruction happens on a very nervous, sensible Part, the Distension of the Vessels must necessarily create Pain, in proportion to the Distraction of the nervous *Fibrillæ*, which help to constitute the obstructed Vessels: and since all Pain is well known to bring on a greater Tension of the obstructed and adjacent Parts, and a greater Flow of Humours to those Parts, it is evident that the Vessels will be more and more distended, and an Inflammation will arise, attended with cruciating Pains, which nothing will relieve but *Bleeding*: For though the original Cause of the Disease might be a Relaxation of the Vessels, and profuse Excretions, whereby the quantity of Blood was diminished beneath its natural, and healthful Standard; yet when
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the Obstructions are large, or numerous, and have been standing some time, the Blood will be accumulated in the larger Vessels, and there may be as great a *Plethora* in regard to the passable Canals, as though there was much more Blood, and no Impediment to its Circulation,

499. The Pulse, at these times, sufficiently evince the Truth of what has been said; and the *Momentum* of the Blood seems to be much too strong against the obstructed Parts, as appears by the throbbing, pulsing Pains always complained of when the Inflammations are large.

500. *Bleeding* therefore is to be insisted on in the Beginning of Obstructions fixed in any of the *Viscera*, provided they are attended with darting Pains, and an inflammatory State; in order to revel from the obstructed Part, to abate the Distension of the Vessels, and to prevent any immediate Danger of their bursting. Besides, let us add, if Bleeding be omitted in the Beginning, and the obstructed Vessels are suffered to be long upon the Stretch, there will be much more Danger of the inflamed Tubercles in the Lungs, or Swellings in the Glands of
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the lower Belly, aposthemating and exulcerating.

501. After Bleeding, the Medicines which take place are those which will dilute, and restrain the Heat and Motion of the Blood, destroy and sheath the Acrimony of the Humours, lubricate and relax the obstructed Vessels, and abate the Inflammation. The *Species Diatragacanth. frigid. Pulv. Hali, Pulv. è Chel. Canc. comp. Sperma Ceti, Sal Nitri, smooth emollient Linctus's*, and such like Medicines are generally prescribed 'till the Inflammation and Pains are abated; drinking after them the *Pectoral Decoction, the common Emulsion, Barley-Water, Linseed, or Liquorish Tea, a thin Decoction of Marsh-Mallows, Medicated Whey, prepared with Fol. Tussilag. Heder. Terrest. Agrimon. Pulmonar. Scabios. Capil. Ven. Flor. Bellid. maj. &c.*

502. Thus *Hætic Fevers*, when they arise from inflamed *Viscera*, are to be treated as common *inflammatory Fevers*, 'till the *Heat, full Pulse, darting, throbbing Pains*, and all the Symptoms of an Inflammation are abated: for since *Suppuration* is the Consequence chiefly to be dreaded and prevented, the first and general Indication is to hinder the

the tumefied Glands from aposthemating. But since the constituent Vessels of the Glands are prodigiously complicated, since their Fibres are generally very lax, since the *Antecedents* are disposed to deposite a slimy *Lentor* on the capillary Vessels of the Glands; and since this *Lentor* is seldom removed by abating or taking off the Inflammation, it follows, that the most difficult Task may yet be behind, *viz.* To dissolve the *Lentor* obstructing in the capillary, sanguine, and lymphatic Arteries, and in the secretory and excretory Ducts of the Glands; which is the Foundation of Tubercles in the Lungs, and of Tumours in the lower Belly; and which, if not removed, in a proper time, will inevitably terminate in Aposthemations, Abscesses, Ulcers, &c.

503. We are assured by *Hippocrates, Lib. de Medic.* that it is a very artful thing to cure Tubercles in the Lungs: For since the Texture of the Glands are but weak and spongy, they are not always able to bear an Impulse proportionable to the Viscidity of the morbid Matter, obstructing in them, without further distending the Vessels, and producing a fresh Inflammation, or an *Hæmoptyoe*. And if we do not exhibit Medi-
cines

cines capable of attenuating, and resolving the *Lentor*, we only palliate the Matter, and deceive our Patients.

504. This it is that renders the Cure of *Pulmonary Consumptions* so extremely difficult, especially in those of a delicate Make, whose Fibres are exceeding thin and tender, and whose Blood-Vessels are almost diaphanous. These People cannot bear the Impulse of sharp, active, irritating, volatile, and ponderous Medicines ; by reason the former will increase the Heat and Acrimony of their Humours, and the latter will endanger an Inflammation, or an *Hæmoptoe*.

505. Our great Care therefore ought to be to find out such Medicines as will dissolve, and dilute the *Lentor*, before the Body is too much extenuated, and give ease to the Symptoms without inflaming or bursting the Vessels. But as Obstructions in different Parts will produce different *Phænomena*, and may require different Treatment ; we shall here make some Distinction between the Cure of *Tubercles* in the *Lungs*, and the Cure of *Swellings* in the *Viscera* of the lower Belly.

506. First then, of the Cure of *Tubercles* in the *Lungs*. If the Cough be very violent,
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if the nervous Membrane which lines the *Bronchial* Pipes be dry and uneasy, for want of mucous Matter to lubricate and defend it from the Irritation of the Air, and Particles floating in it; some *smooth, emollient, oily Linctus* may be prescribed, with *appropriated suitable Liquors*, to sheath the naked, tender Parts, with a mucilaginous Softness; though at the same time, they may be pernicious to the original Obstructions.

507. For the same Reason, receiving the *Steam of some smooth emollient Decoction*, into the Lungs, along with the Breath, may be of service to soften and malax the Mouths of the excretory Ducts of the obstructed Glands, and to promote Expectoration, by rendering the Membranes soft and yielding.

508. *Opiates* also are sometimes order'd, to abate the Violence of the Cough, by giving the Parts a sort of Insensibility, and by thickening the thin, sharp, acrid Juices which are squeezed out of some of the Glands, and which are apt to stimulate the nervous Membrane of the *Trachea* into frequent Contractions: But these are dangerous Remedies where the Obstructions are large, or where there is a Tendency to an Inflammation; and ought never to be given but in
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the last Extremity, where the Cough threatens Convulsions, and where no Sleep can possibly be procured by reason of a constant Irritation.

509. Many, says an ingenious *Author**, place all their hopes in things directed to the *Cough*; the *Lozenge* and *Linctus* are in every body's hand, but this must be attributed to their leading People to take a wrong Aim, to level at the Symptom instead of the Disease. I am confident, says he, Legions of the Dead might have been above ground, if they had but conceived the Fallacy of these Means (to wit, Balsamics;) if they had but stuck close to the proper Quantities of any good *Alterative*, they might have plunged out of their several Maladies. Indeed, if we consider the Matter rightly, it will appear that Obstructions formed in the ultimate Branches of the *Pulmonary Arteries*, can never be relieved by Expectoration (unless after a Suppuration, or an *Hæmoptoe*;) for since they have no other Termination but into the *Pulmonary Veins*, they can only be carried off by a Resolution. And if the Obstructions are situated in the *Bronchial Arteries*, whose excretory Ducts terminate
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* Vide *Fuller's Medicina Gymnastica*.

in the several Ramifications of the *Bronchia*, it is impossible that *oily, smooth, emollient Medicines* should avail, any more than easing the *Cough*, before the obstructed Humours are attenuated, and prepared fit for Expulsion.

510. The greatest Success therefore is to be expected from such Medicines as bid fair to dislodge the Obstructions, and to dissolve, dilute, grind, and absorb the sharp, acrid, irritating Particles, which excite the Cough, and other Symptoms: and when these are cast out through some of the excretory Channels, and the Blood is freed from Acrimony, the Blood it self will prove the best Balsamic, and be able to heal up such Vessels, as have any ways been injured.

511. If we consider that most Obstructions in the Glands, begin with an Incrassation of the Humours which ought to be secreted there, it will obviously appear that the most rational Practice is to depend upon the following sort of Medicines, which are well known to attenuate, and divide all viscid Cohesions, or *Moleculæ* in the Blood and Lymph, and to absorb all acrid, saline, sharp-pointed Particles, and to carry them out of the Habit through some of the Emunctories.

512. I. *Gentle Mercurial Purgatives*, in small Doses, bid the fairest to clear the *Primæ Viæ*, to attenuate the viscid Humours, and to excrete a Portion of the acrid, saline Particles from the Blood; for which reason they ought to be preferred to other Purgatives, and to be exhibited according to the Strength of the Patient, and the Obstinacy of the Obstructions. Nor ought we to be deterred from the Use of them, if they agree, by reason of the Weakness of the Patient; for since they comminute and dissolve the Fluids, and promote the Secretions, they will make abundant amends for the Injury they may seem to do by evacuating Part of the Lymph, and by reducing the Strength. Experience sufficiently testifies the Truth of this; for we often see outward and inward Swellings softened and discussed by the help of *Mercurial Purges* alone; which restore Fluidity to the viscous Juices dammed up in the secretory and excretory Ducts of the Glands. We are therefore to look upon *gentle mercurial Purges*, as Medicines, whose Virtue is to dissolve the Humours and to evacuate them when dissolved.

513. II. On the intermediate Days, and after proper Purgings, *Electuaries*, *Bolusses*,
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Pills,

Pills, Powders, Decoctions, Infusions, &c. may be made of some of the following most suitable Ingredients to dissolve the fizy, viscid Humours, and to resolve the Tubercles; viz. *Millepedes, Sapo Venet. Flos Sulphur. Lac Sulphur. Sal Tartar. Sal vol. Succin. Gum. Ammon. Myrrh. Benzoin. Styrac. Balsam. Tolut. Rad. Enul. Camp. Irid. Flor. Rub. Tinct. Lign. Guaiaci, Rad. Sarsaparil. Chin. Fol. Marrub. alb. Heder. Terrest. Tussilag. Hyssop. &c.*

514. *Chalybeat mineral Waters* are also extremely proper, and conduce very much towards the Cure of this Disease, where there is no Danger of Inflammation, or where the Swellings are crude, and of a cold Nature; for as they attenuate and dilute the Blood, and contribute greatly towards recovering the *Crafsis* of the Fluids, they must necessarily be serviceable in resolving the viscid Matter sticking in the Glands, and in dislodging the Obstructions, by dilating the Vessels, and by adding to the *Momentum* of the Blood.

515. *Vesicatories* may be serviceable in contributing towards the Attenuation of the Humours, in bracing up the Solids, and in suppressing the Cough.

516. All hot, acrid, irritating Medicines, such as *Camphor*, *Crocus*, *Rad. Serp. Virg.* &c. and all strong, distilled, spirituous Liquors, are to be avoided, however faint and spiritless the Patient may seem to be: For as they heat the Blood without resolving the Obstructions, the Humours may be more impacted in the obstructed Glands, and the Tubercles may sooner come to Suppuration.

517. When the Violence of the Symptoms is abated, and the *Cough* grown rotten, (as it is vulgarly termed;) that is, when the obstructing Matter in the *Pulmonic Glands*, is attenuated, dissolved, and loosened, and some part of it is daily brought up by coughing; nothing will contribute more towards freeing the Glands from tough, viscous Matter hanging in them, than a gentle *Puke* with *Oxymel Scylliticum*, which has a peculiar Property of deterging the Glands, both as an *Emetic*, and as an *Alterative*: But then we must be sure that the morbid Matter is already thinned, and loosened, and wants only an additional Impulse to thrust it forth; for should you give an *Emetic* during the Obstinacy of the Obstruction, it is great chance but you rather increase than remove it.

518. But in desperate Cafes, where the Obstructions will not give way to the above-mentioned Medicines, and where the Disease seems to be *chronical*, and lingering, our greatest Dependance is upon *ponderous* Medicines, or such as by their Weight may break through and dislodge the viscid, obstructing Matter. And among all the Medicines of this kind, *Mercury*, or some Preparation of it, seems best adapted to resolve the Obstructions; it being about ten times as heavy as Blood *, and therefore every Particle of it will have ten times the Force to dissolve the *Lentor*, that a Particle of Blood of the same Magnitude will have: For the *Momentum* of either a Particle of Mercury or Blood, to break through any Obstacle, or overcome any Resistance, is a *Rectangle* under the Celerity with which it is moved, and the Quantity of Matter contained in it, which is measured by its Weight.

519. Hence Dr. Cheyne, in his *New Theory of Fevers*, with good Reason tells us, that the Blood, assisted by any considerable quantity of Mercury, will be able to do as much, in the Removal of Obstructions, in
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* Vide Wainwright's Non-Naturals.

one Day, as the Blood unassisted in three Years. And if we add, that *Quicksilver* is the most fluid of all Fluids, and divisible into the minutest Parts by the smallest Force, it will more clearly appear that it must be signally beneficial in *glandular* Swellings, as it is most capable of passing the least permeable Vessels, of fusing the Humours, and colliquating the Juices; and consequently of resolving stubborn Obstructions, scarce otherwise to be removed.

520. Thus *Æthiops Mineral. Mercurius alkalifatus, Cinnab. nativ. Cinnab. Antimon. Antihæticum Poterii*, &c. are most advantageously joined with some of the above-mentioned Medicines, when there is no Inflammation, nor Tendency to an *Hæmoptye*; for the incrassated Humour lodged in the Glands, being by these sort of Medicines agitated, attenuated, and comminuted fine enough to renew its Course, the Vessels will recover their Strength and Elasticity, and the Disease will be wholly removed.

521. *Morton**, one of the best Writers in this Case, tells us, that for the most part these Tubercles of the Lungs are glandulous Tumours of a chronical and cold Nature,

* Vide Phthisiologia.

and somewhat like *King's-Evil* Swellings, having their Original from the Glutinousness of the Humours, or from an Obstruction of the Pore or Duct of the Glandules. Hence, and from the Arguments adduced, we think it reasonable to conclude that the Method we have laid down, is the only rational one, and most likely to be successful: And if near twenty Years Experience may be allowed as a Witness, I can solemnly aver that I have always found it so.

522. If therefore this be true, what must we think of those who rely intirely upon the *testaceous Powders, Asses Milk, a few pectoral Medicines, and the Bark*, when the Fever becomes putrid, and mimicks an *Intermittent*. The sad *Prognostics* they make, of *confirmed Hectic Fevers*, may well be verified, when they prescribe only such *insignificant or dangerous Medicines*; and this is well known to be so common a Practice, that whenever a Patient dies under a decent Course of *sweetening Powders, and Asses Milk, a few Lozenges for the Cough, and a pectoral Drink to nourish him*; his Relations are well satisfied, believing all was done for him, that could possibly be done, and that they lost their Friend according to the *strictest Rules*
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of *Physic*, as well as the *established Laws of Nature*.

523. I shall beg leave to subjoin one Example of this kind of Practice, which, though it was not a *pulmonary Consumption*, may serve to illustrate, in a very particular Manner, the Truth of our Theory, and the Uncertainty of those who presume to prescribe without knowing the Seat of the Distemper, the Causes of the Symptoms, or the Means by which Medicines produce their several Effects.

524. A *Gentlewoman*, aged 36, of a full Habit of Body, and of a sanguine Constitution, was seized with a Pain in the lower Part of the right side of her Belly, some time after a hard Labour, which continued more or less for some Months, and then went off without the application of any Medicines. About four Years afterwards the Pain returned (without being with Child from one time to the other) with more Violence than at first, and was then attended with a *Hætic Fever*, which sometimes appeared in the shape of an *Intermittent*. Upon this, a certain *Practitioner* in the Country, was consulted, who immediately prescribed the *Bark* without any other Preparation than a single Purge of *Decoct.*

Sennæ, &c. and though the Pain and Fever both increased, he persisted in the Use of the *Cortex* for more than six Weeks. After this he put her into a Course of the *testaceous Powders*, and *Asses Milk*, which she continued near four Months.

525. The poor Woman labouring under a deal of Pain, was, at last, persuaded to change her *Physician*; but the Obstructions were so firmly rivetted, by an unskilful Administration of the *Cortex*, &c. that all that could then be done by *Bleeding*, *Purging*, *attenuating and deobstruent Medicines*, was to no purpose: The Tumour came to Suppuration, a vast Abscess was formed, and the Woman died. But to proceed;

526. Great Regard, during the whole Cure, is to be had towards the *Non-Naturals*; for without a careful ordering, and a cautious use of them, the most noble Remedies will not avail. Nothing therefore is to be allowed of by way of *Eating* and *Drinking*, which is hard of Digestion, or that will by any means create a gross, viscid Blood, or heap up in the Humours too many excrementitious Particles: for when the digestive Faculties are weak, we can't take too much

much Care in contriving Food of good Nourishment, and of easy Digestion. A bad Concoction in the first Passages is not to be remedied in the second; especially where the Lungs are disorder'd, and the vital Vigour of their Vessels decayed: For since the Chyle, or animal Emulsion, is to undergo a sort of a second Digestion in the Lungs, by the Pressure of the Air, and the impetuous Motion of the Blood through them, it is not reasonable to suppose that a viscid, coarse Chyle can be properly comminuted, divided, assimilated, and intimately mixed with the Blood, so as to be fit for Nourishment, or to pass freely through the minutest *Tubuli*, when the Action of the Lungs is depressed, or any of their Organs are faulty.

527. Hence it is much safer to give what the concoctive Faculties can digest with pleasure, than to give what equals or exceeds their Strength, either in Quality or Quantity: for a large Quantity of the most innocent Chyle being hastily poured into the Lungs, when faulty, will render the Circulation through them still more uneasy, and create *Heat, Flushings in the Face, a Cough, &c.*

528. For these Reasons therefore, the *white Meats*, such as *Chickens, Veal, Rabbits, Calves Feet, &c.* are to be allowed of, in small quantities. *Fish* which are smooth, are also very good, *viz. Plaice, Whitings, Soals, Flounders, Cray-Fish, &c.* But when the Stomach is so far impaired as not to be able to digest these things, we must have recourse to the most mild, and balmy Food; such as *Jellies, Milk, Snails, Chocolate, Sago, Sallop, Rice, Turneps, Asparagus, Viper-Broth, and new-laid Eggs hot from the Hen.*

529. Nothing can be more innocent and nutritious than new-laid Eggs, especially their *Whites*, which in every respect tally with the Qualities of the *Serum* of the Blood *; and therefore no Diet can be more proper to replenish a decayed Constitution with kindly Juices, where the Organs of the first and second Digestion are impaired, than the *Whites* of new-laid Eggs dissolved in a Draught of warm *Barley-Water*, or in any other convenient Vehicle: For nothing is more free from Acrimony, or more capable of correcting that Disposition in consumptive Fluids; and nothing is more easily assimilated into Blood, and nutritious Juice.

* Vide *Barry's Treatise of Consumptions.*

530. As to *Drinks*, proper for *Hectic* People, with *Tubercula* in their Lungs, they ought to be such as will cool, dilute, dissolve, nourish, and free the Blood and Humours from Acrimony, without leaving behind them a glutinous, viscous *Residuum*, and without being apt to create intestine, fermentative Motions in the Blood, which only augment its Heat, without contributing towards resolving the Obstructions.

531. Hence all *Malt Liquors*, however mild, must needs be pernicious, as they are glutinous, and very fermentative; and consequently apt to relax the Vessels, as well as to excite Heat, and increase the Viscosity of the Humours.

532. If the Pulse are not too full, if there be no spitting of Blood, or Danger of an Inflammation, the *Spaw* or *Pyrmont Water* may be most proper Drinks, as they attenuate, dissolve, and add to the *Momentum* of the Blood, without increasing its Heat to a great degree. But if the Habit be too weak to bear the Force of these Waters, *Milk-Water* with a few *Snails* in it, *Honey* boiled in Water and scummed, old *Malaga Wine* mixed with Water, &c. are most suitable.

533. Proper *Meats* and *Drinks* being agreed upon, the next thing to be advised, is *Exercise*; which if duely followed, every day, in a clear dry Air, and in proportion to the Strength of the Patient, will do Miracles. By a patient and exact Observance of the *Diætic*, and *Gymnastic* Rules, a very bad Constitution may be restored; but then the Sick must conspire with his Physician, and strive indefatigably to follow these Rules; for if he lets slip this golden Opportunity whilst he has a tolerable share of Strength remaining, he may not be able to pursue them as he ought, when, perhaps, he most earnestly desires it.

534. Frequent Experience as well as Reason testifies, that *Riding on horse-back* is the best Exercise in the World; it preserves those that are in health, it comforts and strengthens the Weak and Dispirited, it attenuates the animal Juices, and adds fresh Vigour and Elasticity to the whole System of Fibres, by giving a most agreeable Motion to every Part of the Body, at the least Expence of Spirits. And in *Hectic Fevers*, the frequent little Jolts, or the repeated gentle Concussions which are given to the Body, will vastly contribute towards dislodging the

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Obstructions. Hence *Sydenham* sincerely asserts, that *Mercury* in the *French-Pox*, and the *Jesuits Bark* in *Agues*, are not more effectual than the *Exercise* above-mentioned in curing *Consumptions*.

535. The *Choice of Air* also is a very weighty Concern, and oftentimes a necessary Part of Advice: for the Lungs being of a lax, delicate Texture *, with a Surface of a larger Extent than of the whole Skin exposed to the outward Air, and of a much hotter Temperature, must be extremely sensible of the Qualities of the outward Air, and affected by them as by outward Contact; therefore the Choice of Air to People of tender Lungs, is a Matter of great Importance: *First*, as to Humidity, the least Quantity of it must produce a Cough; as for hot Air, the Lungs cannot bear Air that is hotter than the animal Fluids; Heat and Moisture together, produce Putrefaction; consumptive People often die in a hot Day: But those two Qualities seldom reside long in the Air together. It ought likewise to be considered, that Heating Rooms by any Contrivance which does not let the Vapours escape, may be dangerous to the Lungs: On

; * Vide *Arbutnot* of Air.

On the contrary, Air intensely cold, by its Contact, may condense and coagulate the Blood, through the thin Coats of the Vessels, so as to produce Inflammations which reign here in the Winter, and in many Countries upon cold Blasts. Dry Air, and not intensely hot, must be favourable to the Lungs; accordingly Countries, where the Air has those Qualities, are pretty free from pulmonary Consumptions, and ought to be prefer'd by those who are already seized with that Distemper.

536. Above all things, advise your Patients to be chearful; for there is nothing that unbends the Spring of the Solids, and confirms the Disease, more than *Grief* and *Sadness*. We come now,

537. *Secondly, To the Cure of Hectic Fevers, which arise from Obstructions in the Viscera of the lower Belly.* And here we shall be very brief, by reason the *Indications of Cure* are much the same with those already taken notice of: *Bleeding, lenient Clysters, and emollient, cooling, diluting Medicines* take place whilst there is any *Inflammation*, or *acute Pains*; and after that, such Medicines as attenuate, grind, and comminute the viscid Humours, absorb the acrid, saline, corrosive

rosive Particles, and add to the *Momentum* of the Blood, are most adviseable. The only Difference is, that here we may be more free with *active*, and *ponderous* Medicines, than we could in a *pulmonary* Consumption; because the Vessels which constitute the *Glands* of the *lower Belly* are larger and stronger than those which make up the *pulmonary Glands*; and consequently they are not so liable to burst, or to be inflamed.

538. *Mercurial Purges*, or *Mercurius dulcis* mixed up with the *Gums*, in small quantities, so as not to run off too hastily through the first Passages, are the most effectual Medicines to begin with; especially if the *Tumour* be disposed to terminate in a *Scirrhus*, or where an eroding Acrimony is joined with the Viscidity of the Humours.

539. *Oxymel Scylliticum*, either as an *Emetic*, or corrected into an *Alterative*, is oftentimes of great use in resolving Obstructions, and detarging the *Viscera* of the *lower Belly*.

540. The *Sapo Venet. Millepedes, Sal Tartar. Sal Vol. Succini, Æthiops Mineral, Chalybs cum Sulph. ppt. Cinnab. Antimon. Cinnab. Nativ. Rad. Curcum. Rub. Tinct. &c.*
are

are the Medicines to be depended upon, in order to attenuate the gross, tough, glutinous Matter adhering to the sides of the Vessels, and obstructing the secretory and excretory Ducts of the Glands.

541. The learned *Boerhaave* * assures us, where there is no Inflammation, or Tendency to an alkaline Disposition of the Humours, that *Soap*, rightly prepared, without *Lime*, is one of the most pure and excellent Medicines we possess; the numerous Virtues whereof may ease the Physician, who is acquainted with them, of a great Load of Simples of much less Efficacy. It is an universal *Deobstruent*; or good for all Obstructions arising from an Excess in the Diameter of the obstructing Matter above that of the Canal through which it ought to flow. If we consider what kind of Matter it must be that causes Obstructions in the Body, we shall find that *Soap* is admirably suited to dissolve its Texture, and force it a Passage with the circulating Fluids. Now, it can only be the more gross and viscid Parts of the Fluids themselves, which, coming together, fall into Cohesion, and block up the Cavity of the Vessels: But all the animal Fluids consist
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* Vide New Theory of Chemistry.

of nothing more than Water, Salt, Oil, and Earth; of all which none is more apt to stick than the Oil, upon the account of the superior Tenacity of its Parts, and its Indisposition to dissolve, like Salt, in Water. And in effect, we seldom find that Earth is the Cause of Obstructions in the Body; but an unctious Matter that sometimes appears like Chalk, sometimes like Rosin, and sometimes like an oily Substance; all which are incapable of being dissolved by Water, and hardly by common Salt, but readily yielding to fixed Alkali and Alcohol; the former whereof, however, might first corrode the Vessels of the Body before it reached the Part, whilst the latter would coagulate the Fluids contained therein, and by constringing the Vessels increase the Obstruction, at the time they produce the other Effect: So that *Soap* is the only Remedy, which can be used with Safety and Success in the Cure of Obstructions. And this will presently and effectually dissolve away inspissated and hardened, or pitchy, unctious Matter, unite it to it self, and fit it for Expulsion, or a free Circulation in the Canals again; and all this too in a manner as mild and gentle as it is effectual.

542. The *Aliment* proper for Persons in this Disorder are the same with those above-mentioned; and *Riding* is peculiarly excellent in removing Obstructions in the lower Belly. We seldom observe those who ride much, to have large Bellies, or to be afflicted with the *Dropfy*, *Jaundice*, *Spleen*, or any other Distempers arising from *mesenterial* Obstructions. And another remarkable thing is, that the *Legs* of those who ride very much, are generally small, and scarce ever swell; which further shews how much this Exercise braces up the Fibres, and attenuates the Fluids.

543. These things being properly observed and continued, will seldom fail of curing *Hectic Fevers*, if they are taken in time, before the constituent Vessels of the obstructed Glands are broken, or have quite lost their Tone; or before the animal Fluids are too much corrupted and depraved. But when the Constitution both of the Solids and Fluids, is vastly impaired, when Apothemations and Abscesses are already formed, and sanious purulent Matter is continually discharged from the Mouths of the ruptured Vessels; the Abscesses or Imposthumations must necessarily break, and the Wounds will

will soon degenerate into putrid Ulcers, from the Acrimony of the Humours; and then the Medicines above mentioned, will not avail, neither indeed have we much reason to expect that any others should: But since there have been some Instances of Success, even when things have come to this pass; we undertake,

544. *Thirdly, To lay down the most probable Method of relieving Ulcers in the Lungs, or in any internal Part of the Body.*

545. If we maturely consider how far the Strength, Vigour, and Elasticity of the animal Fibres is decayed, and how much the *Crafs* of the Blood is degenerated from a smooth, mild, balsamic Liquor; if we consider the Situation of the Ulcers, the membranous or vesicular Composition of the Parts, the Delicacy of the *Fibrillæ* which are broken, corroded, and eaten away, and the Acrimony of the Humours flowing to them; and *lastly*, if we consider how much the Parts are stretched and distended, and how thick, hard, and scirrhus their several Vessels and Membranes are rendered, by the Acridness of the Juices, and the Apposition of new and foreign Particles; it will manifestly appear to require the utmost Skill in

the *Physician*, as well as the greatest Courage and Resolution in the *Patient*, to be successful, even where internal Ulcers are small and benign.

546. *Ulcers* are more or less dangerous according to the Nature of the Part they are situated in: Thus Ulcers in the *Lungs* are most dangerous of all, by reason their loose, spongy Texture, and their continual Motion renders all Solutions of their Continuity almost impossible to be healed. Ulcers in the *Kidneys* or *Bladder* are also extremely difficult to cure, because of the continual Flow of Urine through them, which incessantly irritates the Mouths of the ruptured Vessels, prevents the Apposition of nutritious, healing Particles, and renders the Lips of the Wounds hard and scirrhus. Ulcers in all other Parts of the Body are more or less dangerous, according as the Part is more or less vital, more or less nervous, and has a greater or lesser Flow of Humours to it.

547. But however, since the most delicate *Fibrillæ* of the Body, are well known to send forth a proper Cement, or a *Pituita*, or *Mucus* which serves to elongate their broken Ends, and to unite them when there is a Solution of Continuity; it behoves us to
assist

assist *Nature* in this great Undertaking, and to contribute as much as possible towards a Coalition of the broken Fibres.

548. From what has been said, and from the established Laws of the animal Oeconomy, it obviously appears that the *Cure* of all *internal Ulcers* consists in preventing too great an Afflux of Humours to the affected Part; in deterging and cleansing the Mouths of the broken Fibres; in keeping the Part, as much as possible, in a State of Rest; and in disposing all the Humours which arrive there, to be mild, smooth and balsamic.

549. *First* then, since Experience informs us that Ulcers cannot be healed whilst they ouze out a great deal of acrid, corrosive Matter, it seems most rational to begin the Cure with moderate *Revellents*; or by gently drawing away, by *Stool*, some of the morbid Matter. *Calomel*, in small Doses, is generally esteemed the best Medicine to prevent the Defluxion of Humours, and to carry off sharp, acrid, saline, corrosive Particles from the Blood; But then it ought to be exhibited in the very Beginning of Ulcers, or whilst the Patient has a tolerable share of Strength remaining; or otherwise, such forcible Me-

dicines may further decay the *Vis Vitæ*, and aggravate the Complaints.

550. *Issues* may be serviceable, by making a gentle Revulsion from the ulcerated Part, and by draining from the Blood, a Portion of the sharp, irritating Particles, which retard the healing of the Ulcers.

551. *Secondly*, The Medicines in common Practice, for deterging, and digesting of Ulcers, are *Balsam. è Meccâ*, *Bals. Peruv.* *Bals. Copivi*, *Bals. Tolut.* *Gum. Galban.* *Myrrh.* *Aloes*, *Oliban.* *Mastic.* *Tereb. Ven. è Chio*, &c. mixed with the Yolk of an Egg, or made up into Pills, and exhibited with a vulnerary Decoction of *Fol. Tussilag. Hæder. Terrest.* *Scabios.* *Capil. Ven.* *Flor. Bellid. maj.* *Hyperici*, *Rad. Altheæ*, *Glycyrrh.* *Consolid. maj.* &c.

552. *Thirdly*, In Ulcers of the Lungs, *Opiates* are sometimes useful, to abate the Cough, and to give so much Rest to the ulcerated Parts, as to allow time for the purulent Matter to be well digested, and for the nutritious Particles to fix themselves: But they generally leave such a Lowness and Depression behind them, when their Force is worn off, that it would be dangerous to repeat them often.

553. *Fourthly*, All violent Exercise, or strong Motions are to be avoided; and therefore some Amusement or Entertainment of the Mind should constantly be invented: For the Entertainment of the Mind, and keeping it agreeably diverted from reflecting on its Misfortunes or Miseries, is of great use; whereas Anxiety and Concern depress the Spirits, and weaken the Body.

554. *Fifthly*, To obtund the Acrimony of the Fluids, and to fill the Blood with soft, smooth, nutritious, balsamic Particles, *Vipers, Snails, Whites of Eggs, Juice of Turneps, Rad. Chin. Eryngo, &c.* are calculated; which not only nourish, but soften and take off the Sharpness and Acrimony of the Humours: They also contribute to re-unite the broken Fibres, and to heal up the Ulcers, by rendering the animal Juices sweet, smooth, and consolidating. They afford a kind of natural Balsam, fit to sustain and connect the new succeeding Fibres, without which no Ulcer can ever be healed.

555. *Lastly*, The Choice of Diet is of the greatest importance to such as have internal Ulcers; it being evident that the Aliment ought to be such as requires the least Force to convert into Blood and animal Substan-

ces: for such as have an imperfect Circulation through any Organ of the Body, ought to take the greatest Care not to charge their Vessels with gross, and much Matter. Let us add, that Nutrition being performed in the smallest vascular Solids, it requires the most subtile Matter, and is the most perfect animal Action.

556. *Milk* therefore is universally esteemed the best Restorative, it being Chyle already prepared, and most easily assimilated into Blood, and converted into Nourishment. All Milk is of a soft, cooling, nourishing Nature, putting the least Stress upon the several Organs of the Body to digest it, and affording as few excrementitious Particles as can be: but above all, *Women's Breast-Milk* is most to be depended upon, and has raised many People from the most deplorable Conditions. * The Milk drawn from the *Breasts of Women* is the sweetest; the nearest whereto, is *Asses Milk*, which indeed has a saccharine Sweetness, and comes almost up to the human. This is succeeded in Virtue and Goodness by that of *Mares*, which is better than that of *Goats*; yet even this

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* Vide Boerhaave's Chemistry,

exceeds that of *Sheep*, as theirs does that of *Cows*, which is the coarsest of all.

557. Hence *Milk* is most fit to repair the great Decays of consumptive People, and to recruit their exhausted Spirits; and ought always to be drank warm as it comes from the Body, before the spirituous *Gas* evaporates and flies off.

CHAP. X.

Of the Antecedents to a Slow FEVER.

558. **A**LL medical Writers hitherto, have treated of *slow* or *nervous*, and *malignant Fevers*, as one and the same Disease, notwithstanding many of the *antecedent Causes*, and the *diagnostic Phænomena* vary so essentially from each other, that different Opinions have arose in regard to the Appellation of the Disease; some chusing to call it *slow*, by reason of the *mild Heat*, *weak*, *low*, *slow Pulse*, *cold*, *clammy Sweats*, &c. Others are of opinion that it deserves the Title of *Nervous*, because of the *Languor*, or *Prostration of Spirits*, the *sudden Decay of Strength*,

Strength, tremulous Nerves, subsultory Tendons, &c. And there are others who are well assured it deserves the Name of *Malignant*, from the manifest Proofs we often meet with of *Putridity* or *Malignity* in the Humours. For my part, I have many reasons to convince me that there are *Fever*s which arise merely from a *Paucity of animal Spirits*; from some Obstruction to the Secretion in the Brain, or from too profuse a Discharge of this vital Fluid, after it is secreted; and that these Fevers sometimes run out great Lengths without exhibiting the least Signs of *Putridness* or *Corruption* in the Blood. Whereas others are seized, from the very beginning, with an *alkaline Corruption*, or *Malignity* in the Humours; which dissolves the red Globules, creates an intestine fermentative Motion in the animal Fluids, and renders them sharp, acrid and corrosive.

559. In the *former*, some Parts of the Blood run into unnatural Coalitions and Grumes, whilst others are broken down and dissolved for want of sufficient Motion and Heat to preserve their *Crafs*.

560. In the *latter*, the Blood and Humours are too thin and dilute, from the
Action

Action of volatile, acrid, alkaline Salts and Oils, which dissolve the Band of Union between the several Orders of Blood-Globules, and reduce them too small to subserve the Purposes of Life.

561. It is for want of this Distinction that we meet with such various and inconsistent Directions relating to the Cure of *slow*, and *malignant Fevers*: In one, *alexipharmic, volatile, attenuating Medicines* seem to be most proper; whilst in the other, *acid, absorbent, and moderately astringent Remedies* most certainly take place. So that consequently, where the *Theories* of these Fevers, and the *Methods of Cure* are promiscuously treated of, *young Students* must necessarily be confused, and not capable of determining which Remedies are most applicable, till by a patient and diligent Observance of the various *Phænomena*, they make themselves Masters of what was not to be learnt from Books.

562. For these Reasons therefore, I have thought it proper to make a distinction between *slow* and *malignant Fevers*, both in the *Theory* and *Practice*, and hope with E-molument. Those who are averse to this Division, and think it trifling and useless, may,

may, if they please, blend the following Chapters together, and reduce them back again to one Disease. Proceed we to the *Antecedents* of *slow Fevers*.

563. I. Whatever prevents a proper Recruit of animal Spirits, hinders or impedes their Secretion, absorbs or fetters them when secreted, or exhausts or evaporates them in too great quantities, will necessarily rebate the vital Vigour of the Body, the Velocity of the Circulation, and the Heat of the Blood: Hence *Living too low*, or upon *Food of too little Nourishment*, may be very pernicious.

564. *Hippocrates* * assures us, that the Consequents of a slender Diet are more fatal than one that is more plentiful. The latter may be remedied either by Exercise, or gentle Evacuations; but the Decay of Strength, the Laxity of the Vessels, and the Poverty of the Fluids, the natural Consequents of too spare, or too poor a Diet, are not so easily repaired.

565. It is easy to apprehend, that if the Aliment does not replenish the Blood and Juices with nutritious Particles in proportion to the Waste which is daily made by the
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* Vide Aphor. 5. Sect. 1.

several Excretions, the *Vis Vitæ* must necessarily decay, and the several Series of Vessels and Fibres will grow thinner and weaker; in consequence of which, the Velocity of the Circulation will be rebated, the Fluids will run into unnatural Clots and Grumes, the Secretions will be diminished, and Obstructions will be generated in some of the minuteſt *Tubuli*.

566. If the Laxity of the Vessels be very great, and the vital Heat sunk much below its healthful Standard, some Parts of the animal Fluids may thence be liquified, and the natural Consistence of their Parts dissolved. For since Heat, much above the natural Standard, or above a *hundred Degrees*, will tend to inspissate the animal Fluids; it is as certain, that too little Heat, or Heat below *eighty Degrees*, will incline the Blood and Lymph to be thinner than they ought to be. *Ninety two Degrees* of Heat in the Blood (as we have observed above,) is found to be the Standard which preserves the animal Juices in that Consistence, which best subserves the Purposes of Life.

567. Hence living too much upon *Vegetables*, especially *Cucumbers*, *Melons*, *Mushrooms*, *Lettuce*, and all those abounding with cold,

cold, viscid Juices, may be hurtful to some Constitutions, by thickening, and bringing a *Lentor* upon the animal Fluids, and thereby hindering *Perspiration*, &c.

568. II. *An immoderate Use of Venery* may so far debilitate the Nerves, unbend the Spring of the Solids, and depauperate the Blood, as to bring on a *slow Fever*.

569. III. This Disease is also apt to succeed the Courses which are generally gone through in *venereal Cases*; for *Mercury*, in large Doses, and long continued, is very prejudicial to the Nerves.

570. IV. Those of original weak Nerves, or those who have formerly been oppressed and sunk by Illnesses, are observed to be most liable to *slow Fevers*: For since their Fibres are lax, their Digestion weak, and their Circulation slow, it must consequently follow, that an Abuse of the *Non-Naturals*, or any accidental Alteration in them will sooner spoil their Blood and Humours, and render them viscid and ill-condition'd, than in those whose Organs are strong, and their Blood duely fluxil.

571. V. *Too copious a Discharge of the most subtile Parts of the animal Fluids* may

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occasion *slow Fevers*. Dr. Lobb * supposes that the *nervous Tubuli* which terminate either in the internal or external Superficies of the Body, are designed by Nature to throw off some recrementitious Matter from the nervous Juice, as well as to be the Organs of Sensation. If therefore this be true, as it is reasonable to believe, it will evidently appear, that when the Extremities of the Nerves are relaxed, or more than ordinarily dilated, they may let fly, not only the excrementitious, but the most useful and necessary Parts of the animal Spirits; and consequently such an Evacuation may be more detrimental to the Constitution, than an Excess in any other Excretion.

572. VI. To conclude this Chapter, it is sufficient to observe, that whatever will vitiate and impoverish the Blood, by rendering some Parts of it more gross and thick, and others more fluid than natural; or whatever will diminish the Secretion in the Brain, or by any other Means enervate the Fibres, and render them too flaccid and relaxed, may be the *Antecedent Cause* of this Disease.

C H A P.

* Vide Rational Methods of Curing Fevers.

C H A P. XI.

Of the Rise of the most usual Symptoms incident to a SLOW FEVER.

573. I. **A** *Rigor*, or cold *Shudderings*, which sometimes return many times in a Day at great Uncertainties. For as Obstructions happen to be generated in the capillary Vessels, by those Corpuscles of Blood and Lymph which are aggregated, through the Slowness of their Motion, in Grumes too large to pass freely through the *Arteriolæ*, they irritate the adjacent nervous *Fibrillæ* into frequent Vibrations; which being communicated from Part to Part, oftentimes become general, and are no more than so many Efforts of Nature to remove the *Impedimenta*, and to dislodge the Obstructions.

574. II. *Frequent Inclinations to Vomit*, from a deal of cold, viscid, phlegmy, pituitous Matter thrown into the Stomach, by reason of the great Laxity of the Ducts which open into its Cavity.

575. III. *A low, quick, unequal Pulse* most commonly attends this Disease: For as the *Crafs* of the Blood is vitiated, the Secretion in the Brain diminished, and the Fibres are too lax; consequently their Impulses will be weak, and the Expulsion of the Arteries outwards but faint: and as the Obstructions in the capillary Vessels happen to alter the Flow of the Blood and Spirits to the Heart, the Pulse will be quicker or slower, or more or less unequal, proportionate thereto.

576. IV. *The Heat is but mild*: For since the Fibres are greatly relaxed, and the transverse Sections of the several Series of Vessels widened; the Friction of the Blood-Globules, both against the sides of the Canals, and one another, will be less than usual, and consequently the Heat of the Body will be but moderate.

577. V. It sometimes happens that the *Extremities* are cold, whilst the Patient complains of an *inward Heat*; the Cause of which may be easily apprehended, if we consider that the Legs and Arms are at the greatest Distances from the Heart, and consequently the Motion of the Blood will be slowest there: and if the capillary Vessels

338 *Of the Symptoms incident*

towards the external Superficies of the Body happen to be obstructed, or to give more than usual Resistance to the Circulation, the Blood may be, by that means, so much accumulated in the inner *Viscera*, as to occasion great Uneasinesses, and Heat; though, at the same time, the Hands and Feet feel cold, like a dead Carcase.

578. VI. The protrusive Force of the Blood being but weak, and the secretory and excretory Ducts of the subcutaneous Glands being greatly relaxed and widened, *cold and clammy Sweats* are apt to break out in the Beginning of this Disease, which are only *symptomatical*, and very prejudicial: For since the morbid, most viscous Matter of the Blood is not as yet prepared for a *critical* Discharge; and as the Sweats consist of soft, smooth, oleaginous, nutritious Particles, they must necessarily enfeeble the Body, and retard the *Crisis*.

579. VII. The *Thirst* is seldom very troublesome; by reason the Heat is but moderate, and consequently a less quantity of *Saliva* will serve to moisten the *Fauces*, &c.

580. VIII. *Frequent Sighings*, with an Oppression on the *Præcordia*, are pretty constant *Concomitants* of this Disease; from the
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Power of the Muscles serving towards Respiration being rebated, and from the *Lentor* obstructing in the capillary Vessels, and resisting the protrusive Force of the Blood through the Lungs, &c. whereby its Motion becomes more difficult, and a heavy Load seems to press upon the Breast, which the Sick is oftentimes endeavouring to remove by deep Inspirations.

581. IX. The *Urine* is generally *limpid* and *clear*, in the *Beginning* of this Fever, by reason the Salts and Oils are not attenuated and ground fine enough to be discerned by the *Renal Tubuli*. Towards the *stationary Period*, it most times grows turbid, and lets fall a Sediment; but it is seldom or never intensely red or high-coloured.

582. X. In the *Height* of this Disease, when the animal Spirits are most deficient, a *Stupor*, *Subsultus's*, &c. sometimes seize the Patient, and continue for some days.

583. These are the Symptoms which I have observed to attend some *slow Fevers*, which have lasted 20 or 30 Days, and where I have met with no *Phænomena* to indicate, nor have had the least Reason to suspect a Corruption, or Putrefaction, or Malignity in the Humours; but only a viscid State of

some Parts of the Fluids, and too great a Thinness in others; as must necessarily happen when some Parts of so heterogeneous a Fluid as the Blood, are suffered to obey their own proper Laws of Attraction, and unite into Clots; whilst the most fluid Parts are squeezed out, for want of a proper Degree of Motion and Heat to preserve their *Crafsis*.

584. But whenever the Symptoms are more desperate than what I have here mentioned, and the vital Vigour of the Body seems to decay beyond what we could reasonably expect; there may then, perhaps, be too much ground for us to suspect an alkaline, putrid, corrupting Disposition in the Blood and Humours, which will not only occasion different and more direful *Phænomena*, but require a different Method of Cure, as we shall shew in the Sequel of these Papers.



C H A P. XII.

Of the Cure of a slow FEVER.

585. **F**ROM the Account we have given of the *Antecedents*, and *Symptoms* of this Disease, I think it pretty evident that the *Cure* consists in attenuating, diluting, and dissolving the *Moleculæ* obstructing the free Course of the Blood and Lymph through the capillary, sanguine, and lymphatic Arteries; to rouse the weak and languishing Fibres into quicker and smarter Vibrations, in order to recover the healthful *Crafsis* of the Blood; and to cast out of the Body the morbidic, worn-out, useless Particles of the animal Fluids, by the most pervious and patent Outlets.

586. As to Evacuations, *Vomits* are the only ones to be depended upon in the *Beginning* of *slow Fevers*: for as they throw off a deal of viscid, phlegmy, pituitous Matter from the Stomach, without draining from the Blood any thing that is useful; and as they agitate and shake the Vessels, and increase their Vigour, they must necessarily

contribute largely towards resolving the *Lentor*, and removing the *Nausea Ventriculi*.

587. *Blisters* are exceeding proper, and ought never to be neglected throughout the whole Course of this Disease. In the *Beginning*, they are useful in securing the *nervous System*, and preventing *Convulsions*, *Deliria*, &c. In the *Increase*, they greatly maintain, support, and preserve the Springiness and Elasticity of the Fibres, so that they do not sink under their Load before the *Lentor* is attenuated, and prepared fit for Excretion, or to pass freely through the vascular Frame. And in the *Height* of the Fever, they further comminute the febrile Matter, and support the Tone and Vigour of the Vessels; whereby they greatly contribute towards excreting the morbid Particles. Thus Blistering Plaisters are to be shifted from place to place, as they dry up, and as the *Phænomena* require.

588. *Sweats* are not to be encouraged in the *Beginning*, and *Increment* of this Disease; For since it is the Nature of the subject Matter to despume but slowly; that is, since the *Crisis* of a *slow Fever* requires many Days to bring it to Maturity, we must not be too hasty in forcing it by hot, acrid, volatile,

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pungent Medicines, lest Nature should be weakened and confounded, by overstraining the animal Springs, and elongating the Fibres, instead of shortening and contracting them.

589. *Purges* also are detrimental in the *Beginning* and *Increase* of *slow Fevers*: For daily Experience sufficiently informs us, that whenever there is a general Relaxation or Flaccidity of the Solids, a Poverty of the Fluids, and a Languor upon the Spirits, the gentlest purging Medicine creates great Uneasiness: and indeed if any Excretion be considerably enforced, some inconvenience or other will be sure to succeed it, at such times especially, where there is no morbid Matter fit for Expulsion, nor no critical Discharge to be made from the Blood.

590. But above all things be sure to refrain the Use of the *Lancet*, as you value the Life of your Patient, and your own Reputation: For since nothing so immediately rebates the Vigour of the Fibres; since no other Discharge from the Blood, lets out the red Globules thereof; and since these are most instrumental in maintaining the Heat and Strength of the Body; consequently

Bleeding is, of all Evacuations, the most pernicious in *slow Fevers*.

591. As *Purging* has been proved to be injurious in the *Beginning* and *Increment* of this Disease, we need not therefore be solicitous about *Stools*, unless the Patient happens to be more than ordinary costive; and then the most *lenient Clysters* that can be contrived may be sufficient.

592. The *Medicines* which I most heartily recommend in the *Beginning* of this Distemper, are the *Pulv. è Chel. Canc. comp.*, *Pulv. Purpureus*, *Lap. Contrayerv. Confect. Raleighan.* *Pulv. ad Guttetam*, &c. with a few Grains of *Saffron* and *Castor* in proportion to the Weakness of the Pulse, and the Languor upon the Spirits.

593. *Sack-Whey*, *Barley-Water*, with some *soft agreeable Wine*, or some *appropriated Julep*, may serve to wash down these Medicines, which ought always to be in liquid Forms, by reason of the Weakness of the Stomach, and alimentary Tubes. *Pills* and *Bolusses* have been known to pass through the Intestines, in extreme weak Cases, without being dissolved.

594. But in the *Increase*, or rather towards the *stationary Period* of this Disease,

it may be proper to have recourse to warmer or more active Remedies, in order to forward the vital Motions, to undulate and strengthen the Fibres, to attenuate, grind, and comminute the Fluids, and to prepare the peccant Matter fit for some critical Discharge. These are the *Rad. Serp. Virg. Rad. Contrayerv. Rad. Valerian. Sylv. Decoct. Sacrum in Pharmacop. Fulleri, Lap. è Goâ, Antimon. Diaphor. Bezoar miner. Castor. Crocus, Sal Vol. Succini, Sal. Vol. Corn. Cervi, Spec. Diambrae, Conf. Raleighana, Alchermes, Sal Vol. Ol. Spt. Corn. Cervi, Spt. Lavendul. Aq. Pæon. & Epidem. &c.* For whenever the nervous *Tubuli*, or animal Spirits seem torpid, and want to be excited, these sort of Medicines are of admirable Use; and should be continued whilst any Parts of the Blood remain too viscous for want of Motion, and as long as there is no alkaline Acrimony in the Humours, in hopes of forwarding and promoting a *Crisis*.

595. As to the *Crisis*, we are not to expect it to be by any large or profuse Discharges from the Blood; for since there is no real *Plethora*, it does not seem to require it: *A small breathing Sweat, a little Hypostasis in the Urine, a loose Stool or two, or even*

a slight Discharge from an *Apothemat*ion in the Ear, has been known to avert a whole Train of direful Symptoms. It is sufficient that the natural *Cra*sis of the Blood be restored, that the whole vascular Frame be rendered duely elastic and tense, and that all the Secretions and Excretions be performed in a usual and regular manner.

596. But if there be a peculiar *Idiosyncrasy* in the Patient, or if the morbid, febrile Matter be so tough, viscous, or obstinate, as not to give way to the Efforts of Nature, assisted by the above-mention'd Medicines, in some reasonable time, the Symptoms will necessarily increase, and grow worse, and then we have scarce any Chance left for the Recovery of our Patient, but by the Use of moderate *purging Medicines*: For since the natural Excretions by *Perspiration*, *Sweat*, *Urine*, &c. are diminished, or at least they are not sufficient to excrete the morbid Matter, this Evacuation seems to bid the fairest at this time of day. For though all the bad Symptoms proceed from weak and relaxed Nerves, yet if the febrile Matter be fitted for Excretion, and the *miliary* and *renal* Ducts deny it a Passage, however assisted by our Art, the retained Matter will inevitably

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tably

tably grow putrid, the vital Vigour will decay, and Death will most certainly ensue, unless the Body be timely relieved by some few *loose Stools*.

597. Experience assures us, that *gentle lenient Cathartics*, rightly order'd, where the morbid Matter is properly attenuated, diluted, and divided fit for Expulsion, are not only safe, but necessary; and the whole System of Nerves, instead of being weakned, will gain Strength thereby: So that when these Fevers have continued for a long time, and there has been no perfect *Crisis*, they will hardly admit of any other Cure than what is carried on by gentle Cathartics.

598. It sometimes happens that this Disease changes into a true and regular *Intermittent*, and gives way to the *Cortex*, even when there has been little or no Hopes left: But even in such a Case, before we venture to exhibit the *Cortex*, we ought to be very sure that the Intermiſſion is fair, and that we are not deceived by an *Exacerbation* of the Fever at one time of the Day, and a *Remission* only of it at another.

599. The Consequence of such a Mistake would prove fatal; and though the Patient, perhaps, would have died, had not the *Cortex* been

been given, yet, so censorious are the People, it is great odds but they report it to the prejudice of the Physician. For these Reasons therefore, I advise *young Practitioners* to watch the *Phænomena* most diligently, and to observe whether the *Paroxysm* returns at regular and stated times; whether it goes off by Sweat; whether the Pulse are steady and quiet during the Intermision; and whether the Urine grows turbid, or lets fall a laudable Settlement, as is usual in *Intermittents*: If most of these Appearances fail, it is, in my opinion, more adviseable to continue the Use of *moderate Alexipharmics*, 'till the Intermision is fair, or 'till the Fever is carried off, than to run any Risque in administering the *Cortex*.

C H A P. XIII.

Of the Antecedents to a malignant
F E V E R.

600. I. **I**T is a common Observation that *malignant* or *pestilential Fevers* seldom breed in *cold Weather*, but are generally

rally the Consequents of *excessive Heat*; and that because of a general Tendency towards Putrefaction in all animal and vegetable Substances at such a time.

601. Hence *Sanctorius* * very justly observes, that an obstructed Perspiration in *Summer*, disposes to *malignant Fevers*; whereas in *Winter* it makes but small Alteration: For Bodies are more subject to an Acrimony or Sharpness of the perspirable Matter in Summer, than in Winter Seasons. For when the Fibres are weak, as in Summer and sultry Weather, and the perspirable Matter, by any Cause whatsoever, happens to be obstructed, the Solids then must needs be much less able to circulate it, and break it small enough for Transpiration; and the Heat also of the external Air, will favour its sooner falling into fermentative and intestine Motions, and dispose it thereby to Corruption; from whence will arise such as are commonly called *malignant* and *putrid Fevers*. But in cold Weather, both the Constitution is better able by degrees to overcome and wear away such an additional Load, and the obstructed Matter will besides be not so apt to Putrefaction, but sometimes
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* Vide Aphor. xxxv. Sect. II.

continue a considerable while without any great Injury.

602. *Heat* is well known to excite more than ordinary Vibrations and Agitations in the dullest of Matter; so that in animal Bodies, whose Texture consists of the most active, heterogeneous, strongly attracting, elastic Particles, it is beyond our finite Capacities to conceive into what Commotion their constituent Particles are put, when agitated by Heat; or how suddenly their Texture, Bulk, and Figuration are commuted or changed by such intestine, fermentative Motions.

603. The Experiment which * *Boerhaave* made by putting a Dog into a Sugar-Baker's drying Stove, the Heat of which was so great as to raise the Mercury in *Fahrenheit's* Thermometer to an hundred and forty six Degrees, does well illustrate the ill Effects of very hot Air. After the Dog, says he, had been in seven Minutes, he panted much for Breath, though he did not sweat, and in a quarter of an Hour expressed great uneasiness; soon after which he grew faint, and died in twenty eight Minutes: He drivelled all the time a great quantity of red Foam, which
did

* Vide New Theory of Chemistry.

did stink so intolerably, that a strong labouring Man, who went near it, was almost struck down in an instant with this Stench.

604. From this Experiment the *Doctor* observes the dire Effects of this Degree of Heat, how soon it brought on a most acute Distemper, with very violent and mortal Symptoms; how suddenly the Humours were changed from a healthy to a nauseous, putrid State, more pestilential and deadly than the rottenest Carcase; how greatly the Humours must be altered in so short a time, to make the *Saliva* red. He also justly observes, that these were not the mere Effects of the Heat of the Stove; for if the Flesh of a dead Animal had been hung up there, it would have dried, and not have turned to pestilential Corruption, which must therefore arise from the Friction caused by the vital Motion of the Blood in the Lungs; where it being in this Case not at all refrigerated, did thereby acquire a greater Heat than that of the Stove; whence its sudden Tendency to Putrefaction, the Oils, Salts, and Spirits of the Dog being thoroughly putrefied in twenty eight Minutes. He also observes, that when a Man breathes an Air as hot as his natural Heat, he soon finds such a Difficulty of Breath-

Breathing, that he cannot long endure it, but earnestly pants after cooler Air, which invigorates, while hot Air weakens and dispirits; for neither Animals nor Plants can long bear a hot Air, without intervals of cool refreshing Air.

605. Hence it is plain to Demonstration, that *extreme hot Weather* may dispose to *putrid, malignant Fevers*, by rendering the animal Salts and Oils acrid, and alkaline, and by destroying the healthful *Crisis* of the Blood and Humours.

606. II. If the Air be *moist* as well as warm, it will render the animal Fibres more supple and lax, and sooner dispose the Humours to corrupt and putrefy: For as *moist Air* may help to dissolve the *Crisis* of the Blood, and to spoil its Consistence, by rendering it too thin and unactive, so it may weaken the Action of the Heart, Lungs, and Arteries, and thereby bring on putrid Fevers.

607. III. It sometimes happens, that the Air is contaminated with some certain *Effluvia* which destroy the healthy *Crisis* of the Blood, and render *malignant Fevers* *endemic*. But what these *Effluvia* are, whence they arise, from what Bodies they are produced,

duced, how they act upon the several Fluids of the Body, and excite such strange and dismal Symptoms, seems exceeding hard to determine, and can only be deduced from accurate and diligent Observations of their Effects on animal Bodies.

608. It is certain the venomous *Miasma* wherewith the Air is impregnated at such times, may pass immediately into the Blood through the *Vasa imbalantia* situated on the external Superficies of the Body, and the internal Superficies of the Lungs, as well as swallowed along with the Aliment; so that consequently the Blood and Humours may be affected in such Seasons, according to the Nature and Properties of the morbid *Effluvia*: And if we may be allowed to guess at their Manner of Action, from the Symptoms they produce, it is reasonable to suppose, that upon their Mixture with the Blood, a sort of an Effervescence arises, or by their strongly attracting and repulsive Power they create more than ordinary Agitations and Commotions in the animal Fluids; in consequence of which, Corpuscles are generated *de novo*, some of the Globules coalesce and form *Moleculæ* too bulky to pass freely through the minutest Vessels, whilst others are dissolved

and melted down, so as to be of no further service to the animal Oeconomy. Hence the Blood is rendered unfit for the Generation of fresh Spirits, the vital Vigour of the Body decays, and the compounding Globules both of Blood and Lymph, are assimilated from smooth, polite Spherules, into angulated and sharp-pointed Corpuscles. *The Languor, sudden Decay of Strength, Oppression on the Præcordia, colliquative Sweats, Petechial Spots, &c.* seem all to prove the Truth of this Supposition, as we shall shew more clearly in the subsequent Chapter.

609. *Air replete with the Steams of Animals*, especially such as are rotting, has many times produced pestilential Fevers in that place. * The Steams of great quantities of corrupted Vegetables have produced the same Effects in their Neighbourhood. The *Effluvia* of human live Bodies are extremely corruptible; the Water in which human Creatures bathe, by keeping smells cadaverous. And less than three thousand human Creatures living within the Compass of an Acre of Ground, would make an Atmosphere of their own Steams about 71 Feet high, in 34 Days; which, if not carried away
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* Vide *Arbutnot of Air*.

by Winds, would turn pestiferous in a moment: from whence we may infer, that living in great and populous Cities, or in Camps, or near a number of dead Carcases, may dispose to *putrid, malignant Fevers*.

610. It is certain the Causes of *malignant Fevers* cannot always be ascribed to the sensible Alterations of the Weather, or the manifest Qualities of *Heat, Cold, Moisture, or Dryness*, highly predominant in the Air; but they sometimes proceed from something more nice and latent than all this.

611. IV. *Putrefied or corrupted Food* may occasion this Disease, by mixing with the Blood some deleterious, morbid Particles, which will impress the same Qualities on the animal Fluids, that they are possessed of themselves. For since the constitutive Parts of all animal, and some vegetable Substances, are highly exalted and volatilized, and changed from a neutral State to one that is acrid and alkaline, whenever they are corrupted so as to stink; it evidently follows, that stale, stinking Meat, or stagnant, corrupted Water may vitiate and corrupt the animal Juices, by assimilating them into their own Nature, and by rendering them alkaline, corrosive and poisonous.

612. A *Corruption* or *Putrefaction* of the animal Fluids is no more than a Disjunction of their component Parts, whereby the proper Cohesion, or Cement between their Globules, or that Consistence which best subserves the Purposes of Life is destroyed; and whereby the Globules both of the red Blood and Lymph, divide into lesser and lesser, and continue subdividing 'till some of their Particles (chiefly the saline and oleaginous) become volatile, acrid, and pungent. And if the Dissolution be carried further than this, as in dead, corrupting Bodies; these volatile, pungent Particles become more minute, and fly off the Body in great quantities, and yield a strong and fetid Scent.

613. The White of an Egg (as we have observed above,) the most innocent thing in the World, when digested and putrefied, is well known to operate like a Poison, causing Vomiting, Looseness, &c. Whence I should think that the *polite* Way of hanging up *Venison*, *Rabbits*, &c. till they turn green, or stink, must oftentimes be unwholesome and prejudicial. Not long since I was called to a poor Man who had eaten heartily of *stale Mutton*, which he bought by reason of its Cheapness; I found him vomit-
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ing and purging to a strange degree, and in all respects he seemed as if he had been poisoned: *Vinegar* diluted with Water, contributed most towards the Cure.

614. V. If any of the Excretions are obstructed, and the obstructed Matter is neither removed by *Nature*, nor a *feverish Heat*, there is immediate Danger of a *malignant Fever*; according to *Sanctorius's Aphor. 46. Sect. 1.* For if the pent-up Matter be so much corrupted or degenerated from its natural *Crafsis*, that it cannot be excreted, or if the Vessels have so far lost their Vigour or Elasticity as to be unable to excite a feverish Heat; the obstructed Matter will, by being long detained in the Body, grow acrid, putrid, and corrosive, and will be disposed to produce intestine, fermentative Motions in the animal Juices, whereby some Parts will coalesce and form Corpuscles too bulky to circulate freely, whilst others will be reduced too low for a healthy State.

615. VI. *Preceding Illnesses* sometimes degenerate into *malignant Fevers*. *Bellini*, under the 27th *Proposition*, in his *Mechanical Account of Fevers*, tells us, That *malignant Fevers* are sometimes the Consequences of those that are not so; that a *simple intermit-*

ting *Tertian* easily changes into a double *Intermittent*, and this into a *Continuent*, and that into a *Malignant* Fever. Since therefore, says he, all these Changes are only from a lesser to a greater Tenacity and Adhesion of *Lentor*, a malignant Fever must necessarily be from the same Origin as the rest; and as those go on from lesser to greater, even to the utmost Aggravation of *Lentor*, the last must be the same as the first, and consist in the highest Degree of *Lentor*.

616. But as to the latter Part of this Assertion, I cannot acquiesce to it for the following Reasons. 1st, That in the Height of a *continual* Fever, when the *Phænomena* are most dreadful, when the Heat has been very intense for a long time, when the Humours seem to grow putrid, and the Fever is bordering upon a *malignant* State, the animal *Salts* and *Oils* are volatilized and exalted into an acrid, alkaline, corroding State; whence they contract a *dissolvent* Quality; they colligate and melt down the red Globules; the quantity of Lymph increases, and all the Humours contract an alkaline Acrimony. 2^{ly}, Though we allow that when *Intermittents* happen to be changed into *Continuents*, the *Lentor* is aggravated;
yet

yet when Continents degenerate into *malignant* Fevers, the most usual *diagnostic* Signs plainly discover the Texture of the Blood to be weakened, and consequently the Attraction between the constituent Globules of the *Lentor* to be less strong.

617. If it was allowable to let blood in *malignant* Fevers, the thing would evidently appear; but as it is not, we must depend upon the Symptoms for our Guide. I shall only add, that I have some few times seen some Blood which flowed from the Nose of Persons afflicted with this Disease, and which had not only more *Serum* than I ever found in *ardent* Fevers, but the *Crassamentum* was more tender, and a deal of red Powder was sunk to the Bottom of the Cup, which seemed as though the red Globules had been ground and torn to pieces, by some dissolvent Quality in the malignant Matter. However, as the Instances are but few, and the quantities of Blood were but small, I can't pretend to lay much stress upon these *Phænomena*, only as they are analogous to the Arguments we have deduced from the Symptoms of this Disease.

618. VII. I would observe here, that there is some reason to think that the *nervous*, as

well as the other *animal Fluids*, is sometimes affected by the *Antecedents*, not only by diminishing the Secretion in the Brain, but by altering the Quality of the Matter secreted. For though the nervous *Tubuli* are exceeding minute, and though very subtile Particles only can pass through them; yet it is easy to apprehend that some of the malignant, febrile Particles may be small enough to be discerned by the Glands of the Brain, and sent through the Nerves; since any Particles, whose Bulk is less than the Diameter of the Orifices of the Secreting *Tubuli*, may enter into them, though they are of different Figures and Sorts. * And indeed if different sorts of Particles did not sometimes happen in the nervous Fluid, it doth not seem possible, that so great a Variety of nervous Disorders should afflict human Bodies, as have occurred to the Observation of Physicians. If the nervous Fluid was purely simple, and consisted but of one sort of Particles, which admitted of no Variation, and only could differ from the healthful Standard by Excess or Deficiency in their Quantity, nervous Distempers might be fewer in Number, and more uniformly the

* Vide Lobb's Rational Methods of Curing Fevers.

the same in their Appearances. But if the *Crafs* of the Blood may be so far dissolved, and the animal *Salts* and *Oils* so comminuted, and divided, and the Mouths of the secreting *Tubuli* of the Brain so much widened and relaxed, as to admit of some foreign, heterogeneous Particles to pass along with the nervous Fluid; then it will follow, that as they render it either more sharp and acrid, or more viscous and less fluxil, they will produce a large Train of direful Symptoms, proportionate to the Qualities and Quantities of the morbidic Particles.

C H A P. XIV.

Of the Rise of the most usual Symptoms incident to a malignant
FEVER.

619. **M**OST Authors agree that the general and true *characteristic Phænomena* of this Disease are as follow, viz.

I. *Cold Shiverings* at the Beginning, and a *quick, low, unequal Pulse*; which arise from

362 *Of the Symptoms incident*

from the same Causes with those already taken notice of §. 575.

620. II. *Great Heat*, in the inward Parts, soon succeeds the *Rigor*, not only from the Blood being accumulated in the larger Arteries and *Viscera*, but also from the intestine, fermentative Motion, between the elastic, strongly attracting, morbidic Particles, and those of the Blood.

621. III. The *Thirst* is oftentimes exceeding troublesome, and much beyond the Measure of Heat; by reason of the Paucity of *Saliva*, and the Acrimony of the Juices which are secreted by the Glandules of the *Fauces*, *Oesophagus*, and *Stomach*, and which fret, and irritate the nervous Tunics, so as to cause a perpetual Uneasiness. The Extremities of the capillary Vessels which terminate on the Superficies of the Tongue sometimes mortify, by reason the proper Supply of Blood and Lymph is prevented by some Obstructions, and from a Tendency in the Fluids towards Putrefaction. But if the Patient recovers, these dry, black, mortified Fibres are sloughed off from the sounder Parts, in thick Skins, by the impulse of a fresh and sufficient Supply of Juices.

622. IV. *Colliquative, symptomatical Sweats* break forth in the *Beginning* and *Increase* of this Disease, which greatly debilitate the Nerves, and aggravate the Symptoms. They arise from the Dissolution of the Blood and Lymph, and the Relaxation of the miliary Glands, and their excretory Ducts.

623. V. The Vigour of the Stomach being abated, and its Glands relaxed, a deal of viscous, sharp, ill-conditioned Matter is commonly cast into it, at the Beginning of this Disease: Whence an *Inappetency, Nausea, Vomiting, and Heart-burning.*

624. VI. *Violent Head-Ach, Pains in the Back, and Loins, Oppression on the Breast, and frequent Sighings,* arise from Obstructions in the *Arteriolæ*, and the Distension of the Vessels from the intestine, fermentative Motion of the Fluids.

625. VII. *Pertinacious Watchings, Deliria, Coma, &c.* proceed from the same Cause in a greater degree.

626. VIII. *A Languor, Fainting, Horror and Despair* are almost constant *Concomitants* of this Fever; by reason the *Crisis* of the Blood is vitiated, and the Secretion of animal Spirits diminished: And, perhaps, not only so, but the Decay of the *Vis Vitæ*
is

364 *Of the Symptoms incident*

is sometimes so extremely sudden, that it seems as if the *malignant* Matter had enter'd the Nerves, and fixed and destroyed the Elasticity or Virtue of the nervous Juice already secreted.

627. IX. *Petechial Spots*, or *red Efflorescencies* in large *Areas* sometimes appear upon the Skin, and never rise above the Surface. * They seem to be constituted of broken Particles of red Blood ouzing from the capillary sanguine Arteries through the lymphatic Arteries, and cutaneous Glandules; which being not minute or subtle enough to perspire through the Pores of the *Epidermis*, nor large enough to produce Tumours, do remain between the *Epidermis*, and the *Cutis*, in the form of flat Spots. They do not seem to be critical Discharges from the Blood, because the Sick does not grow a whit the better upon their Appearance. The brighter red they are of, so much the better Sign; but when they appear of a purple, brown, dusky, or black Colour, they manifest a greater Degree of Putrefaction.

628. X. When the venomous *Miasma* have very much ruined the *Crafsis* of the Blood, and broken down the red Globules
into

* Vide *Lobb's Rational Methods of Curing Fevers*.

into their *Minima*, it is no uncommon thing for them to run out of their own proper Channels, and produce *Tumours*, *Buboes*, *Carbuncles*, *Hæmorrhagies*, &c.

629. XI. The *Urine* is sometimes limpid and pale like that of Hypochondriac and Hysterical Persons; and at other times it is intensely red and high-coloured. When it is most crude and clear, the Symptoms are generally aggravated, by reason the acrid, sharp, corrosive, saline and sulphureous Particles are left behind in the Blood, which are apt to inflame the *Meninges* of the Brain, and dispose the Patient to be delirious, &c.

630. XII. Towards the *Height* of this Disease it is common for an *Apthæ*, or an Inflammation of the Membranes which line the Mouth, Gullet, Stomach, and intestinal Tube, to arise; and is generally esteemed to be an Effort of Nature to throw off the morbid Matter through the excretory Ducts of the Glands which serve those parts.

631. XIII. In the *last State* of malignant Fevers, when the Secretion of animal Spirits is greatly diminished, when the Humours are most putrid, when the animal *Salts* and *Oils* are render'd extremely acrid and corrosive, when the red Globules are melted
down,

down, and the *Crafs* of the Blood is utterly spoiled, it is no uncommon thing for the Sick to be deficient in his *Sight, Hearing, Smelling, Taste*, through the Paucity of animal Spirits, and the languid, relaxed State of the Nerves; which are no longer able to receive and convey the *Ideas*, in a proper manner, to the common *Sensorium* in the Brain.

632. XIV. For the same Reasons a *Stupor, Syncope, tremulous Nerves, subsultory Tendons, Hiccoughs, involuntary Effusions of the Fæces and Urine, Coldness of the Extremities, Loss of their Motion, and Mortifications* may arise: For when the *Vis Vitæ* is at the lowest Ebb, there is nothing bad that does not happen at that time; and of all the Miseries that afflict human Life, there are none more deplorable than those, which, at some time or other, attend *malignant Fevers*.

C H A P. XV.

Of the Cure of a malignant FEVER.

633. **T**HE *Cure* of this most dreadful Disease is plainly deducible from what has been said in regard to the *Antecedents*, and the *Phænomena* that attend it; *viz.* To support the vital Power of the whole vascular Frame, to dissolve the grumous Parts of the Fluids, to correct and alter the animal Salts and Oils from their acrid, alkaline Property, back again into a neutral State, and to restore to the whole Volume of Blood and Lymph their natural and healthy *Crafsis*.

634. I. *Vomits* seem to be most proper in the *Beginning*, to discharge the acrid, corrosive Matter from the first Passages, and to attenuate the *Lentor*.

635. II. *Blistering Plaisters* may be serviceable in bracing up and constringing the Fibres; though, perhaps, in regard to the alkaline Acrimony of the Fluids, they may do mischief.

636. III. What has been said in relation to *Sweating, Purging, and Bleeding*, in the
Cure

Cure of slow Fevers, may be applied more earnestly here, they being sure to bring on fatal Consequences.

637. IV. If the Pulse are quick, if there be any preternatural Heat, with a scorched, dry Tongue, and Throat, *Diluents* and *Coolers* are most certainly indicated, notwithstanding some of the Symptoms may seem to require more generous Liquors. If we consider how long these Fevers sometimes last, if we reflect on the Nature of the *Lenitor*, and the Acrimony of the Humours, it may easily be apprehended how necessary *cooling, acescent, diluting Drinks* may be, and how prejudicial those which are hot, acrid, and spirituous.

638. V. All *farinacious* Things therefore are proper, as having an acescent Quality. *Rhenish-Wine* mixed with *Water*, *Barley-Water* with *Vinegar*, *Sack-Whey* with the Juice of *Lemons* or *Oranges*,; and even the *strongest Acids*, viz. *Ol. Vitriol. Ol. Sulphur. per Camp. Spt. Vitriol. &c.* dropt into some convenient Vehicle, produce good Effects, by strongly attracting, and fermenting with the alkaline, animal Salts, and reducing them back again to a neutral State.

639. VI. All Medicines which strengthen the Action of the Heart, Lungs, and Arteries, raise the Pulse, and promote the Secretion of animal Spirits, without colliquating and dissolving the Globules of Blood, and increasing the Alkaline Acrimony of the Juices, are of excellent Use. Such are, *Rad. Tormentil. Rad. Bistort. Bol. Armen. Terra Japon. Coral. rub. ppt. Margarit. Ocul. Canc. Chel. Canc. Bezoar Orient. Lap. è Goâ, &c.*

640. But all *volatile Salts* and *Spirits*, such as, *Sal Vol. Succini, Corn. Cervi, Armoniac. Viperarum, &c. Spt. Corn. Cervi, Sal Vol. Ol. Spt. Sal. Armon. &c.* are destructive Medicines, because they are known to break down and colliquate the Blood-Globules, and to render the animal Juices more acrid and alkaline; so that consequently where the Blood tends to an alkaline Corruption, where the Bile is too acrid and pungent, and where the Solids and Fluids are dissolved and melted down, such Medicines as these should be avoided as Poison.

641. VII. If *Petechial* Spots appear, and the Symptoms continue moderate, it is sufficient if what you give be able to keep out the Eruptions, and to preserve them of a good Colour.

642. VIII. Towards the *stationary Period* of this Disease, when every thing seems to take a fatal Turn, we frequently meet with *Apthæ*, * which may be conjectured coming on, from the great Dryness of all the Parts of the *Fauces*, but especially, those more backward, attended with some Difficulty in passing of his Liquors: When this proves white, and separates kindly, after few days, the Patient has still a good Chance for an Escape: But if black, shining, or glassy, spreading further over the Palate, too long durable; or if casting off, returning again, there is little to be expected as to Recovery.

643. This Thrush is not to be meddled with, but suffer'd, like Fruit duely ripened, to fall off it self; nor is any thing to be advised, unless a little of the warm *pectoral Decoction* to be thrown in at these Times; For *Nature*, who has found out the way of this particular *Crisis*, will, in her own time, best fit it for throwing off, which Art may possibly interrupt, by too hasty a Suppuration, from the Use of maturing *Gargarisins*, or fix them faster by *restringent* ones.

644. IX. If *Tumours*, *Carbuncles*, or *Buboes* arise, or if the *Crisis* happens to fall
upon

* Vide *Turner's Discourse concerning Fevers*.

upon any Part, where external Applications can be serviceable, it ought to be immediately encouraged, by *softning, relaxing, emollient Cataplasms*.

645. X. But if no *Crisis* can be procured either by Art, or the Strength of Nature; if the Pulse flag, the *Tremor*, and *Subsultus Tendinum* increase, the Tongue falters, the Urine and Fæces come away involuntarily, the Features sink, the Patient keeps picking up the Bed-Clothes, and the extreme Parts are cold; we are to make a fatal *Prognostic*, and endeavour to support him with the *highest Cordials*, as long as Life remains: for we don't want Instances of those who have recovered, even after all these Symptoms have been upon them.

F I N I S.



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